MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

Department Of Computer Science and Engineering

STUDENT HAND BOOK
FOR
II B.Tech I Sem

INSTITUTION VISION AND MISSION

Vision:

To be as an ideal academic institution by graduating talented engineers to be ethically strong, competent with quality research and technologies.

Mission:

- Utilize rigorous educational experiences to produce talented engineers
- Create an atmosphere that facilitates the success of students
- Programs that integrate global awareness, communication skills and Leadership qualities
- Education and Research partnership with institutions and industries to prepare the students for interdisciplinary research

DEPARTMENT VISION AND MISSION

Vision:

To empower the students to be technologically adept, innovative, self-motivated and responsible global citizen possessing human values and contribute significantly towards high quality technical education with ever changing world.

Mission:

- To offer high-quality education in the computing fields by providing an environment where the knowledge is gained and applied to participate in research, for both students and faculty.
- To develop the problem-solving skills in the students to be ready to deal with cutting edge technologies of the industry.
- To make the students and faculty excel in their professional fields by inculcating the communication skills, leadership skills, team building skills with the organization of various co-curricular and extra-curricular programmes.
- To provide the students with theoretical and applied knowledge, and adopt an education approach that promotes lifelong learning and ethical growth.

PROGRAM OUTCOMES

PO Name	Graduate Attributes	PO Statements
PO1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2	Problem analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/ development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO 5	Modern tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES

Sl. No.	PEOs Name	Program Education Objective Statements
1	PEO - 1	To induce strong foundation in mathematical and core concepts, which enable them to participate in research, in the field of computer science.
2	PEO – 2	To be able to become the part of application development and problem solving by learning the computer programming methods, of the industry and related domains.
3	PEO – 3	To gain the multidisciplinary knowledge by understanding the scope of association of computer science engineering discipline with other engineering disciplines
4	PEO – 4	To improve the communication skills, soft skills, organizing skills which build the professional qualities, there by understanding the social responsibilities and ethical attitude.

PROGRAM SPECIFIC OUTCOMES

Program Specific Outcomes	
PSO1	Applications of Computing: Ability to use knowledge in various domains to provide solution to new ideas and innovations.
PSO2	Programming Skills: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.
PSO3	Make use of computational and experimental tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	**DATABASE MANAGEMENT SYSTEMS**			
Course Code	2030503			
Regulation	**R20 - JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	0	-	3
Course Faculty	Y Appa Rao Assoc.Prof			

COURSE OVERVIEW:

This course introduces the core principles and techniques required in the design and implementation of database systems. This introductory application-oriented course covers the relational database systems RDBMS - the predominant system for business, scientific and engineering applications at present. It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an introduction to SQL. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	3	4	Basic concepts of files, data structures and design of database systems

MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
Mid Semester Test There shall be two midterm examinations. Each midterm examination consists of subjective type and objective type tests. The subjective test is for 25 marks of 90 minutes duration. Subjective test of shall contain 10 questions, the student has to answer 10 questions, each carrying 1 mark. The long type test is for 15 marks. It consists the student has to answer all the questions and each carry two half mark. First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.	70	100

Sessional Marks	University End Exam marks	Total marks
Assignment Five marks are earmarked for assignments. There shall be two assignments in every theory course. Marks shall be awarded considering the average of two assignments in each course.		

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	90 minutes	25
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	25
4.	II Assignment	-	5
5.	External Examination	3 hours	70

V. COURSE OBJECTIVES:

I. **Discuss** the basic database concepts, applications, data models, schemas and instances.
II. **Design** Entity Relationship model for a database.
III. **Demonstrate** the use of constraints and relational algebra operations.
IV. **Describe** the basics of SQL and construct queries using SQL.
V. **Understand** the importance of normalization in databases.
VI. **Demonstrate** the basic concepts of transaction processing and concurrency control.
VII. **Understand** the concepts of database storage structures and identify the access techniques.

VI. COURSE OUTCOMES:

CO	Course outcome	Blooms taxonomy level
C211.1	Gain knowledge of fundamentals of DBMS database design and normal forms.	Analyze
C211.2	Master the basics of SQL for retrieval and management of data.	Understand
C211.3	Acquaint the basics of transaction processing and concurrency control.	Remember
C211.4	Understand the basic concepts and the applications of database systems.	Create
C211.5	Expertise in the basics of SQL and construct queries using SQL.	Apply

VII HOW PROGRAM OUTCOMES ARE ASSESSED

Program Outcomes		Level	Proficiency assessed by
PO1	An ability to apply Knowledge of Science Mathematics Engineering &Computing fundamentals for the solutions of ComplexEngineering Problems	H	
PO2	An ability to identify, formulates, research literature and analyze complex engineering problems using firstprinciples of mathematics and engineering sciences.	H	
PO3	An ability to design solutions to complex process or program to meet desired needs	H	substantiated
PO4	Ability to use research-based knowledge and research methods including design of experiments to provide valid conclusions	S	----------
PO5	An ability to use appropriate techniques, skills and tools necessary for computing practice Ability to apply reasoning informed by the contextual knowledge to assess social issues, consequences & responsibilities relevant to the professional engineering practice	H	----------
PO6	Ability to understand the impact of engineering solutions in a global, economic, environmental, and societal context with sustainability	N	----------
PO7	An understanding of professional, ethical, Social issues and responsibilities	N	----------
PO8	An ability to function as an individual, and as a member or leader in diverse teams and in multidisciplinary settings	N	
PO9	An ability to communicate effectively on complex engineering activities within the engineering community.	H	----------
PO10	Ability to demonstrate and understanding of the engineering and management principles as a member	N	----------
PO11	Ability to engage in independent and lifelong learning in the context of technological change.	S	
PO12	Ability to engage in independent and lifelong learning in the context of technological change.	S	Projects

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Applications of Computing: Ability to use knowledge in various domains to provide solution to new ideas and innovations.	1	Lectures, Assignments
PSO2	Programming Skills: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.	2	Projects
PSO3	Make use of computational and experimental tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.	3	

IX. SYLLABUS

UNIT – I

Introduction -Data base System Applications, Purpose of data base Systems, View of Data – Data Abstraction – Instances and Schemas – data Models, Database Languages – DDL – DML – database Access for applications Programs, Transaction Management, Data Storage and Querying, Database architecture, Database users and administrators, History of database systems, Introduction to database design, ER Diagrams, Beyond ER design, Entities, Attributes and entity sets, Relationships and relationship sets, Additional features of ER model, Conceptual design with ER model, Conceptual design for large enterprises, Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

UNIT – II

Relational Algebra and Calculus: Relational Algebra – Selection and projection ,set operations – renaming – Joins – Division – Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity‟s – AND, OR and NOT– Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT – III

Introduction to Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition –Functional dependencies, reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF ,Properties of decompositions, Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form, Join dependencies, Fifth Normal Form, Inclusion Dependencies.

UNIT – IV

Transaction Management: Transaction Concept-Transaction State- Implementation of atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability. Concurrency Control: Lock-Based Protocols –time Stamp Based Protocols- Validation Based Protocols-Multiple Granularity. Recovery System-Failure Classification-storage Structure-recovery and Atomicity-Log Based Recovery-Recovery with Concurrent Transactions-Buffer Management-Failure with loss of Non Volatile Storage-Advance Recovery Systems-Remote Backup Systems.

UNIT – V

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster

Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations . Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure-Search, Insert, and Delete-Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing –Extendable vs. Linear hashing.

Text books:

1. Raghurama Krishnan, Johannes Gehrke (2003), Database Management Systems, 3rd edition, Tata McGraw Hill, India.
2. Database System Concepts, A.Silberschatz, H.F.Korth, S.Sudharshan, Mc Grab hill, 5th Edition, 2006

References:

1. Database systems, 6th edition, Ramez Elmasri, Shamkant, B.Navathe, Pearson Education, 2013
2. Database system concepts, Peter rob and carles coronel, cengage learning 2008
3. Introduction to database management ML Gillenson & others, Willey student edition.

X. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes.

Lecture No.	Course Learning Outcomes	Topics to be covered	Reference
1-4	**Understand** the basic concepts of databases and different type s of data models, languages	Introduction, Data base System Applications, Purpose of data base Systems.	T2: 1.1, 1.2
		View of Data – Data Abstraction, Instances and Schemas	T2: 1.3
		Data Models	T2: 1.4
		Database Languages – DDL – DML – Database Access for applications Programs	T2: 1.5
5-8	**Describe** overall architecture of DBMS	Transaction Management, Data Storage and Querying	T2: 1.7, 1.8.1
		Database architecture	T2: 1.8
		Database users and administrators, History of database systems	T2:1.6, 1.10
		Introduction to database design, ER Diagrams Beyond ER design	T1: 2.1
9-12	**Identify** the entities and relationships and demonstrate the features of ER model	Entities,Attributesandentitysets, Relationships and relationship sets	T1: 2.2, 2.3
		Additional features of ER model	T1: 2.4
		Conceptual design with ER model, Conceptual design for	T1: 2.5, 2.6
13-16	**Apply** integrity constraints	Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations	T1: 3.1, 3.2
		Enforcing Integrity constraints – Querying relational data – Logical data base Design	T1:3.3 - 3.5
		Introduction to Views – Destroying /altering Tables and Views	T1:3.6, 3.7
17-19	**Analyze and solve** database problems using relational algebra, relational calculus	Relational Algebra and Calculus: Relational Algebra – Selection and projection –	T1: 4.1, 4.2.1
		set operations – renaming, Joins – Division	T1: 4.2.2 - 4.2.5
20-28	**Analyze and solve** database problems using SQL	Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.	T1:4.3, 4.4
		Form of Basic SQL Query – Examples of Basic SQL Queries	T1: 5.2
		Introduction to Nested Queries – Correlated Nested Queries Set	T1: 5.4
		Comparison Operators– Aggregative Operators	T1: 5.4.3, 5.5

		NULL values – Comparison using Null values , Logical connectivity‟s – AND, OR and NOT	T1: 5.6
		Disallowing NULL values – Complex Integrity Constraints in SQL ,Triggers and Active Data bases	T1: 5.7, 5.8
29-30	**Discuss** basic concepts of schema refinement	Introduction to Schema refinement – Problems Caused by redundancy	T1: 19.1
		Decompositions – Problem related to decomposition	T1:19.1.3
31-38	**Define and Apply** the normal forms	Functional dependencies, reasoning about FDS – FIRST, SECOND Normal forms	T1: 19.4
		THIRD Normal forms – BCNF ,Properties of decompositions,	T1:19.4, 19.5
		Lossless join Decomposition – Dependency preserving Decomposition	T1: 19.5
		Schema refinement in Data base Design – Multi valued Dependencies	T1: 19.7, 19.8.1
		Forth Normal Form,Join dependencies,Fifth Normal Form,Inclusion Dependencies	T1: 19.8.2 -19.8.5
39-44	**Understand** the basic concepts of transaction and ACID properties	Transaction Management: Transaction Concept-Transaction State-	T2: 15.1, 15.2
		Implementation of atomicity and Durability,	T2: 15.3
	Solve problems of Concurrent Execution and Implement ACID properties	Concurrent Executions, Serializability , Recoverability,	T2: 15.4 - 15.6
		Implementation of Isolation, Testing for Serializability.	T2: 15.7, 15.9
45-47	**Describe** the Concurrency control protocols	Concurrency Control: Lock-Based Protocols – time Stamp Based Protocols-	T2: 16.1, 16.2
		Validation Based Protocols-Multiple Granularity.	T2: 16.3, 16.4
48-53	**Understand** storage structure, recovery process	Recovery System-Failure Classification-storage Structure	T2: 17.1, 17.2
		recovery and Atomicity-Log Based Recovery-	T2: 17.3, 17.4
		Recovery with Concurrent Transactions-	T2: 17.6
		Buffer Management-Failure with loss of Non Volatile Storage	T2: 17.7, 17.8
		Advance Recovery Systems-Remote Backup Systems	T2: 17.9, 17.10
54-56	**Understand** the basic concepts of file organization	Overview of Storage and Indexing: Data on External Storage	T1: 8.1
		File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes	T1: 8.2
57-59	**Differentiate** Index data structures and File Organizations	Index data Structures – Hash Based Indexing	T1: 8.3.1
		Tree base Indexing – Comparison of File Organizations	T1: 8.3.2, 8.4
60-61	**Apply** Indexes ,ISAM on trees	Tree Structured Indexing: Intuitions for tree Indexes	T1: 10.1
		Indexed Sequential Access Methods (ISAM)	T1: 10.2
62-63	**Discuss** Dynamic Index Structures and apply different operations	B+ Trees: A Dynamic Index Structure-Search, insert, Delete	T1: 10.3 - 10.6
64-65	**Differentiate** Static and Dynamic hashing techniques	Hash Based Indexing: Static Hashing – Extendable hashing	T1: 11.1, 11.2
		Linear Hashing –Extendable vs. Liner hashing	T1: 11.3, 11.4

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES

Program outcomes	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
C211.1	3	1	0	2	0	0	0	0	0	0	0	0	2	0	0
C211.2	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0
C211.3	3	2	2	2	0	0	0	0	0	0	0	0	3	0	3
C211.4	3	2	2	2	3	0	0	0	0	0	0	0	3	0	3
C211.5	3	2	2	2	0	0	0	0	0	3	0	0	3	0	3
Average	**3**	**1.75**	2	2	3					3			2.6		3

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ASSIGNMENT QUESTIONS

Course Name : **DATABASE MANAGEMENT SYSTEMS**
Course Code : 2030503
Class : II B. Tech II Semester
Branch : Computer Science and Engineering
Year : 2022-2023
Course Faculty : Y Appa Rao Assoc.Prof

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner"s learning process.

S. No.	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	**Define** (i) Database (ii) DBMS (iii) database Applications?	Knowledge	2
2	**Discuss** about Data Definition language, commands with example?	Understand	1
3	**Discuss** about Data Manipulation language, commands with example?	Understand	2
4	**List** various types of attributes?	Knowledge	3
5	**Discuss** how can you change the data in the table?	Understand	4
6	**Explain** data model and list the types of data model used?	Understand	2
7	**Define** instance, schema and data abstraction and give the levels of data abstraction?	Understand	2
8	**Discuss** about the Concept Design with the ER Model?	Understand	4
9	**Define** the terms i) Entity ii) Entity set iii) weak entity set iv) strong entity set?	Knowledge	3
10	**Explain** different types of database users and write the functions of DBA?	Understand	2
	UNIT – II		

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	**Illustrate** different set operations in Relational algebra with an example?	Apply	1
2	**Discuss** about Domain Relational calculus in detail?	Understand	2
3	**Define** trigger and explain its three parts? Differentiate row level and statement level triggers?	Knowledge	3
4	**Illustrate** Group by and Having clauses with examples?	Apply	4
5	**List** the table modification commands in SQL?	Knowledge	2
6	**Discuss** about the operators SELECT, PROJECT, UNION?	Knowledge	2
7	**Discuss** about the operators renaming, joins, division?	Knowledge	2
8	**Demonstrate** how to add a NOT NULL column to a table with example?	Apply	3
9	**Define** a nested query? Write a nested query to find the names of sailors who have reserved both a red and green boat?	Knowledge	3
10	**Discuss** correlated nested queries? Write a query to find the names of sailors who have reserved a red boat?	Understand	3
	UNIT – III		
1	**Define** decomposition and how does it address redundancy? Discuss the problem s that may be caused by the use of decompositions?	Knowledge	3
2	**Define** functional dependencies.How are primary keys related to FD‟s?	Knowledge	3
3	**Define** normalization? Explain 1NF, 2NF, 3NF Normal forms?	Knowledge	4
4	**Compare and contrast** BCNF with 3NF?	Apply	4
5	**Describe** properties of decompositions?	Understand	4
6	**Illustrate** Multivalued dependencies and Fourth normal form with example?	Apply	4
7	**Discuss** about Join dependencies and Fifth normal form?	Understand	4
8	**Illustrate** Inclusion dependencies with example?	Apply	4
9	**Illustrate** fully functional dependency with example?	Apply	4
10	**Demonstrate** transitive dependency? Give an example?	Apply	4
	UNIT – IV		
1	**Explain** ACID properties and Illustrate them through examples?	Understand	2
2	**Illustrate** Concurrent execution of transaction with examples?	Apply	2
3	**Discuss** two phase locking protocol and strict two phase locking protocols?	Understand	2
4	**Describe** Timestamp based locking protocols?	Understand	2
5	**Describe** Validation-based locking protocols?	Understand	2
6	**Explain** Buffer Management?	Understand	2

7	**Explain** different types of Advanced Recovery Techniques?	Understand	2
8	**Write** in detail about Remote Backup systems?	Apply	2
9	**Discuss** the failures that can occur with loss of Non-volatile storage?	Understand	1
10	**Define** a Transaction? List the properties of transaction	Knowledge	2
	UNIT – V		
1	**Write** in detail about Hash based Indexing and Tree based Indexing?	Apply	1
2	**Compare** I/O costs for all File Organizations?	Understand	1
3	**Explain** in detail about ISAM?	Understand	1
4	**Explain** B+ trees? Discuss about this Dynamic Index Structure?	Understand	1
5	**Demonstrate** searching a given element in B+ trees? Explain with example?	Understand	1
6	**Illustrate** insertion and deletion of an element in B+ trees with example?	Apply	1
7	**Write** in detail about Static Hashing?	Apply	1
8	**Explain** in detail about Extendible Hashing?	Understand	1
9	**Explain** in detail about Linear Hashing?	Understand	1
10	**Compare and Contrast** Extendible Hashing with Linear Hashing?	Apply	1

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TUTORIAL QUESTION BANK

Course Name	:	**DATABASE MANAGEMENT SYSTEMS**
Course Code	:	2030503
Class	:	II B. Tech I Semester
Branch	:	Computer Science and Engineering
Year	:	2022-2023
Course Faculty	:	Y Appa Rao Assoc.Prof

OBJECTIVES

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PART – A (Short Answer Questions)

Q. No	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1.	**List** the advantages of DBMS?	Knowledge	1
2.	**List** the database applications?	Knowledge	2
3.	**Define** instances and schemas of database?	Knowledge	2
4.	**Discuss** data independence?	Understand	2
5.	**Define** (i) database (ii) DBMS	Knowledge	2
6.	**Explain** about database storage structure?	Understand	2
7.	**Discuss** transaction management?	Understand	2
8.	**Explain** the query processor?	Understand	2
9.	**Define** (i) entity (ii) attribute iii) entity set	Knowledge	3
10.	**Define** relationship and relationship set?	Knowledge	3
11.	**Discuss** about data definition language and commands?	Understand	2
12.	**Discuss** about data manipulation language and commands?	Understand	2
13.	**Explain** about querying relational data?	Understand	2
14.	**Discuss** how can you change the data in the table?	Understand	2
15.	**Define** a database administrator and specify any two responsibilities of DBA?	Knowledge	3
16.	**Discuss** how can you alter and destroy tables?	Understand	2
17.	**Explain** data model and list the types of data model used?	Understand	2
18.	**Give** the levels of data abstraction?	Understand	2
19.	**Define** weak and strong entity sets?	Knowledge	3
20.	**Explain** about stored and derived attributes?	Understand	3
	UNIT – II		
1	**Define** relational database query?	Knowledge	1
2	**State** about SELECT operation in relational algebra?	Knowledge	1
3	**State** about PROJECT operation in relational algebra?	Knowledge	1
4	**Define** aggregate functions and list the aggregate functions supported by SQL?	Knowledge	1
5	**Discuss** the use of rename operation?	Understand	1

6	**Illustrate** division operation?	Apply	2
7	**Discuss** the basic form of SQL query?	Understand	2
8	**Define** null value and explain how to restrict insertion of null values into the table.	Knowledge	1
9	**Define** tuple variable with its syntax?	Knowledge	3
10	**Define** primary key and foreign constraints with examples?	Knowledge	1

11	**Define** string functions in SQL?	Knowledge	3
12	**Explain** about trigger and its operations?	Understand	1
13	**Demonstrate** how to add a NOT NULL column to a table?	Apply	1
14	**Explain** about unique, not null and default constraint?	Knowledge	1
15	**List** the table modification commands in SQL?	Knowledge	2
16	**What** is domain integrity? Give example.	Understand	3
17	**List** the set operations of SQL?	Knowledge	1
18	**Wha**t is the use of group by clause?	Understand	1
19	**Discuss** about the operators SELECT, PROJECT, UNION?	Knowledge	1
20	**Discuss** about the operators renaming, joins, division?	Knowledge	1
	UNIT – III		
1	**Define** redundancy?	Knowledge	1
2	**List** out the Problems related to decompositions?	Knowledge	2
3	**Define** functional dependency? Why are some functional dependencies trivial?	Knowledge	2
4	**Discuss** normalization?	Understand	2
5	**Illustrate** functional dependency with example?	Apply	2
6	**Illustrate** fully functional dependency with example?	Apply	3
7	**Define** First Normal Form?	Knowledge	3
8	**Define** Second Normal Form?	Knowledge	3
9	**Define** Third Normal Form?	Knowledge	3
10	**Define** Fourth Normal Form?	Knowledge	4
11	**Demonstrate** transitive dependency? Give an example?	Apply	4
12	**Discuss** Domain-Key Normal Form?	Understand	4
13	**Explain** about Loss less-join dependency?	Understand	4
14	**Explain** about BCNF?	Understand	4
15	**Explain** about multi-valued dependencies?	Understand	4
16	**Define** join dependency and fifth normal form?	Knowledge	4
17	**Define** Armstrong axioms for FD‟s?	Knowledge	4
18	**Explain** the concept scheme refinement in database design?	Understand	4
19	**Define** dependency preserving decomposition?	Knowledge	4
20	**Explain** about inclusion dependency?	Understand	1
	UNIT – IV		
1	**Define** a transaction? List the properties of transaction	Knowledge	1
2	**Discuss** different phases of transaction?	Understand	1
3	**Discuss** recoverable schedules?	Understand	1
4	**Discuss** cascade less schedules?	Understand	1
5	**Define** two phase commit protocol?	Knowledge	1
6	**Demonstrate** the implementation of isolation?	Apply	1
7	**Discuss** the procedure to test serializability?	Understand	1
8	**Explain** about different types of locks?	Understand	2
9	**Discuss** about failure classification?	Understand	2
10	**Define** a checkpoint?	Knowledge	2
11	**Discuss** the failures that can occur with loss of non-volatile storage?	Understand	2
12	**Demonstrate** conflict serializability?	Apply	2
13	**Discuss v**iew serializability?	Understand	3
14	**Explain** about transition states?	Understand	3
15	**Explain** about acid properties?	Understand	3
16	**Explain** about locking protocols?	Understand	3
17	**Define** timestamp-based protocol?	Understand	3

18	**Explain** about multiple granularity?	Understand	2
19	**Explain** about storage structure?	Understand	2
20	**Explain** about remote backup systems?	Understand	2
	UNIT – V		
1	**Discuss** about data on external storage?	Understand	2
2	**Explain** clustered indexes?	Understand	1
3	**Discuss** the primary and secondary indexes?	Understand	1
4	**Define** Tree Indexing?	Knowledge	1
5	**Explain** hash-based indexing?	Understand	1
6	**Discuss** the intuition for tree indexes?	Understand	1
7	**Define** indexed sequential access method?	Knowledge	1
8	**Discuss** about overflow pages and locking considerations of ISAM?	Understand	1
9	**Discuss** the cost model of heap files?	Understand	1
10	**Discuss** the cost model of sorted files?	Understand	1
11	**Discuss** the cost model of clustered files?	Understand	1
12	**Explain** about several ordered indexing?	Understand	1
13	**Explain** about B+ tree index file?	Understand	1
14	**Explain** about static hashing?	Understand	1
15	**Explain** about organization of records in files?	Understand	1
16	**Discuss** the impact of workload on indexes?	Knowledge	1
17	**Explain** about RAID	Understand	2
18	**Define** extendable hashing?	Knowledge	1
19	**Define** linear hashing?	Knowledge	1
20	**Differentiate** extendable vs linear hashing?	Knowledge	1

PART – B (Long Answer Questions)

Q. No	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	**Compare** and contrast file systems with database systems?	Apply	1
2	**Define** data abstraction and discuss levels of abstraction?	Knowledge	2
3	**Discuss** about different types of data models?	Understand	2
4	**Describe** the structure of DBMS?	Understand	2
5	**Discuss** additional features of the ER-Models.	Understand	3
6	**Discuss** about the concept design with the ER Model?	Understand	4
7	**Write** about views and updates on views?	Knowledge	1
8	**Explain** different types of database users and write the functions of DBA?	Understand	2
9	**Explain** about different types of integrity constraints?	Understand	3
10	**Discuss** about the logical database design?	Understand	4
11	**Distinguish** strong entity set with weak entity set? Draw an ER diagram to illustrate weak entity set?	Apply	3
12	**Differentiate** relation schema and relational instance? Define the terms arity and degree of s relation? What are domain constraints?	Understand	2
13	**Explain** about types of database languages with syntax and example?	Apply	1
14	**Differentiate** DBMS and RDBMS?	Understand	1
15	**Explain** briefly about database users?	Understand	1
16	**Explain** briefly about database administrator and responsibilities of DBA?	Understand	1
17	**Explain** about TCL and DCL commands with examples?	Apply	3
18	**List** the data definition language commands with examples?	Apply	3
19	**Explain** about transaction management?	Understand	1
20	**Explain** about class hierarchy and aggregation in dbms?	Understand	1
	UNIT – II		
1	**Illustrate** different set operations in relational algebra with an example?	Apply	2
2	**Define** Join? Explain different types of joins?	Knowledge	1
3	**Discuss** about selection and projection in relational algebra in detail?	Understand	3
4	**Define** trigger and explain its three parts? Differentiate row level and statement level triggers?	Knowledge	1

5	**Illustrate** group by and having clauses with examples?	Apply	1
6	**Discuss** about complex integrity constraints in SQL?	Understand	2
7	**Discuss** different types of aggregate operators with examples in SQL?	Understand	1
8	**Define** a nested query? a. **Write** a nested query to find the names of sailors who have reserved both a red and green boat? b. **Write** a nested query to find the names of sailors who have reserved all boats?	Knowledge	1
9	**Discuss** correlated nested queries? a. **Write** a query to find the names of sailors who have reserved a red boat? b. **Write** a query to find the names of sailors who have not reserved a red boat?	Understand	1
10	**Explain** about union and intersect operator a. **Write** a query to find the names of sailors who have reserved boat 103 and color is green? b. **Write** a query to find the names of sailors who have reserved a red or a green boat?	Understand	1
11	**Discuss** about active databases and write an example for trigger?	Knowledge	1
12	**Illustrate** outer joins and its types with examples?	Knowledge	1
13	**Describe** logical connectives of SQL with examples?	Knowledge	1
14	**Explain** briefly about joins and its types with examples?	Knowledge	1
15	**a) Explain** about relational algebra and its operations? **b) Write** a relational algebra query to find the names of sailors who reserved a red boat?	Knowledge	1
16	**State** the difference between primary key constraint and foreign key constraint?	Understand	1
17	**Explain** briefly about key constraints with examples?	Knowledge	1
18	**Discuss** about types of keys with valid examples?	Understand	1
19	**Discuss** about types of string functions in dbms by using SQL queries.	Understand	1
20	**Explain** the term constraint and specify different types of constraints?	Understand	1
	UNIT – III		
1	**Illustrate** redundancy and the problems that it can cause?	Apply	3
2	**Define** decomposition and how does it address redundancy? Discuss the problem s that may be caused by the use of decompositions?	Knowledge	3
3	**Define** functional dependencies. How are primary keys related to FD‟s?	Knowledge	3
4	**Define** normalization? Explain 1NF, 2NF, 3NF normal forms?	Knowledge	3
5	**Compare** and contrast BCNF with 3NF?	Apply	3
6	**Describe** properties of decompositions?	Understand	3
7	**Explain** about schema refinement in database design?	Understand	3
8	**Illustrate** multi valued dependencies and fourth normal form with example?	Apply	3
9	**Discuss** about join dependencies and fifth normal form?	Understand	3
10	**Illustrate** inclusion dependencies with example?	Apply	3
11	**Discuss** join dependencies and fifth normal form, and explain why 5NF?	Understand	3
12	**Define** a functional dependency. List and discuss the six inference rules for functional dependencies. Give relevant examples.	Knowledge	3
13	**Explain** the role of functional dependency in the process of normalization.	Understand	3
14	**State** the need for normalization of a database and explain various normal forms?	Understand	3
15	**Explain** about properties of decomposition?	Understand	3
	UNIT – IV		
1	**Explain** ACID properties and illustrate them through examples?	Understand	2
2	**Discuss** how do you implement atomicity and durability?	Understand	2
3	**Illustrate** concurrent execution of transaction with examples?	Apply	2
4	**Discuss** serializability in detail?	Understand	2
5	**Discuss** two phase locking protocol and strict two-phase locking protocols?	Understand	2
6	**Describe** timestamp based locking protocols?	Understand	2
7	**Describe** validation-based locking protocols?	Understand	2
8	**Discuss** in detail multiple granularity?	Understand	2
9	**Explain** in detail storage structure?	Understand	2
10	**Discuss** deferred database modification and immediate database modification?	Understand	2
11	**Discuss** how do you recover from concurrent transactions?	Understand	2

12	**Explain** buffer management?	Understand	2
13	**Explain** different types of advanced recovery techniques?	Understand	2
14	**Write** in detail about remote backup systems?	Apply	2
15	**Explain** briefly about lock-based concurrency control?	Understand	

	UNIT-V		
1	**Write** in detail about hash-based indexing and tree-based indexing?	Apply	1
2	**Compare** I/O costs for all file organizations?	Understand	1
3	**Explain** in detail about ISAM?	Understand	1
4	**Explain** B+ trees? Discuss about this dynamic index structure?	Understand	1
5	**Demonstrate** searching a given element in B+ trees? Explain with example?	Understand	1
6	**Illustrate** insertion and deletion of an element in B+ trees with example?	Apply	1
7	**Write** in detail about static hashing?	Apply	1
8	**Explain** in detail about extendible hashing?	Understand	1
9	**Explain** in detail about linear hashing?	Understand	1
10	**Compare** and contrast extendible hashing with linear hashing?	Apply	1

Q. No	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	Consider the database given by the following schemes. Customer (CustNo, SalesPersonNo, City) Sales_ Person (SalesPersonNo ,SalesPersonName, CommonPrec,YearofHire) Give an expression in SQL for each of the following queries: a) Display the list of all customers by Cust_No with the city in which each is located. b) Select Cust No, city from Customer list the names of the sales persons who have accounts in Delhi.	Apply	3
2	**Explain** the term aggregation in an ER model? Develop an ER diagram using aggregation that captures the following information: Employees work for projects. An employee working for a particular project uses various machinery. State any options you make. Also discuss about the ER diagram you have designed.	Apply	3
3	**Construct** an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.	Apply	3
4	**Explain** briefly about views in database and analyze and find whether view exists if the table is dropped from the database?		
5	**Explain** the structure of a DBMS With a neat diagram,	Apply	3
6	We can convert any weak entity set to strong entity set by simply adding appropriate attributes. Analyze why, then, do we have weak entity sets?	Analyze	3
7	**Explain** about primary key constraint and foreign key constraint briefly and by using primary key and foreign key create tables for student and college.	Analyze	1
8	**Define** constraint and explain each constraint with an example?	Analyze	1
9	**Create** a database for the college library system by using E-R diagram and identify the relations between the entities, primary key and foreign key.	Analyze	3
	UNIT-II		
	Consider the following relational schema Employee (empno,name,office,age) Books(isbn,title,authors,publisher) Loan(empno, isbn,date) **Write** the following queries in relational algebra.		

<table>
<tr><td>1</td><td>• Find the names of employees who have borrowed a book Published by McGraw-Hill?
• Find the names of employees who have borrowed all books Published by McGraw-Hill?
• Find the names of employees who have borrowed more than five different books published by McGraw-Hill?
• For each publisher, find the names of employees who have borrowed?
• Find the details of employee in ascending order.</td><td>Apply</td><td>1</td></tr>
<tr><td>2</td><td>Given the Students relation as shown below
• For the Student relation find the details of student with highest CPI.
• Display the names of the students in reverse order.
• Find the details of employee in descending order.
• Find the average of CPI from the table.
• Find the details of student whose name starts with „S‟.</td><td>Apply</td><td>1</td></tr>
<tr><td>3</td><td>Consider the following relations containing
employee(name,salary,deptno)
department (deptno, deptname, address)
Solve the query by using the basic relational algebra operations (U, -,x , ,p)?</td><td>Apply</td><td>1</td></tr>
<tr><td>4</td><td>Explain about aggregation functions in detail and
• Write SQL Query to find second highest salary of employee from employee table?
• Write SQL Query to find the name of employee from Employee table whose ages are between 30 to 50.</td><td>Apply</td><td>1</td></tr>
<tr><td>5</td><td>Consider the following information about a university database and create tables for following entities:
• Professors have an SSN, a name, an age, a rank, and a research specialty
• Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.)</td><td>Apply</td><td>1</td></tr>
<tr><td>6</td><td>Consider the following relational schema:
Emp (eid: integer, ename: string, age: integer, salary: real)
Works (eid: integer, did: integer, pcttime: integer)
Dept (did: integer, dname: string, budget: real, managerid: integer)
• Write an SQL statement to add John Doe as an employee with eid = 101, age = 32 and salary = 15, 000.
• Write an SQL statement to give every employee a 10 percent raise.
• Write an SQL statement to delete the Toy department.
• Display the details of employees in order.</td><td>Apply</td><td>1</td></tr>
<tr><td>7</td><td>Define a query and explain SQL queries with solutions for the following data:
<table><tr><th>Sid</th><th>name</th><th>login</th><th>Age</th><th>gpa</th></tr><tr><td>58</td><td>luther</td><td>Luther1@hgmail.com</td><td>25</td><td>1.8</td></tr><tr><td>31</td><td>Ricky</td><td>Ricky.r@gmail.com</td><td>20</td><td>2.0</td></tr><tr><td>42</td><td>rosey</td><td>Rosey01@gmail.com</td><td>21</td><td>2.1</td></tr></table>• Modify this query so that only the login column is included in the answer.
• If the clause WHERE S.gpa >= 2 is added to the original query, what is the set of tuples in the answer?
• Find the difference between the highest gpa and least gpa.</td><td>Apply</td><td>1</td></tr>
<tr><td>8</td><td>Consider the following relations containing
Suppliers (sid: integer, sname: string, address: string)
Parts (pid: integer, pname: string, color:string)
Catalog (sid: integer, pid: integer, cost: real)
• Find the names of suppliers who supply some red part.
• Find the sids of suppliers who supply some red part and some green part.
• Find the pids of parts supplied by at least two different suppliers.
• Create a view by combining three tables.</td><td>Apply</td><td>1</td></tr>
</table>

9	Consider the following relations containing airline flight information: Flights (flno: integer, from: string, to: string, distance: integer, departs: time, Aircraft(aid: integer, aname: string, cruisingrange: integer) Certified (eid: integer, aid: integer) Employees (eid: integer, ename: string, salary: integer)	Apply	1

	UNIT – III		
1	Consider a relation scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold: {A–>B, BC–> D, E–>C, D–>A}. **Write** the candidate keys of R?	Apply	**1**
2	Consider the following relational schemes for a library database: **Book (Title, Author, Catalog_no, Publisher, Year, Price) Collection (Title, Author, Catalog_no)** the following are functional dependencies: \ a. Title Author --> Catalog_no b Catalog_no --> Title Author Publisher Year c Publisher Title Year --> Price	Apply	**2**
3	Consider a schema R (A, B, C, D) and functional dependencies A -> B and C ->D. **Solve** and find whether the decomposition of R into R1 (A, B) and R2(C, D) belongs to which one or both (dependency preserving and loss less join)?	Apply	**3**
4	**Show** that: if $\alpha \rightarrow \beta$ and $\alpha \rightarrow \gamma$ then $\alpha \rightarrow \beta\gamma$	Apply	**4**
	UNIT-IV		
5	**Explain** briefly about functional dependency and trivial functional dependency and FD axioms.	Apply	**1**

1	Consider the following transactions with data items P and Q initialized to zero:
	T1: read(P);
	read(Q);
	If P=0 then Q:=Q+1;
	write(Q);
	T2: read(Q);
	read(P);
	If Q=0 then P:=P+1;
	write(P);
	Solve and find any non-serial interleaving of T1 and T2 for concurrent execution leads to a serializable schedule or non-serializable schedule. Explain?
		Apply	**2**

2	**Analyze** which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock? Explain the following: a. 2-phase locking b. Time-stamp ordering	Apply	**1**
3	Suppose that there is a database system that never fails. **Analyze** whether a recovery manager required for this system?	Apply	**1**
	UNIT-V		
1	Consider a B+-tree in which the maximum number of keys in a node is 5. **Calculate** the minimum number of keys in any non-root node?	Apply	**1**
2	In the index allocation scheme of blocks to a file, **Calculate** on what maximum possible size of the file depends?	Apply	**2**
3	A clustering index is defined on the fields of which type? **Analyze** them.	Apply	**2**
4	**Calculate** the minimum space utilization for a B+ tree index?	Apply	**2**

COMPUTER SCIENCE AND ENGINEERING
COURSE DESCRIPTION FORM

Course Title	**BUSINESS ECONOMICS AND FINANCIAL ANALYSIS**			
Course Code	**2030010**			
Regulation	**R20– JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	3	-	-	3
Course Faculty	Rajeswara Rao, Asst.Prof			

I. COURSE OVERVIEW:

The present course is designed in such a way that it gives an overview of concepts of Economics. Managerial Economics enables students to understand micro environment in which markets operate how price determination is done under different kinds of competitions. Financial Analysis gives clear idea about concepts, conventions and accounting procedures along with introducing students to fundamentals of ratio analysis and interpretation of financial statements. Break Even Analysis is very helpful to the Business Concern for Decision Making, controlling and forward Strategic Planning. Ratio analysis gives an idea about financial forecasting, financial planning, controlling the business and decision making.

II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	3	3	Managerial Economics and Financial Analysis

III. MARKS DISTRIBUTION:

Sessional Marks	University End Exam Marks	Total Marks
Mid Semester Test There shall be two midterm examinations. Each midterm examination consists of subjective type and objective type tests. The subjective test is for 25 marks of 90 minutes duration. Subjective test of shall contain 10 questions, the student has to answer 10 questions, each carrying 1 mark. The long type test is for 15 marks. It consists the student has to answer all the questions and each carry two half mark. First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.	70	100

IV. ALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	90 minutes	25
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	25
4.	II Assignment	-	5
5.	External Examination	3 hours	70

V. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

I. To understand the concepts of managerial economics and financial analysis this helps in optimal decision making in business environment.

II. To be familiar with demand concepts, types of methods or techniques of demand those are used by the entrepreneur or producer.

III. To have a thorough knowledge on the production theories and cost while dealing with the production and factors of production.

IV. To introduce the concepts of cost and significance, limitation of Break even analysis.

V. An ability to study the various pricing methods which are adopted in attracting the potential customers for the different commodities..

VI. To acquaint the significance of the project management, capital budgeting, estimation of the projects through capital budgeting methods for choosing the best and optimal projects.

VII. To provide the optimal decisions acquiring the knowledge on financial accounting and management accounting.

VI. COURSE OUTCOMES:

CO	Course outcome	Blooms taxonomy level
C212.1	Understand the various Forms of Business and the impact of economic variables on the Business.	Create
C212.2	Understand Demand, Supply, Production, Cost, Market Structure, Pricing aspects.	Analyze
C212.3	Analyze the firm's financial position and financial Statements of a Company.	Understand
C212.4	Understand the basic Business types, impact of Firms specifically.	Understand
C212.5	Analyze the Business from the Financial Perspective.	Evaluation

VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	**Engineering knowledge**: An ability to apply knowledge of basic sciences, mathematical skills, engineering and technology to solve complex electronics and communication engineering problems (**Fundamental Engineering Analysis Skills**).	S	Assignments, Tutorials
PO2	**Problem analysis**: An ability to identify, formulate and analyze engineering problems using knowledge of Basic Mathematics and	S	Assignments

Program Outcomes		Level	Proficiency assessed by
	Engineering Sciences (**Engineering Problem Solving Skills**).		
PO3	**Design/development of solutions**: An ability to provide solution and to design Electronics and Communication Systems as per social needs **(Social Awareness).**	N	-
PO4	**Conduct investigations of complex problems**: An ability to investigate the problems in Electronics and Communication field and develop suitable solutions (**Creative Skills**).	N	-
PO5	**Modern tool usage** An ability to use latest hardware and software tools to solve complex engineering problems (**Software and Hardware Interface**).	N	-
PO6	**The engineer and society**: An ability to apply knowledge of contemporary issues like health, Safety and legal which influences engineering design **(Social Awareness).**	N	--
PO7	**Environment and sustainability**: An ability to have awareness on society and environment for sustainable solutions to Electronics and Communication Engineering problems **(Social Awareness).**	N	--
PO8	**Ethics**: An ability to demonstrate understanding of professional and ethical responsibilities **(Professional Integrity).**	S	Oral Discussions
PO9	**Individual and team work**: An ability to work efficiently as an individual and in multidisciplinary teams **(Team work).**	S	Seminars, Discussions
PO10	**Communication**: An ability to communicate effectively and efficiently both in verbal and written form **(Communication Skills).**	H	Presentations
PO11	**Life-long learning**: An ability to develop confidence to pursue higher education and for life-long learning **(Continuing Education Awareness).**	S	Seminars, Discussions
PO12	**Project management and finance**: An ability to design, implement and manage the electronic projects for real world applications with optimum financial resources **(Practical Engineering Analysis Skills**).	H	Presentations, Assignments.

N - None **S - Supportive** **H - Highly Related**

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Applications of Computing: Ability to use knowledge in various domains to provide solution to new ideas and innovations.	1	Lectures, Assignments
PSO2	Programming Skills: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.	2	
PSO3	Make use of computational and experimental tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.	3	

IX. SYLLABUS:

UNIT-I

Introduction & Demand Analysis:

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics – Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting

UNIT-II

Production & Cost Analysis:

Theory of Production and Cost Analysis: Production Function – Iso-quants and Iso-costs, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs vs. Implicit costs, out of pocket costs vs. Imputed costs, Break-even analysis, Determination of Break – Even point (Simple Problems) , Managerial Significance of BEA.

UNIT-III

Markets& New Economic Environment:

Market structures: Types of competition, Features of perfect competition, Monopoly and monopolistic competition. Price determination& Price Statistics: Price Output determination in case of perfect competition and monopoly. Pricing objectives and policies of pricing, Methods of pricing. Business features and evaluation of different forms of Business organization: Sole proprietorship, partnership, Joint Stock Company, public enterprises and their types, New Economic Environment: changing business environment in post-liberalization scenario.

UNIT-IV

Capital Budgeting:

Capital and its significance, types of capital, estimation of fixed and working capital requirements, methods and sources of raising capital- Trading Forecast, Capital budget, Cash Budget. Features of capital budgeting proposals, methods of capital budgeting – payback method, Accounting rate of return (ARR), Net Present Value Method (simple problems).

UNIT-V

Introduction to Financial Accounting and Financial Analysis:

Accounting Concepts and Conventions, Introduction to IFRS– Double – Entry Book keeping, Journal, Ledger, Trial balance, Final accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.) Financial Analysis through Ratios: Significance, limitations of Ratio Analysis and Ratios Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio). Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio) and profitability ratios (Gross profit Ratio, Net profit ratio, Operating Ratio, P/E Ratio and EPS), Du Pont Chart.

Text Books:

1. A.R. Aryasri (2007) Managerial Economics and Financial Analysis, 3nd Ed, TMH.

Reference Books:

i. Managerial Economics, Dwivedi, 5th Ed, Vikas Publication House Pvt.Ltd.
ii. S.N. Maheshwari & S.K.Maheshwari, Financial Accounting, 4th Ed, Vikas Publication House Pvt.Ltd, 2012.
iii. R.Narayana Swamy:, Financial Accounting- A managerial Perspective, Pearson,2012.
iv. J.V.Prabhakar Rao & P.V.Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.
v. M.Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi,2012.
vi. Varshney & Maheswari, Managerial Economics, Sulthan Chand, 2009.

X. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes:

Lecture No.	Unit No	Course Learning Objective	Topics Covered	Text Book/ Reference
1-2	I	Able to **Explain** about business economics according to the business	Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics.	T1- 1.3-1.8
3-4		Able to **Describe** about demand analysis, the Law of Demand and Demand Function.	Demand Analysis: Demand Determinants of Demand, Definitions, Assumptions and Exceptions of Law of Demand and Demand Function.	T1-2.2-2.11
5-8		Able to **Understand** elasticity of the demand of the product, different types, Measurement of Elasticity of Demand and Factors influencing on Elasticity of Demand.	Definitions, Significance of Elasticity of Demand, Types and Measurement of Elasticity of Demand and Factors influencing Elasticity of Demand.	T1-3.3-3.20
9-11		Able to **Discuss** different methods of Demand Forecasting and the factors governing Demand Forecasting.	Methods of demand forecasting and Factors Governing Demand Forecasting.	T1-4.6-4.19
12-16	II	Able to **Understand** the Production function, features of Iso-Quants and Iso-Costs, different types of Internal Economies, External Economies and Law of Returns with appropriate examples	Production function, features of Iso-Quants, Iso-Costs, MRTS, Least Cost Combination of Inputs and Cobb-Douglas Production Function, Different types of Internal Economies, External Economies and Law of Returns.	T1- 5.3-5.18
17		Able to **Classify different types of costs**	Cost concepts, fixed vs Variable costs, explicit vs implicit costs, out of pocket costs vs Imputed costs.	T1- 5.29-6.8
18		Able **Identify** the Significance and Limitations of Break-Even Analysis	Break-even Analysis (BEA). Managerial Significance of BEA.	T1- 7.13-7.14
19-21	II	Able to **Calculate** Break-Even Point (Simple Problems)	Determination of Break-Even Point (Simple Problems)	T1- 7.1-7.12
22-26	III	Able to **Examine** the features, price-output determination under Perfect	Market structures: Types of competition, Features of Perfect Competition, Monopoly and	T1- 8.4-8.16

Lecture No.	Unit No	Course Learning Objective	Topics Covered	Text Book/ Reference
		Competition, Monopoly and Monopolistic competition Markets.	Monopolistic competition Markets and determination of price –output under Perfect Competition, Monopoly and Monopolistic competition markets.	
27-30		Able to **Discuss** the Objectives, Policies and Methods of Pricing Strategies and Price Methods.	Objectives and Policies of Pricing-Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization	T1- 8.21-8.25
31-35	III	Able to **Describe** Features of business, Definitions of Various forms of Business Units.	Characteristic features of Business, Definitions, Features, Merits and Demerits of Sole Proprietorship, Partnership, Joint Stock Company.	T1-9.3-9.15
36-38	III	Able to **Predict** the Merits & Demerits of Different types of Public Enterprises and Changing Business Environment to Post Liberalization Scenario.	Definitions, Features, Merits and Demerits of Public Enterprises and their types and Changing Business Environment in Post-liberalization scenario	T1- 9.26-10.23
39-41	IV	Able to **Explain** the significance and classification of capital, Methods and Sources of Raising Finance.	Capital and its significance, Types of Capital, Working capital requirements, Methods and sources of rising finance, Trading Forecast, Capital Budget and Cash Budget.	T1- 11.3-11.15
42-45		Able to **Enumerate** the concept of capital budgeting and allocations of the resources through capital budgeting methods and compute simple problems.	Nature and Significance of capital budgeting, Methods of Capital Budgeting (PBP, ARR, IRR, NPV.PI) Simple Problems.	T1-12.1-12.26
46-49	V	Able to **Illustrate** the Significance of Financial Accounting, Double Entry, Accounts, Accounting Concepts and Conventions	Significance of Financial Accounting and Accounting Terminology and Accounting Cycle.	T1-13.4-13.15
50-58		Able to **Examine** the meaning, advantages and Limitations of the Journal, Ledger and Trial Balance and Final Accounts and Solve simple Problems.	Meaning, Advantages and Limitations of the Journal, Ledger and Trial Balance and Final Accounts and Simple Problems from Journal, Ledger, Trail Balance and Final Accounts with simple adjustments.	T1-13.15-13.68.

Lecture No.	Unit No	Course Learning Objective	Topics Covered	Text Book/ Reference
59		Able to **Describe** Meaning, Definitions and Limitations of Ratio Analysis	Meaning, Definitions and Limitations of Ratio Analysis.	T1-14.18
60-65		Able to **Compute** different types of Financial Ratios	Computation, Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Leverage Ratios and Profitability Ratios.	T1-14.4-14.18

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Program outcomes	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	0	0	0	0	0	0	0	1	0	0	3
CO2	3	3	3	3	0	0	0	0	0	0	0	1	2	3	0
CO3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
CO4	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
CO5	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
Average	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**3**	**3**

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ASSIGNMENT

Course Name	:	**BUSINESS ECONOMICS AND FINANCIAL ANALYSIS**
Course Code	:	2030010
Class	:	II - B. Tech I Semester
Branch	:	COMPUTER SCIENCE AND ENGINEERING
Year	:	2022- 2023
Course Faculty	:	Rajeswara Rao, Asst.Prof

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S. No	Question	Blooms Taxonomy Level	Course Outcome
	ASSIGNMENT-I **UNIT-I** **INTRODUCTION & DEMAND ANALYSIS**		
1	Define Business Economics. Explain its nature.	Remember	1
2	Define Business Economics. Write its scope.	Analyze	1
3	Define Law of Demand. State the assumptions of Law of Demand.	Remember	2
4	Briefly explain the exceptions of Law of Demand.	Understand	2
5	Describe the determinants of Demand.	Understand	2
1	Explain the significance/Importance of Elasticity of Demand.	Remember	2
2	Illustrate different types of Price Elasticity of Demand.	Apply	2
3	Write different types of Income Elasticity of Demand.	Analyze	2
4	Identify the factors which are influencing/governing Elasticity of Demand.	Apply	2
5	Consider different methods of Cross Elasticity of Demand.	Understand	2
6	How to measure Price Elasticity of Demand? Explain.(Methods of Price Elasticity of Demand)	Remember	2
7	Define Demand Forecasting. Illustrate different methods of Demand Forecasting.	Apply	2
8	Discuss the factors governing Demand Forecasting.	Understand	2
9	Express Survey based Demand Forecasting methods with appropriate examples.	Remember	2
10	Write the significance/Importance of Elasticity of Demand.	Analyze	2
	UNIT-II **PRODUCTION & COST ANALYSIS**		
1	Describe different types of Internal Economies.	Understand	3
2	Briefly explain different types of External Economies.	Remember	3

S.No	Question	Blooms Taxonomy Level	Course Outcome
3	Consider the significance of Break-Even Analysis.	Understand	3
4	State the limitations of Break-Even Analysis.	Remember	3
5	Write the Law of Returns with appropriate examples.	Analyze	3
6	Discuss the economies of scale that accrue to a firm.	Remember	3
7	Define Production function. How can a producer find it usefulness? Illustrate.	Apply	3

8	State the features of Iso- Quants and Iso-Costs.	Remember	3
9	Briefly Explain about the Cobb-Douglas Production Function.	Understand	3
10	You are required to Determine i)P/V Ratio (ii) Break Even Point in Value (iii) Sales required to earn a profit of Rs.4,50,000 and (iv) Profit when Sales are Rs.21,60,000 from the following information Fixed Expenditure Rs.90,000 Variable Cost Per unit : Direct Material Rs.5 Direct Labour Rs.2 Direct Overheads 100% of Direct Labour Selling price per unit Rs.12.	Apply	3
11	The following data are available from the records of a company Sales Rs.60,000 Variable cost Rs.30,000 Fixed cost Rs.15,000 You are required to i) Calculate the P/V Ratio, Break-Even Point and Margin of Safety at this level. ii) Calculate the above with the effect of 10% increase in selling price. iii) Calculate the above with the effect of 10% decrease in selling price.	Apply	3
12	The Sales Turnover and profit during two years were given as follows: **Years** **2001** **2002** Sales (Rs.) 7,00,000 9,00,000 Profit/Loss (Rs.) - 10,000 10,000 You are required to Determine the following: i) P/V Ratio ii) Fixed Cost iii) Break Even Point in Value and Units iv) Sales required to earn a profit of Rs.40,000 v) Profit when Sales are Rs.12,00,000. The Selling Price per unit can be assumed at Rs.100	Remember	3
13	The Sales Turnover and profit during two years were given as follows: **Years** **2005** **2006** Sales (Rs.) 38,000 65,000 Profit/Loss (Rs.) - 2,400 3,000 You are required to Determine the following: P/V Ratio ii) Fixed Cost iii) Break Even Point in Value and Units iv) Sales required to earn a profit of Rs.5,000 v) Profit when Sales are Rs.46,000. The Selling Price per unit can be assumed at Rs.10	Evaluate	3

s.no	Question	Blooms Taxonomy Level	Course Outcome
14	The Sales Turnover and profit during two years were given as follows: **Years** **2003** **2004** Sales (Rs.) 1,00,000 1,20,000 Profit (Rs.) 15,000 23,000 You are required to Determine the following: i)P/V Ratio ii) Fixed Cost iii) Break Even Point (Value) ii) Sales required to earn a profit of Rs.20,000 iii) Profit when Sales are Rs.1,25,000.	Understand	3

15	You are given the following information about two companies in 2000. **Sales** CompanyA:Rs.50,00,000 CompanyB:Rs.50,00,000 **Fixed Expenses** CompanyA:Rs.12,00,000 CompanyB:Rs.17,00,000 **Variable Expenses** CompanyA:Rs.35,00,000 CompanyB:Rs.30,00,000 You are required to show that i) P/V Ratio ii) B.E.P iii) Margin of Safety iv) MOS Ratio v) Profit at Desired Sales of Rs.80,00,000 vi) Sales at a profit of Rs,1,50,000 for each company from the above information.	Remember	3
16	The Total Sales Turnover and Total Cost during two years were given as follows: **Years** **2009** **2010** Total Sales (Rs.) 42,500 39,200 Total Cost (Rs.) 38,700 36,852 You are required to Determine the following: i) P/V Ratio ii) Fixed Cost iii) Break Even Point (Value) ii) Sales required to earn a profit of Rs.6,000 iii) Profit when Sales are Rs.47,500	Apply	3
	UNIT-III		
1	Define Perfect Competition. List out the features of Perfect Competition?	Remember	4
2	Define Monopoly. Discuss the features of Monopoly?	Remember	4
3	How to determine price under Perfect Competition? Illustrate.	Apply	4
4	Discuss price-output determination in case of Monopoly.	Remember	4
5	Write differences between Perfect competition and Monopoly.	Apply	4
6	Write differences between perfect and imperfect market. Explain different types of Pricing.	Apply	4
7	Define Monopolistic Competition. Explain the features of Monopolistic Competition.	Apply	4
8	How to determine price- output in case of Monopolistic Competition? Discuss.	Apply	4
	UNIT-IV		
1	Define Business. Explain its characteristics.	Remember	5
2	Define Sole Trading. Describe the features, merits and demerits of Sole Trading?	Understand	5
3	Define Partnership. State the features, merits and demerits of Partnership?	Remember	5
4	Define Joint Stock Company. Illustrate the features, merits and demerits of Joint Stock Company.	Apply	5

S. No	Question	Blooms Taxonomy Level	Course Outcome
5	Distinguish between public company and private company.	Apply	5
6	State the merits & demerits of different types of Public Enterprises.	Remember	5
7	Explain different types of Partners.	Remember	5
	UNIT-IV		
1	Define Capital. Explain its significance.	Remember	6
2	Determine different types of capital.	Create	6
3	Consider the factors which are influenced on working capital requirement.	Understand	6
4	Describe the advantages and Disadvantages of Pay-back Period.	Understand	6
5	State the advantages and Disadvantages of ARR Method.	Remember	6
6	Illustrate the advantages and Disadvantages of NPV Method.	Apply	6
7	Write the advantages and Disadvantages of IRR Method.	Analyze	6
8	Explain the advantages and Disadvantages of Profitability Index Method.	Apply	6
9	Define Capital Budgeting. Illustrate the significance and limitations of Capital Budgeting.	Apply	6
10	The cost of a project is Rs.50,000 and annual cash inflows for the next five years are given as follows: 1st year Rs.25,000		

	2nd year Rs.25,000 3rd year Rs.25,000 4th year Rs.25,000 5th year Rs.25,000 Total 1,25,000 What is the pay-back period for the project?	Remember	6
11	There are two projects X and Y. Each project requires an investment of Rs.20,000. You are required to Rank these two projects according to pay-back period method from the following information: Net Profits Before Depreciation and After Tax (NPBDAT) for Two projects were given below: Years / Project-X (Rs.) / Project-Y (Rs.) 1 / 1,000 / 2,000 2 / 2,000 / 4,000 3 / 4,000 / 6,000 4 / 5,000 / 8,000 5 / 8,000 / Nil	Apply	6
12	A firm is considering two projects each with an initial investment of Rs.20,000 and a life of 4 years. The following is the list of estimated cash inflows after taxes and depreciation. Years / Proposal-I / Proposal-II / Proposal-III 1 / 12,500 / 11,750 / 13,500 2 / 12,500 / 12,250 / 12,500 3 / 12,500 / 12,500 / 12,250 4 / 12,500 / 13,500 / 11,750 Total / 50,000 / 50,000 / 50,000 Determine Accounting Rate of Return on (i) Average Capital (ii) Original Capital Employed.	Apply	6
S. No	**Question**	**Blooms Taxonomy Level**	**Course Outcome**
13	**No project is acceptable unless the yield is 10%. Cash Inflows of a certain project along with Cash outflows are given below:** Years / Cash Outflows (Rs.) / Cash Inflows (Rs.) 0 / 1,50,000 / ---------- 1 / 30,000 / 20,000 2 / ----- / 30,000 3 / -------- / 60,000 4 / -------- / 80,000 5 / -------- / 30,000 The salvage value at the end of the 5th year is Rs.40,000. Calculate (i) Net Present Value. P.V. of Rs.1 @10%D.f as per Present Value Tables given below: Years / 1 / 2 / 3 / 4 / 5 P.V. of Rs.1 @10% D.f / 0.909 / 0.826 / 0.751 / 0.683 / 0.621	Apply	6
14	A project requires an investment of Rs.11,11,111 and is expected to generate cash inflows of Rs.3,33,333, Rs.4,44,444, Rs.5,55,555 Rs.4,44,444 and Rs.3,33,333 for the next 5 years. The Risk free cost of capital is 11%. Evaluate the project by using IRR Method with the help of 25% and 26% D.f. If a Risk premium of 9% is considered, how do you evaluate the project and do you observe any change in		

your earlier decision? Compute (i) Fake Pay-back period and(ii) IRR with the help of 25% and 26% D.f. Understand 6

Years	1	2	3	4	5
P.V.Factor@25%	0.800	0.640	0.512	0.410	0.328
P.V.Factor@26%	0.794	0.630	0.500	0.397	0.315

15 A Company has an estimated Life of 4 years and an investment opportunity costing Rs.2,50,000 with the following expected Net Cash flow After Taxes and Before Depreciation.

Years	**Net Cash Flows (Rs.)**	**P.V. of Rs.1 @24% D.f**
1	1,20,000	0.806
2	90,000	0.650
3	1,60,000	0.524
4	30,000	0.423

Remember 6

Using 24% as the cost of capital determine the following:
(i)Net Present Value @24% D.f.
(ii)Profitability Index @24%D.f
(iii)Pay-back Period
(iv)Discounted Pay-back Period

1st Year	Rs. 2,000	Rs.3,000
2nd Year	1,500	3,000
3rd Year	1,500	2,000
4th Year	1,000	1,000
5th Year	Nil	1,000
Total PAT	6,000	10,000

	UNIT-V INTRODUCTION TO FINANCIAL ACCOUNTING & FINANCIAL ANALYSIS		
1	Define Financial Accounting. Explain the importance and Limitations of Financial Accounting.	Remember	7
2	Define Account. Illustrate different types and principles of Accounts (Rules of Debit and Credit).	Apply	7
3	What is Double Entry System? Describe the advantages and Disadvantages of Double Entry System.	Evaluate	7
4	Explain different types of Accounting Concepts.	Understand	7
5	Discuss different types of Accounting Conventions.	Understand	7
6	State the advantages of the Journal.	Remember	7
7	Illustrate the importance of the Ledger.	Apply	7
8	Write the significance of Trial Balance.	Analyze	7

S. No	Question	Blooms Taxonomy Level	Course Outcome
9	Write Journal Entries in the books of Mr. Sukumar from the following transactions 2008,Jan.1st Goods purchased from Raju on credit Rs.10,000 Jan 2nd Goods purchased from Ramu Rs.20,000 Jan 3rd Goods returned to Raju Rs.1,000 Jan 4th Goods returned to Ramu Rs.2,000 Jan 5th Goods sold to Suresh on credit Rs.30,000 Jan 6th Goods sold to Mahesh Rs.40,000 Jan 7th Goods returned from Mahesh Rs.4,000 Jan 8th Goods returned by Suresh Rs.3,000 Jan 9th Building sold to Venkat Rs.50,000 Jan 31st Furniture purchased from Kishore Rs.5,000 Jan 31st Depreciation charged on Machinery Rs.3,000 Jan 31st Depreciation charged on Furniture Rs.500	Understand	7
10	Write Journal Entries from the following transactions 2010, March 1st Business started by Rama Rao with cash Rs.40,000 , Cheque Rs.25,000 and Stock Rs.25,000. March 2nd Goods taken by proprietor for his personal use Rs.10,000 March 3rd Cash Taken for personal use Rs.5,000 March 4th Investment purchased for Rs. 8,000 March 5th Sale of Furniture for Rs.2,000 March 6th Goods sold to Ganesh for 10,000. March 7th Goods returned from Ganesh Rs.2,000 March 7th Cheque received from Ganesh for 3,000 March 8th Ganesh cheque was dishonoured. March 9th Ganesh became insolvent, 0.50 paisa in a rupee was collected from his estate towards final settlement and the remaining balance being Bad Debts. March 10th Goods purchased from Kamesh Rs.20,000 March 11th Goods returned to Kamesh Rs.2,000 March 12th Amount of Rs.17,500 paid to Kamesh in full settlement of his Account. March 13th Insurance Premium paid to LIC of India by cheque	Remember	7

	Rs.15,000 March 14th Commission received from Naresh Rs.5,000 March 15th Goods sold to Prasad on credit Rs.30,000 March 16th Prasad returned goods to us Rs.3,000 March 17th A cheque received from Prasad for full settlement of Rs.26,500.		

S.No	Question	Blooms Taxonomy Level	Course Outcome
11	Write Journal Entries in the books of Gopal from the following: 2008, May 1st Business started with Rs.60,000 May 2nd Sale of Typewriter for Rs.1,000 May 3rd Salaries paid to staff by cheque Rs.5,000 May 4th Wages paid to Labour for Rs.15,000. May 5th Rent paid to Landlord Raja Rao Rs.8,000 May 6th Interest received from Rajani Rs.2,000 May 7th Commission received from Kamala Rs.3,000 May 8th Insurance paid by cheque Rs.3,000 May 9th Telephone Rent Paid in cash Rs.2,000 May 10th Stationery Purchased for Rs.1,000 May 11th Telegrams sent to New Delhi Rs.2,500 May 12th Advertisement charges paid in cash Rs.5,000 May 13th Machinery Purchased for Rs.90,000 May 14th Furniture purchased for personal use Rs.30,000 May 13th Depreciation charged on Machinery Rs.9,000 May 14th Depreciation charged on Furniture Rs.3,000 May 15th Repairs Paid on Buildings Rs.15,000 May 16th Rent received for Rs.6,000	Remember	7
12	Record the following transactions in the books of Krishna Mohan. 2007, June 1st Business started with cash Rs.25,000 and Cheque Rs.20,000 .June 2nd Interest paid for Rs.5,000 June 3rd Commission paid by cheque Rs.2,000 June 4th Bad Debts written off on Debtors Rs.3,000 June 5th Bad Debts recovered from Debtors Rs.1,500 June 6th Rent paid to Naresh Rs.10,000 June 7th Interest received from Raghu Rs.2,000 June 8th Commission received from Kamesh Rs.7,000 June 9th Cash paid to Srinivas Rs.6,000 June 10th Cheque issued to Srikanth Rs.7,000 June 14th Srikanth cheque was Dishonoured. June 15th Cash received from Kiran Rs.8,000 June 16th Cheque received from Gayathri Rs.10,000 June 20th Gayathri cheque was dishonoured.	Understand	7

13 | Record /consider the following transactions in the books of Mr.Kiran. | Understand | 7

2009, July 1st Business started with cash Rs.50,000
July 2nd Cash deposited into Bank Rs.20,000
July 3rd Cash Withdrawn from Bank Rs.10,000
July 4th Cash taken from bank for personal use Rs.5,000
July 5th Cash Paid to Mohan Rs.15,000
July 6th Cash received from Amar Rs.8,000
July 7th Cheque received from Bharat Rs.2,000
July 8th Cheque Issued to Charan Rs.7,000
July 9th Machinery Purchased on cash Rs.12,000
July 10th Furniture sold for cash Rs.8,000
July 11th Salaries paid Rs.15,000
July 12th Rent received Rs.5,000
July 28th Rent paid to Landlord Rama Rao Rs.13,000
July 29th Commission received from Sujatha Rs.10,000
July 30th Goods purchased from Krishna on cash Rs.20,000
July 31st Goods sold to Gopal for cash Rs.30,00
July 31st Wages paid by cheque Rs.50,000

14 | **Prepare Trading, Profit &Loss A/c of Mr. Sukumar for the year ending 31-3-2007 and Balance Sheet as on that date from the following Trial Balance** | Apply | 7

Debit Balances	Rs.	Credit Balances	Rs.
Land	15,300	sales	41,460
Purchases	11,200	Returns Outwards	420
Salaries	2,200	(P/R)	240
Rent	600	Interest	4,120
Postage	300	Creditors	3,000
Opening Stock	3,100	Loan	12,000
Building	1,700	Capital	
Furniture	1,000		
Debtors	6,000		
Cash in Hand	1,300		
Stationery	240		
Wages	5,200		
Freight & Carriage	560		
inwards	500		
Miscellaneous	900		
Expenses	120		
Repairs	1,020		
Bad Debts	5,640		
Returns Inwards	4,360		
(S/R)			
	61,240		61,240

Adjustments:1. Closing stock Rs.2,980
2. Outstanding Salaries Rs.200
3. Prepaid Rent Rs.60
4. Provide 5% for Doubtful Debts on Debtors

15 | From the following Trial Balance and Adjustments, show Trading and Profit& Loss Account for the year ending 31-12-2003 and Balance Sheet as on that date in the books of Mr. Vijay.

Sl. No.	Heads of Accounts	L.F	Debit Balance (Rs.)	Credit Balance (Rs.)
1.	Electricity		14,000	
2.	Discount			22,000
3.	Interest		16,000	
4.	Wages		50,000	
5.	Opening Stock		20,000	
6.	Rent		24,000	
7.	Sales			8,00,000

	8.	Purchases		3,00,000		Understand	7
	9.	Office Expenses		30,000			
	10.	Land & Building		5,40,000			
	11.	Salaries		90,000			
	12.	Returns		20,000	10,000		
	13.	Power, Gas and Water		30,000			
	14.	Sundry Creditors			60,000		
	15.	Capital			3,02,000		
	16.	Furniture		15,000			
	17.	Sundry Debtors		60,000			
	18.	Bills Payable			15,000		
		TOTAL		12,09,000	12,09,000		

Adjustments:

1. Closing Stock Rs.80,000.
2. Outstanding Salaries Rs.10,000.
3. Depreciate Buildings by 10% p.a.

16	Define Ratio Analysis. Describe the advantages/ significance and limitations of Ratio Analysis.	Remember	7
17	Discuss different types of Liquidity Ratios.	Understand	7
18	State different types of Activity Ratios.	Remember	7
19	Explain different types of Capital Structure Ratios.	Understand	7
20	Express different types of Profitability Ratios.	Remember	7
21	From the following Balance Sheet, You are required to calculate (i) Gross Profit Ratio(ii) Debtors Turnover Ratio(iii) Average Collection Period (iv) Creditors Turnover Ratio (v) Average Payment Period (vi) Stock / Inventory Turnover Ratio	Remember	7

Balance Sheet of M/s. XYZ Ltd as on 31st March, 2003.

Liabilities	Amount (Rs.)	Assets	Amount(Rs.)
Paid-up Capital	15,00,000	Fixed Assets	16,50,000
Reserves & Surplus	6,00,000	Stock-in-Trade /Closing Stock / Inventory	9,10,000
Debentures	5,00,000	Book Debts / Trade Debtors	12,40,000
Bank Overdraft	2,00,000	Investments(Short-term)	1,60,000
Trade Creditors	12,00,000	Cash –in-hand	40,000
	40,00,000		40,00,000

Other Information:

1. Annual Credit Sales amounted to Rs. 74,40,000
2. Gross Profit Rs. 7,44,000.
3. Bank Overdraft is payable on demand.

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QUESTION BANK

Course Name	:	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
Course Code	:	2030010
Class		II - B. Tech ISemester
Branch		COMPUTER SCIENCE AND ENGINEERING
Year	:	2022-2023
Course Faculty		Rajeswra Rao, Asst.Prof

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1. Group - A (Short Answer Questions)

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
	UNIT-I INTRODUCTION & DEMAND ANALYSIS		
1	Define Managerial Economics.	Remember	1
2	Write a short note on Macro Economics	Analyze	1
3	Write a short note on Micro Economics.	Analyze	1
4	Explain Investment Decision.	Understand	1
5	State the Normative Statement.	Remember	1
6	Define demand.	Remember	2
7	List the determinants of demand	Remember	2
8	Discuss about the Giffen's Paradox.	Understand	2
9	Describe a short note on consumer surplus.	Understand	2
10	Describe the autonomous demand.	Remember	2
11	How managerial economics is used in price-output decision? Discuss.	Remember	1
12	How economics is linked with psychology? Explain	Understand	1
13	Define Elasticity of Demand.	Remember	2
14	What is Test Marketing?	Understand	2
15	What is perfectly elastic?	Understand	2
16	What is cross elasticity of demand?	Understand	2
17	State How to estimate Demand.	Remember	2

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
18	Express Income Elasticity.	Understand	2
19	Write a note on elasticity as a tool for the finance minister.	Analyze	2
20	Discuss the need for estimation of demand? Discuss.	Remember	2

21	Describe Demand forecasting for established products.	Understand	2
22	What is barometric technique?	Remember	2
23	Briefly explain about judgmental approach.	Understand	2
24	Illustrate censes method.	Apply	2
25	Discuss sample method.	Remember	2
26	Explain about survey of sales force method.	Remember	2

UNIT-II

PRODUCTION & COST ANALYSIS

1.	Explain the Break Even Point.	Remember	3
2.	Discuss about Iso- Cost.	Understand	3
3.	Discuss about Iso- Quant.	Remember	3
5.	What is least cost combination of input?	Understand	3
6.	Express law of returns to scale.	Remember	3
10.	Write a note on opportunity cost	Analyze	3
11	Write Differences between explicit and implicit costs.	Analyze	3
12	What is optimum size?	Understand	3
13	What is angle of incidence	Understand	3
14	Write the assumptions of BEA?	Analyze	3
15	What is CVP analysis?	Understand	3
15	Explain about law of Equi-Marginal Utility.	Understand	3
16	Write differences between Marginal Utility and Total Utility	Analyze	3
17	State the exceptions of law of diminishing marginal utility.	Remember	3
18.	What are the external economies of scale?	Evaluate	3
19	State about expansion path.	Remember	3
20.	Illustrate Cobb-Douglas production function	Apply	3

UNIT-III

MARKETS AND NEW ECONOMIC ENVIRONMENT

1.	Illustrate perfect competition.	Apply	4
2.	Explain about product differentiation	Understand	4
3.	Discuss about oligopoly.	Remember	4
4.	Identify the market skimming.	Create	4
5.	Describe the Block Pricing.	Understand	4
6.	Sketch the market structure.	Apply	4
7.	State the equilibrium price.	Remember	4
8.	Discuss the penetration pricing.	Understand	4
9.	List out the pricing objectives.	Remember	4
10.	Discuss the cross subsidization.	Understand	4
11	Illustrate the Sealed Bid.	Apply	4
12	Describe monopolistic competition.	Remember	4
13	Write about marginal revenue curve.	Analyze	4
14	What is promotional pricing?	Understand	4
15	Define market.	Remember	4
16	Discuss the privatization.	Understand	4
17	State the liberalization.	Remember	4
S. No	**QUESTION**	**Blooms Taxonomy Level**	**Course Outcome**
18	What is anti dumping duties?	Evaluate	4
19	Write a note on world trade organization.	Analyze	4
20	Write the economic reforms.	Analyze	4
21	What is globalization?	Understand	4
22	Write about Asian economic crisis.	Analyze	4
23	Write the objectives of new industrial policy, 1991.	Analyze	4
24	What is removal of compulsory convertibility clause?	Understand	4
25	What is franchising?	Understand	4

26	What is the real strength of economic reforms?	Understand	4
27	Write the amendments to MRTP Act.	Analyze	4
28	What are the factors that led to globalization?	Evaluate	4
29	Discuss few features of industrial policy 1991.	Understand	4
30	Write a note on removal of compulsory convertibility.	Analyze	4
31	Define Business.	Remember	5
32	List out the features of business.	Remember	5
33	Define sole trading.	Remember	5
34	Define Partnership	Remember	5
35	Define Company.	Remember	5
36	List out the features of company.	Remember	5
37	Define Public Enterprise.	Remember	5
38	State Public Corporation.	Remember	5
39	What is unlimited Liability?	Evaluate	5
40	List out different types of Partners.	Remember	5
41	Write any two differences between Public Company and Private company.	Analyze	5
	UNIT-IV **CAPITAL BUDGETING**		
1	List out the features of fixed capital.	Remember	6
2	Sketch the requirements of capital.	Apply	6
3	Discuss the components of working capital.	Understand	6
4	Sketch working capital cycle.	Apply	6
5	Explain Debt Factoring.	Understand	6
6	Write different types of shares.	Analyze	6
7	Write differences between hire purchase and leasing.	Analyze	6
8	Observe a note on commercial paper.	Remember	6
9	Write a note on venture capital.	Analyze	6
10	Discuss the characteristics of common methods of finance.	Remember	6
11	Observe a note on rights issue	Analyze	6
12	Discuss the nature of capital budgeting proposals.	Remember	6
13	Illustrate capital rationing.	Apply	6
14	Explain the meaning of payback period.	Remember	6
15	Write a note on profitability index.	Analyze	6
	UNIT-V **INTRODUCTION TO FINANCIAL ACCOUNTING & FINANCIAL ANALYSIS**		
1	Define Financial Accounting.	Remember	7
2	Discuss the meaning of Journal Proper.	Understand	7
3	List out different types of Accounting Concepts.	Remember	7
4	Explain the meaning of Double Entry System.	Understand	7

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
5	State the meaning of purchase book	Remember	7
6	Define subsidiary books	Remember	7
7	Identify the meaning of trial balance.	Evaluate	7
8	State the errors of principle	Remember	7
9	Describe the Meaning of Errors of Omission	Understand	7
10	Write a note on provisions for doubtful debts.	Analyze	7
11	State the Meaning of Revenue Receipt	Remember	7
12	Express the meaning of Contra Entry.	Understand	7
13	Illustrate the meaning of ledger account.	Apply	7
14	Explain the meaning of Capital Expenditure.	Understand	7
15	List out different types of Accounting Conventions.	Remember	7
16	Explain a note on current ratio	Understand	7
17	Identify the formula for Operating ratio.	Apply	7

18	Determine the formula for Debt Equity Ratio	Remember	7
19	List out the limitations of ratio analysis.	Remember	7
20	Discuss the Return on Capital Employed	Understand	7
21	What is the formula for debt collection period?	Understand	7
22	Define Ratio Analysis.	Remember	7
23	State the meaning of Price-Earnings Ratio.	Remember	7
24	Write the meaning of Earnings per share.	Analyze	7
25	Describe two types of capital structure ratios.	Understand	7
26	Identify different types of Activity Ratios.	Create	7
27	State the meaning of Interest Coverage Ratio.	Remember	7
28	Explain the meaning and computing procedure of Return on Capital Employed.	Understand	7
29	Identify the formulas for liquidity ratios.	Evaluate	7
30	What is the formula for Interest Coverage Ratio?	Understand	7

2. Group - II (Long Answer Questions)

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT-I **INTRODUCTION & DEMAND ANALYSIS**		
1	Define Managerial Economics. Explain its nature.	Remember	1
2	Define Managerial Economics. Write its scope.	Analyze	1
3	Define Law of Demand. State the assumptions of Law of Demand.	Remember	2
4	Briefly explain the exceptions of Law of Demand.	Understand	2
5	Describe the determinants of Demand.	Understand	2
6	Explain the significance/Importance of Elasticity of Demand.	Remember	2
7	Illustrate different types of Price Elasticity of Demand.	Apply	2
8	Write different types of Income Elasticity of Demand.	Apply	2
9	Identify the factors which are influencing/governing Elasticity of Demand.	Analyze	2
10	Consider different methods of Cross Elasticity of Demand.	Understand	2
11	How to measure Price Elasticity of Demand? Explain.(Methods of Price Elasticity of Demand)	Remember	2
12	Define Demand Forecasting. Illustrate different methods of Demand Forecasting.	Apply	2

S. No	Question	Blooms Taxonomy Level	Course Outcome
13	Discuss the factors governing Demand Forecasting.	Understand	2
14	Express Survey based Demand Forecasting methods with appropriate examples.	Remember	2
15	Write the significance/Importance of Elasticity of Demand.	Analyze	2
	UNIT-II **PRODUCTION & COST ANALYSIS**		
1	Describe different types of Internal Economies.	Understand	3
2	Briefly explain different types of External Economies.	Remember	3
3	Consider the significance of Break-Even Analysis.	Understand	3
4	State the limitations of Break-Even Analysis.	Remember	3
5	Write the Law of Returns with appropriate examples.	Analyze	3
6	Discuss the economies of scale that accrue to a firm.	Remember	3
7	Define Production function. How can a producer find it usefulness? Illustrate.	Apply	3
8	State the features of Iso- Quants and Iso-Costs.	Remember	3

9	Briefly Explain about the Cobb-Douglas Production Function.	Understand	3
	UNIT-III **MARKETS & NEW ECONOMIC ENVIRONMENT**		
1	Define Perfect Competition. List out the features of Perfect Competition?	Remember	4
2	Define Monopoly. Discuss the features of Monopoly?	Understand	4
3	How to determine price under Perfect Competition? Illustrate.	Apply	4
4	Discuss price-output determination in case of Monopoly.	Understand	4
5	Write differences between Perfect competition and Monopoly.	Apply	4
6	Write differences between perfect and imperfect market. Explain different types of Pricing.	Apply	4
7	Define Monopolistic Competition. Explain the features of Monopolistic Competition.	Remember	4
8	How to determine price- output in case of Monopolistic Competition? Discuss.	Apply	4
9	Define Business. Explain its characteristics.	Remember	5
10	Define Sole Trading. Describe the features, merits and demerits of Sole Trading?	Understand	5
11	Define Partnership. State the features, merits and demerits of Partnership?	Remember	5
12	Define Joint Stock Company. Illustrate the features, merits and demerits of Joint Stock Company.	Apply	5
13	Distinguish between public company and private company.	Apply	5
14	State the merits & demerits of different types of Public Enterprises.	Remember	5
15	Explain different types of Partners.	Understand	5
16	List out different types of companies.	Remember	5
	UNIT-IV **CAPITAL BUDGETING**		
1	Define Capital. Explain its significance.	Remember	6
2	Determine different types of capital.	Create	6
3	Consider the factors which are influenced on working capital requirement.	Understand	6
4	Describe the advantages and Disadvantages of Pay-back Period.	Understand	6
5	State the advantages and Disadvantages of ARR Method.	Remember	6
6	Illustrate the advantages and Disadvantages of NPV Method.	Apply	6
7	Write the advantages and Disadvantages of IRR Method.	Analyze	6
8	Explain the advantages and Disadvantages of Profitability Index Method.	Remember	6
9	Define Capital Budgeting. Illustrate the significance and limitations of Capital Budgeting.	Apply	6
	UNIT-V **INTRODUCTION TO FINANCIAL ACCOUNTING & FINANCIAL ANALYSIS**		
1.	Define Financial Accounting. Explain the importance and Limitations of Financial Accounting.	Remember	7
2.	Define Account. Illustrate different types and principles of Accounts (Rules of Debit and Credit).	Apply	7
3.	What is Double Entry System? Describe the advantages and Disadvantages of Double Entry System.	Evaluate	7
4.	Explain different types of Accounting Concepts.	Understand	7
5.	Discuss different types of Accounting Conventions.	Understand	7
6.	State the advantages of the Journal.	Remember	7
7.	Illustrate the importance of the Ledger.	Apply	7
8.	Write the significance of Trial Balance.	Analyze	7
9.	Sketch different methods of preparing Trial Balance.	Apply	7
10.	Explain the importance of Trading Account.	Understand	7
11.	Illustrate the significance of Profit & Loss Account.	Apply	7
12.	Consider the importance of Balance Sheet.	Understand	7
13.	Define Ratio Analysis. Describe the advantages/ significance and limitations of Ratio Analysis.	Remember	7
14.	Discuss different types of Liquidity Ratios.	Understand	7

15.	State different types of Activity Ratios.	Remember	7
16.	Explain different types of Capital Structure Ratios.	Understand	7
17.	Express different types of Profitability Ratios.	Remember	7
18.	Write formulas for of Liquidity Ratios.	Apply	7
19.	State the formulas for Activity Ratios.	Apply	7
20.	Explain the formulas for Capital Structure Ratios.	Apply	7
21.	Write the formulas for Profitability Ratios.	Apply	7

3. Group - III (Problems and Analytical Thinking /Analysis Questions)

S.No	QUESTIONS	Blooms Taxonomy Level	Course Outcome
	UNIT-II **PRODUCTION & COST ANALYSIS**		
1	You are required to Determine i)P/V Ratio (ii) Break Even Point in Value (iii) Sales required to earn a profit of Rs.4,50,000 and (iv) Profit when Sales are Rs.21,60,000 from the following information Fixed Expenditure Rs.90,000 Variable Cost Per unit : Direct Material Rs.5 Direct Labour Rs.2 Direct Overheads 100% of Direct Labour Selling price per unit Rs.12.	Apply	3
2	The following data are available from the records of a company Sales Rs.60,000 Variable cost Rs.30,000 Fixed Cost RS.15,000 You are required to i) Calculate the P/V Ratio, Break-Even Point and Margin of Safety at this level. ii) Calculate the above with the effect of 10% increase in selling price. iii) Calculate the above with the effect of 10% decrease in selling price.	Understand	3
3	The Sales Turnover and profit during two years were given as follows: **Years 2001 2002** Sales (Rs.) 7,00,000 9,00,000 Profit/Loss (Rs.) - 10,000 10,000 You are required to Determine the following: i) P/V Ratio ii) Fixed Cost iii) Break Even Point in Value and Units iv) Sales required to earn a profit of Rs.40,000 v) Profit when Sales are Rs.12,00,000. The Selling Price per unit can be assumed at Rs.100	Remember	3
4	The Sales Turnover and profit during two years were given as follows: **Years 2005 2006** Sales (Rs.) 38,000 65,000 Profit/Loss (Rs.) - 2,400 3,000 You are required to Determine the following: i) P/V Ratio ii) Fixed Cost iii) Break Even Point in Value and Units iv) Sales required to earn a profit of Rs.5,000 v) Profit when Sales are Rs.46,000. The Selling Price per unit can be assumed at Rs.10	Evaluate	3
5	The Sales Turnover and profit during two years were given as follows: **Years 2003 2004**		

	Sales (Rs.) 1,00,000 1,20,000 Profit (Rs.) 15,000 23,000 You are required to Determine the following: i)P/V Ratio ii) Fixed Cost iii) Break Even Point (Value) ii) Sales required to earn a profit of Rs.20,000 iii) Profit when Sales are Rs.1,25,000.	Understand	3
6	The Total Sales Turnover and Total Cost during two years were given as follows: **Years 2009 2010** Total Sales (Rs.) 42,500 39,200 Total Cost (Rs.) 38,700 36,852 You are required to Determine the following: i)P/V Ratio ii) Fixed Cost iii) Break Even Point (Value) ii) Sales required to earn a profit of Rs.6,000 iii) Profit when Sales are Rs.47,500	Apply	3
7	The Sales Turnover and profit during two years were given as follows: **Years 2003 2004** Sales(Rs.) 1,40,000 1,60,000 Profit (Rs.) 15,000 20,000 You are required to Determine the following: i). Break Even Point(value) ii). Sales required to earn a profit of Rs.40,000 iii). Profit when sales are Rs.1,20,000		
8	You are given the following information about two companies in 2000. **Sales** CompanyA:Rs.50,00,000 CompanyB:Rs.50,00,000 **Fixed Expenses** CompanyA:Rs.12,00,000 CompanyB:Rs.17,00,000 **Variable Expenses** CompanyA:Rs.35,00,000 CompanyB:Rs.30,00,000 You are required to show that i) P/V Ratio ii) B.E.P iii) Margin of Safety iv) MOS Ratio v) Profit at Desired Sales of Rs.80,00,000 vi) Sales at a profit of Rs,1,50,000 for each company from the above information.		
	UNIT-IV **CAPITAL BUDGETING**		
1	The cost of a project is Rs.50,000 and annual cash inflows for the next five years are given as follows: 1st Years Rs.25,000 2nd Years Rs.25,000 3th Years Rs.25,000 4th Years Rs.25,000 5th Years Rs.25,000 total 125,000 What is the pay-back period for the project?		
2	X Ltd. is producing articles mostly by manual labour and is considering replacing it by a new machine. There are two alternative models M and N of the new machines. Prepare a statement of profitability showing the pay-back period from the following information: **Particulars** | **Machine-M** | **Machine-N** Estimated Life | 4 years | 5 years Cost of machine | Rs.90,000 | Rs.1,80,000 Estimated Savings in scrap | Rs.5,000 | Rs.8,000		

		Estimated Savings in direct labour/ wages	Rs.60,000	Rs.80,000	
		Additional cost of Maintenance	Rs.8,000	Rs.10,000	
		Additional cost of supervision	Rs.12,000	Rs.18,000	
3	There are two projects X and Y. Each project requires an investment Rs.20,000. You are required to Rank these two projects according to pay-back period method from the following information: Net Profits Before Depreciation and After Tax (NPBDAT) for Two projects were given below:				
4	A firm is considering two projects each with an initial investment of Rs.20,000 and a life of 4 years. The following is the list of estimate cash inflows after taxes and depreciation.			Apply	6
5	Company has an investment opportunity costing Rs.50,000 with the following expected net cash flows after taxes and before depreciation.			Understand	6
6	**No project is acceptable unless the yield is 10%. Cash Inflows of a certain project along with Cash outflows are given below:**				

Years	Proposal-I	Proposal-II	Proposal-III
1	12,500	11,750	13,500
2	12,500	12,250	12,500
3	12,500	12,500	12,250
4	12,500	13,500	11,750
Total	50,000	50,000	50,000

Determine Accounting Rate of Return on (i) Average Capital (ii) Original Capital Employed.

Years	Net Cash Flows (Rs.)	P.V. of Rs.1 @10% D.f
1	20,000	0.909
2	15,000	0.826
3	25,000	0.751
4	10,000	0.683

Using 10% as the cost of capital determine
(i) Pay-back Period (ii) Discounted Pay-back Period (iii) Net Present Value @10% D.f. and (iv) Profitability Index @10% D.f.

Years	1	2	3	4
P.V. of Rs.1 @10% D.f	0.909	0.826	0.751	0.683

Years	Cash Outflows (Rs.)	Cash Inflows (Rs.)
0	1,50,000	----------
1	30,000	20,000
2	----------	30,000
3	----------	60,000

	4	--------	80,000	Apply	6
	5	--------	30,000		

The salvage value at the end of the 5th year is Rs.40,000.
Calculate (i) Net Present Value.
P.V. of Rs.1 @10%D.f as per Present Value Tables given below:

Years	1	2	3	4	5
P.V. of Rs.1 @10% D.f	0.909	0.826	0.751	0.683	0.621

7	ACompanyhasanestimatedLifeof4yearsandaninvestmentopportunitycostingRs.2,50,000withthefollowingexpectedNetCashflowAfterTaxesandBeforeDepreciation. **Years** / **Net Cash Flows (Rs.)** / **P.V. of Rs.1 @24% D.f** 1 / 1,20,000 / 0.806 2 / 90,000 / 0.650 3 / 1,60,000 / 0.524 4 / 30,000 / 0.423 Using24%asthecostofcapitaldeterminethefollowing:(i)Net PresentValue@24%D.f. (ii)ProfitabilityIndex@24%D.f(iii)Pay-backPeriod(iv)DiscountedPay-backPeriod	Remember	6
8	AprojectrequiresaninvestmentofRs.11,11,111andisexpectedtogeneratecashinflowsofRs.3,33,333,Rs.4,44,444,Rs.5,55,555Rs.4,44,444andRs.3,33,333forthenext5years.TheRiskfreecostofcapitalis11%.Evaluatetheprojectbyusing IRRMethodwiththehelpof25%and26%D.f.IfaRiskpremiumof9%isconsidered,howdoyouevaluatethe projectanddoyouobserveanychangeinyourearlierdecision?Compute(i)FakePay-backperiodand(ii)IRRwiththehelpof25%and26%D.f. Years / 1 / 2 / 3 / 4 / 5 P.V.Factor@25% / 0.800 / 0.640 / 0.512 / 0.410 / 0.328 P.V.Factor@26% / 0.794 / 0.630 / 0.500 / 0.397 / 0.315	Understand	6
9	AprojectrequiresaninvestmentofRs.1,44,000andisexpectedtogeneratecashinflowsofRs.54,000,Rs.63,000,Rs.72,000,Rs.63,000andRs.54,000perannumforthenext5years.Compute(i)FakePay-backperiod(ii)IRRwiththehelpof31%and32%D.f. Years / 1 / 2 / 3 / 4 / 5 P.V.Factor@31% / 0.763 / 0.583 / 0.445 / 0.340 / 0.259 P.V.Factor@32% / 0.758 / 0.574 / 0.435 / 0.329 / 0.250	Apply	6

10	ACompanyhasaninvestmentopportunitycostingRs.40,000withthefollowingexpectednetcashflowaftertaxesandbeforedepreciation. Years | NetCashFlows(Rs.) | P.V.ofRs.1@10%D.f | P.V.ofRs.1@15%D.f 1 | 7,000 | 0.909 | 0.870 2 | 7,000 | 0.826 | 0.756 3 | 7,000 | 0.751 | 0.658 4 | 7,000 | 0.683 | 0.572 5 | 7,000 | 0.621 | 0.497 6 | 8,000 | 0.564 | 0.432 7 | 10,000 | 0.513 | 0.376 8 | 15,000 | 0.467 | 0.327 9 | 10,000 | 0.424 | 0.284 10 | 4,000 | 0.386 | 0.247 Using10%asthecostofcapital,Determine(i)Pay-backperiod.(ii)NetPresentValue@10%D.f.and15%D.f.iii)ProfitabilityIndex@10%D.f.andiv)IRRwiththehelpof10%and15%D.f.	Understand	6
11	ComputetheAccounting/AverageRateofReturn(ARR)fortheprojectsAandBon(i)OriginalInvestment(ii)AverageInvestmentfromthefollowinginformation. Particulars | Project-A | Project-B OriginalInvestment | Rs.20,000 | Rs.30,000 ExpectedLife(Nosalvage Value) | 4Years | 5Years ProjectedNetIncome(PAT) | | 1st Year | Rs.2,000 | Rs.3,000 2nd Year | 1,500 | 3,000 3rd Year | 1,500 | 2,000 4th Year | 1,000 | 1,000 5th Year | Nil | 1,000 TotalPAT | 6,000 | 10,000 Iftherequiredrateofreturnis12%whichprojectshouldbeundertaken?	Remember	6
	UNIT-V **INTRODUCTIONTOFINANCIALACCOUNTING&FINANCIALANALYSIS**		
1	WriteJournalEntriesinthebooksofMr.Sukumarfromthefollowingtransactions 2008,Jan.1st GoodspurchasedfromRajuoncreditRs.10,000Jan 2nd GoodspurchasedfromRamuRs.20,000 Jan3rd GoodsreturnedtoRajuRs.1,000Jan4th GoodsreturnedtoRamuRs.2,000 Jan5th GoodssoldtoSureshoncreditRs.30,000Jan6th GoodssoldtoMaheshRs.40,000 Jan7th GoodsreturnedfromMaheshRs.4,000Jan8th GoodsreturnedbySureshRs.3,000Jan9th BuildingsoldtoVenkatRs.50,000 Jan31st FurniturepurchasedfromKishoreRs.5,000Jan31st DepreciationchargedonMachineryRs.3,000	Understand	7

2	WriteJournalEntriesfromthefollowingtransactions2002,Jan.1st BusinesscommencedwithRs.15,000 Jan.2nd.CashpaidintobankRs.10,000Jan.3rd.SoldgoodsforcashRs.7,000 Jan.4th.PurchasedgoodsfromVijayRs.3,000Jan.5th.MachineryPurchasedforRs.5,000Jan.31st RentpaidRs.2,000	Apply	7
3	WriteJournalEntriesfromthefollowingtransactions 2010,March1st BusinessstartedbyRamaRaowithcashRs.40,000,ChequeRs.25,000andStockRs.25,000. March2nd GoodstakenbyproprietorforhispersonaluseRs.10,000March3rd CashTakenforpersonaluseRs.5,000 March4th InvestmentpurchasedforRs.8,000March5th SaleofFurnitureforRs.2,000March6th Goodssoldto Ganeshfor10,000. March7th GoodsreturnedfromGaneshRs.2,000March7th ChequereceivedfromGaneshfor3,000March8th Ganeshchequewasdishonoured. March9th Ganeshbecameinsolvent,0.50paisainarupeewascollectedfromhisestatetowardsfinalsettlementandtheremainingbalancebeingBadDebts. March10th GoodspurchasedfromKameshRs.20,000March11th GoodsreturnedtoKameshRs.2,000 March12th AmountofRs.17,500paidtoKameshinfullsettlementofhisAccount. March13th InsurancePremiumpaidtoLICofIndiabychequeRs.15,000 March14th CommissionreceivedfromNareshRs.5,000March15th GoodssoldtoPrasadoncreditRs.30,000March16th PrasadreturnedgoodstousRs.3,000 th	Remember	7
4	WriteJournalEntriesinthebooksofMr.SivaKumarfromthefollowingtransactions. 2010,Jan.1st BusinessstartedwithcashRs.30,000,ChequeRs.20,000andStockRs.10,000Jan2nd CashdepositedintheBankRs.5,000 Jan3rd CashwithdrawnfromtheBankRs.3,000forOfficeuseJan4th CashWithdrawnfromthebankforpersonaluseRs.1,000Jan5th GoodspurchasedfromRajaoncreditForRs.5,000 Jan6th GoodsreturnedtoRajaRs.1,000 Jan7th CashpaidtoRajaRs.3,600infullsettlementofhisaccountRs.4,000. Jan8th GoodssoldtoArjunoncreditforRs.3,500Jan9th GoodsreturnedfromArjunRs.500 Jan10th Arjunsettledhisaccountwithamountof Rs.2,900 Jan11th GoodstakenbyproprietorforhispersonaluseRs.5,000Jan12th	Understand	7

5	WriteJournalEntriesfromthefollowinginthebooksofMr.Praveen. 2009,Dec1st BusinessstatedwithcashRs.50,000,StockRs.30,000andFurniture Rs.10,000andMachineryRs.20,000. Dec2nd TelephonechargespaidincashRs.5,000Dec3rd TransportchargespaidbychequeRs.3,000 Dec4th AdvertisementschargespaidtoNagaRajuRs.4,000 Dec5th DividendreceivedfromAshokcompanyPvt.Ltd.Rs.2,000Dec6th FurniturepurchasedforpersonaluseRs.5,000 Dec7th RentpaidtoLandlordRamanaforRs.8,000Dec8th MachinerypurchasedforRs.15,000 Dec9th Buildingpurchasedfor1,00,000 Dec10th ComputerpurchasedbychequeforPersonaluseRs.20,000Dec11th InvestmentssoldforRs.25,000 Dec12th SaleofMachineryforRs.30,000Dec13th SaleofFurnitureforRs.10,000 Dec14th SaleofBuildingforcashRs.1,50,000D	Apply	7
6	WriteJournalEntriesinthebooksofGopalfromthefollowing:2008, May1st BusinessstartedwithRs.60,000 May2nd SaleofTypewriterforRs.1,000 May3rd SalariespaidtostaffbychequeRs.5,000May4th WagespaidtoLabourforRs.15,000. May5th RentpaidtoLandlordRajaRaoRs.8,000May6th InterestreceivedfromRajaniRs.2,000 May7th CommissionreceivedfromKamalaRs.3,000May8th InsurancepaidbychequeRs.3,000 May9th TelephoneRentPaidincashRs.2,000May10th StationeryPurchasedforRs.1,000May11th Telegramssenttto NewDelhiRs.2,500 May12th AdvertisementchargespaidincashRs.5,000May13th MachineryPurchasedforRs.90,000 May14th FurniturepurchasedforpersonaluseRs.30,000May13th DepreciationchargedonMachineryRs.9,000May14th DepreciationchargedonFurnitureRs.3,000May15th RepairsPaidonBuildingsRs.15,000	Remember	7
7	Recordthefollowingtransactionsinthebooksof KrishnaMohan. 2007,June1st BusinessstartedwithcashRs.25,000andChequeRs.20,000. June2nd InterestpaidforRs.5,000 June3rd CommissionpaidbychequeRs.2,000June4th BadDebtswrittenoffonDebtorsRs.3,000 June5th BadDebtsrecoveredfromDebtorsRs.1,500June6th RentpaidtoNareshRs.10,000 June7th InterestreceivedfromRaghuRs.2,000 June8th CommissionreceivedfromKameshRs.7,000June9th CashpaidtoSrinivasRs.6,000 June10th ChequeissuedtoSrikanthRs.7,000June14th SrikanthchequewasDishonoured.June15th CashreceivedfromKiranRs.8,000 June16th ChequereceivedfromGayathriRs.10,000June20th Gayathrichequewasdishonoured.	Understand	7

8	WriteJournalEntriesinthebooksMr.Mahendrafromthefollowingtransactions: 2006,April1st BusinessstartedwithCashRs.1,00,000.April2nd OpenedcurrentaccountwithBankRs.50,000April3rd InterestreceivedonInvestmentRs.5,000April4th GoodssoldtoRamuforRs.20,000 April4th BillsreceivableReceivedfromRamuRs.20,000for2months.April5th TheaboveBillsreceivablewasdiscountedatBankat19,800April6th TheaboveB/Rwasdishonoured. April7th GoodspurchasedfromPratapforcashRs.10,000April8th GoodssoldtoMaheshoncashRs.15,000 April9th GoodspurchasedfromSaratforRs.12,000 April10th Acceptance(B/P)giventoSaratfor3monthsforRs.12,000April11th TheaboveB/Pwasdishonoured. April12th AchequereceivedfromHariforRs.1,000April13th Hari'sChequewasdishonoured. April14th AchequeissuedtoMalhotraforRs.7,000Ap	Apply	7
9	Record/considerthefollowingtransactionsinthebooksofMr.Kiran.2009, July1st BusinessstartedwithcashRs.50,000 July2nd CashdepositedintoBankRs.20,000July3rd CashWithdrawnfromBankRs.10,000 July4th CashtakenfrombankforpersonaluseRs.5,000July5th CashPaidtoMohanRs.15,000 July6th CashreceivedfromAmarRs.8,000July7th ChequereceivedfromBharatRs.2,000July8th ChequeIssuedtoCharanRs.7,000 July9th MachineryPurchasedoncashRs.12,000July10th FurnituresoldforcashRs.8,000 July11th SalariespaidRs.15,000 July12th RentreceivedRs.5,000 July28th RentpaidtoLandlordRamaRaoRs.13,000July29th CommissionreceivedfromSujathaRs.10,000 July30th GoodspurchasedfromKrishnaoncashRs.20,000July31st GoodssoldtoGopalforcashRs.30,00	Understand	7
10	Prepare**TrialBalance**ason31.12.2009underbalancesmethodfromthefollowinginformation: CapitalRs.6,000;CashinhandRs.500;BillsReceivableRs.4,550;Land&BuildingRs.6,000;PurchasesRs.7,000;SalesRs.8,000;DebtorsRs.3,300;CreditorsRs.600;BillsPayableRs.2,750;BankOverdraftRs.4,000.	Remember	7
11	Prepare**TrialBalance**ason31.3.2002underbalancesmethodfromthefollowinginformation DrawingsRs.4,000;DiscountAllowedRs.1,500;DiscountReceivedRs.500;OfficeExpensesRs.2,000;ManufacturingExpensesRs.1,200;BillsPayableRs.17,000;BillsReceivableRs.10,000;CashinHandRs.4,800;CashatBankRs.30,800;OfficeRentRs.3,600;BharatCapitalRs.2,00,000;MachineryRs.60,000;Stockason1.4.2001Rs.32,000;WagesRs.1,00,000;CarriageInwardsRs.1,000;Salaries Rs.10,000;FactoryRentRs. 4,800 ; Repairs Rs. 800; Fuel &PowerRs.5,000;FurnitureRs.11,000;BuildingsRs.80,000;SundryDebtorsRs.40,000; SalesRs.4,07,200;Purchases Rs.2,44,000;CreditorsRs.25,000;ReturnsInwardsRs.7,200;ReturnsOutwardsRs.4,000.	Understand	7

12	PrepareTrialBalanceofMr.Rajaramason31.12.2005fromthefollowingbalances: Rs. Rs. 1. SundryDebtors32,000 9.Stockason1.1.200522,000 2. CashinHand 35 10.CashatBank 1,545 3. Plant&Machinery17,500 11.SundryCreditors 10,650 4. Tradeexpenses 1,075 12.Sales 2,34,500 5. Salaries 2,225 13.CarriageOutwards 400 6. Rent 900 14.BillsPayable 7,500 7. Purchases 2,18,870 15.DiscountAllowed 1,100 8. Capital 79,500 16.BusinessPremises 34,500	Apply	7
13	YouarerequiredtoshowthatTrialBalanceason31.12.1998fromthefollowingInformation: (1)Land&BuildingsRs.2,750(2)Plant&MachineryRs.1,332(3) Stockon1.1.1998 Rs.4,173(4)SalesRs.20,783 (5)PurchasesRs.12,733(6)CarriageinwardsRs.478 (7)BadDebtsRs.225 (8)WagesRs.1,227 (9)DebtorsRs.5,445 (10)CreditorsRs.2,429 (11)DiscountReceivedRs.763 (12)DiscountAllowedRs.824 (13)FurnitureRs.192 (14)CapitalRs.10,659 (15)GeneralExpensesRs.1,338 (16)CashatBankRs.1,874 (17)Rent&RatesRs.188 (18)DrawingsRs.1,855.	Remember	7

<table>
<tr>
<td>14</td>
<td>FromthefollowingTrialBalanceandAdjustments,showTradingandProfit&LossAccountfortheyearending31-12-2003andBalanceSheetasonthatdateinthebooksofMr.Vijay.
Adjustments:
1. ClosingStockRs.80,000.
2. OutstandingSalariesRs.10,000.
3. DepreciateBuildingsby10%p.a.
<table>
<tr><th>Sl. No.</th><th>HeadsofAccounts</th><th>L.F</th><th>DebitBalance(Rs.)</th><th>CreditBalance(Rs.)</th></tr>
<tr><td>1.</td><td>Electricity</td><td></td><td>14,000</td><td></td></tr>
<tr><td>2.</td><td>Discount</td><td></td><td></td><td>22,000</td></tr>
<tr><td>3.</td><td>Interest</td><td></td><td>16,000</td><td></td></tr>
<tr><td>4.</td><td>Wages</td><td></td><td>50,000</td><td></td></tr>
<tr><td>5.</td><td>OpeningStock</td><td></td><td>20,000</td><td></td></tr>
<tr><td>6.</td><td>Rent</td><td></td><td>24,000</td><td></td></tr>
<tr><td>7.</td><td>Sales</td><td></td><td></td><td>8,00,000</td></tr>
<tr><td>8.</td><td>Purchases</td><td></td><td>3,00,000</td><td></td></tr>
<tr><td>9.</td><td>OfficeExpenses</td><td></td><td>30,000</td><td></td></tr>
<tr><td>10.</td><td>Land&Building</td><td></td><td>5,40,000</td><td></td></tr>
<tr><td>11.</td><td>Salaries</td><td></td><td>90,000</td><td></td></tr>
<tr><td>12.</td><td>Returns</td><td></td><td>20,000</td><td>10,000</td></tr>
<tr><td>13.</td><td>Power,GasandWater</td><td></td><td>30,000</td><td></td></tr>
<tr><td>14.</td><td>SundryCreditors</td><td></td><td></td><td>60,000</td></tr>
<tr><td>15.</td><td>Capital</td><td></td><td></td><td>3,02,000</td></tr>
<tr><td>16.</td><td>Furniture</td><td></td><td>15,000</td><td></td></tr>
<tr><td>17.</td><td>SundryDebtors</td><td></td><td>60,000</td><td></td></tr>
<tr><td>18.</td><td>BillsPayable</td><td></td><td></td><td>15,000</td></tr>
<tr><td></td><td>TOTAL</td><td></td><td>12,09,000</td><td>12,09,000</td></tr>
</table>
</td>
<td>Understand</td>
<td>7</td>
</tr>
<tr>
<td>15</td>
<td>FromthefollowingBalanceSheet,Youarerequiredtocalculate(i)GrossProfitRatio(ii)DebtorsTurnoverRatio(iii)AverageCollectionPeriod(iv)CreditorsTurnoverRatio(v)AveragePaymentPeriod(vi)Stock/InventoryTurnoverRatio

BalanceSheetofM/s.XYZ Ltdason31st March,2003.
<table>
<tr><th>Liabilities</th><th>Amount (Rs.)</th><th>Assets</th><th>Amount(Rs.)</th></tr>
<tr><td>Paid-upCapital</td><td>15,00,000</td><td>FixedAssets</td><td>16,50,000</td></tr>
<tr><td>Reserves& Surplus</td><td>6,00,000</td><td>Stock-in-Trade /ClosingStock/Inventory</td><td>9,10,000</td></tr>
</table>
</td>
<td>Remember</td>
<td>7</td>
</tr>
</table>

	Debentures	5,00,000	Book Debts / Trade Debtors	12,40,000		
	Bank Overdraft	2,00,000	Investments (Short-Term)	1,60,000		
	Trade Creditors	12,00,000	Cash –in-hand	40,000		
		40,00,000		40,00,000		

Other Information:

1. Annual Credit Sales amounted to Rs. 74,40,000.
2. Gross Profit Rs. 7,44,000.
3. Bank Overdraft is payable on demand.

16 You are required to compute i) Debt Equity Ratio ii) Proprietary Ratio iii) Fixed Assets Ratio iv) Interest Coverage Ratio from the following Balance Sheet.

Liabilities	**Amount (Rs.)**	**Assets**	**Amount (Rs.)**
Equity Share Capital	10,00,000	Goodwill	5,00,000
6% Preference Share Capital	5,00,000	Plant& Machinery	6,00,000
General Reserve	1,00,000	Land & Building	7,00,000
Surplus (P&L A/c)	4,00,000	Furniture	1,00,000
12% Debentures	5,00,000	Stock- in -Trade	6,00,000
Creditors	80,000	Bills Receivables	30,000
Bank Overdraft	20,000	Debtors	1,50,000
Bills Payable	1,24,000	Bank Balance	2,00,000
Provision for Taxation	1,76,000	Marketable Securities	20,000
	29,00,000		**29,00,000**

Other Information: Earnings Before Interest and Taxes (EBIT) Rs. 5,00,000

Understand 7

17 You are required to calculate General Profitability Ratios like (i) Gross Profit Ratio (ii)Net Profit Ratio (iii) Operating Ratio (iv) Operating Profit Ratio (v) Earnings per Share(EPS) (vi) Price Earnings Ratio (P/E Ratio) (vii) Cost of Goods Sold Ratio (viii) Administrative Expenses Ratio (ix)Selling &Distribution Expenses Ratio from the following Trading and Profit & Loss Account

Trading and Profit & Loss A/c of Mr. Mukesh for the year ending 31-12-2008.

Dr Cr

Particulars	**Amount Rs.**	**Particulars**	**Amount Rs.**
To Opening Stock	76,250	By Net Sales	5,00,000
To Purchases	3,15,250	By Closing Stock	98,500
To Wages	7,000		
To Gross Profit (B.F) (To be transferred to P&L A/c)	2,00,000		
	5,98,500		**5,98,500**
To Administrative Expenses	1,01,000	By Gross Profit	2,00,000
To Selling & Distribution Expenses	12,000	By Non-operating Income	6,000

Apply 7

	To Non-operating Expenses(Depreciation, Interest and Tax)	9,000				
	To Net Profit (B.F) (To be transferred to Capital A/c)	84,000				
		2,06,000		**2,06,00**0		

Other Information:

10,000 Equity Shares Market Price @ Rs.10 each	Rs.1,00,000

18	You are required to compute i) Current Ratio ii) Quick Ratio / Acid Test Ratio iii) Absolute Quick Ratio from the following Balance Sheet.				Evaluate	7

Liabilities	Amount (Rs.)	Assets	Amount (Rs.)
Equity Share Capital	10,00,000	Goodwill	5,00,000
6% Preference Share Capital	5,00,000	Plant& Machinery	6,00,000
General Reserve	1,00,000	Land & Building	7,00,000
Profit & Loss A/c	4,00,000	Furniture	1,00,000
12% Debentures	5,00,000	Stock- in -Trade	6,00,000
Creditors	80,000	Bills Receivables	30,000
Bank Overdraft	20,000	Debtors	1,50,000
Bills Payable	1,24,000	Bank Balance	2,00,000
Provision for Taxation	1,76,000	Marketable Securities	20,000
	29,00,000		29,00,000

19	From the following Balance Sheet, You are required to Find out (1) Debt-Equity Ratio (2) Proprietary Ratio (3) Stock / Inventory Turnover Ratio (4) Average collection Period. (5) Current Ratio (6) Acid-Test Ratio / Quick Ratio.				Understand	7

Balance Sheet of M/s. XYZ Ltd as on 31st March, 2003.

Liabilities	Amount (Rs.)	Assets	Amount(Rs.)
Share Capital	1,00,000	Land Buildings	1,25,000
Reserves & Surplus	65,000	Plant & Machinery	75,000
5% Debentures	1,00,000	Stock / Inventory	50,000
Bills Payable	7,000	Book Debts	10,000
Sundry Creditors	18,000	Bills Receivable	5,000
		Cash at Bank	20,000
		Preliminary Expenses	5,000
	2,90,000		2,90,000

Other Information: Sales for the year Rs.6,00,000

20	You are required to Compute i) Gross Profit Ratio ii) Net Profit Ratio iii) Operating Ratio iv) Operating Profit Ratio from the following Trading and Profit& Loss Account.						
		Particulars	Amount Rs.	Particulars	Amount Rs.	Remember	7
		To Opening Stock	30,000	By Net Sales	1,10,000		
		To Purchases	60,000	By Closing Stock	20,000		
		To Wages	10,000				
		To Gross Profit	30,000				
			1,30,000		**1,30,000**		
		To Administrative Expenses	10,000	By Gross Profit	30,000		
		To Selling & Distribution Expenses	5,000	By Sundry Receipt	5,000		
		To Net Profit	20,000				
			35,000		**35,00**0		

Prepared by : HOD,CSE

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	**PROBABILITY AND STATISTICS**			
Course Code	**2030004**			
Regulation	**R20 - JNTUH**			
Course Structure	Lectures	Tutorials	Practical	Credits
	3	-	-	3
Course Faculty	B. Sreedar Reddy , Asst.Prof			

I. COURSE OVERVIEW:

The course matter is divided into five chapters covering duly-recognized areas of theory and study. This course develops abstract and critical reasoning by studying logical proofs and the axiomatic method as applied to basic probability and to make connections between probability and other branches of mathematics. The topics covered include probability, random variables and distributions, correlation and regression, sampling distribution, testing of hypothesis for large samples and small samples, queuing theory and stochastic process. The course helps students gain an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study.

II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	3	3	Basic Statistics and Algebra

III. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
There shall be two midterm examinations. Each midterm examination consists of subjective type and objective type tests. The subjective test is for 25 marks of 90 minutes duration. Subjective test of shall contain 10 questions, the student has to answer 10 questions, each carrying 1 mark. The long type test is for 15 marks. It consists the student has to answer all the questions and each carry two half mark. First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.	70	100

Sessional Marks	University End Exam marks	Total marks
commencement of the semester. These are of problem solving in nature with critical thinking. Marks shall be awarded considering the average of two midterm tests in each course.		

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	90 minutes	25
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	25
4.	II Assignment	-	5
5.	External Examination	3 hours	70

V. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

1. Expose students to the elements of probability, probability distributions and statistical inference.
2. Provide an introduction to probability and statistics with applications.
3. Develop an understanding about the role of statistics in engineering.
4. Develop an understanding about the application of statistical analysis to solve real-life problems.

VI. COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

CO	Course outcome	Blooms taxonomy level
C213.1	Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.	Analyze
C213.2	Apply discrete and continuous probability distributions.	Analyze
C213.3	Classify the concepts of data science and its importance.	Understand
C213.4	Infer the statistical inferential methods based on small and large sampling tests.	Understand
C213.5	Interpret the association of characteristics through correlation and regression tools.	Understand

VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, fundamentals, and an engineering engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge research methods including design of and experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, and modern engineering and IT tools resources, including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply principles and commit to professional ethical ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one‟s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Applications of Computing: Ability to use knowledge in various domains to provide solution to new ideas and innovations.	1	Lectures, Assignments
PSO2	Programming Skills: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.	2	Projects
PSO3	Make use of computational and experimental tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.	3	

III. SYLLABUS:

UNIT-I

Single Random variable and probability distribution: Random Variable-Discrete and continuous. probability distributions, mass function/density function of a probability distribution. mathematical expectation, moments about origin, central moments. Moment generating function of probability distribution. Binomial, passion & normal distributions and their properties. Moment generating functions of the above three distributions and hence find the mean and variance

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distribution-joint probability mass/density function, marginal probability mass/density function, covariance of two random variables, correlation-coefficient of correlation, the rank correlation Regression-Regression coefficient. The lines of regression and multiple correlation & regression.

UNIT-III

Sampling Distribution and Testing of Hypothesis:

Sampling: Definition of population, sampling, statistic, parameter. Types of sampling, expected values of sample mean and variance, sampling distribution, standard error, sampling distribution of means and sampling distribution of variance.

Parameter estimation-likelihood estimation, interval estimation.

Testing of Hypothesis: Null hypothesis, alternative hypothesis, type-I &type II errors-critical region, confidence interval, level of significance, one sided test, two sided test.

Large sample tests:

Test of equality of means of two samples equality of sample mean and population mean(cases of known variance & unknown variance, equal and unequal variances)

Tests of significance difference between sample S.D and population S.D

Tests of significance difference between sample proportion and population proportion & difference between two samples proportions.

Small sample tests:

Student t-distribution, its properties; test of significance difference between sample mean and population mean; difference between means of two small samples. Snedecor‟s F-distribution and its properties. Test equality of two population variances, Chi-square distribution and its properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: Structure of a queuing system,operating characteristics of queuing syatem.Transient and steady states,terminology of queuing system,arrival and service processes-pure birth-death process-deteministic queuing models-M/M/1 model of infinite queue,M/M/1 model finite queue.

UNIT-V

Stochastic processes: Introduction to stochastic process-classification of random processes,methods of description of random processes,stationary and non-stationary random process,average values of single random process and two or more random process.Markov process,Markov chain,classification of states-examples of Markov chains,Stochastic matrix.

Text Books:

1. Dr. B. S. Grewal, “Higher Engineering Mathematics”, Khanna publishers.
2. Sheldon M Ross, “Probability and Statistics for Engineering and Scientists”, Academic press.
3. S. D. Sarma, “Operation Research”.

Reference Books:

1. K. B. Datta and M.A.S.Srinivas, "Mathematics for Engineering", Cengage Publications.
2. T. K. V. Iyengar, B. Krishna, "Probability and Statistics", Gandhi Et.
3. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons.
4. Jay I Devore, "Probability and Statistics for Engineers and Scientists", California, 2004.

X. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes:

Lecture No.	Topics to be covered	Course Learning Outcomes	References
1	Single random variables and probability distributions: Introduction to probability	**Demonstrate** an understanding of the basic concept of probability and random variables	T1,R2
2	Definition of random variable	**Describe** the concept of random variables	T1,R2
3	Discrete probability distributions	**Contrast** discrete random variables and calculate the mean and variance of discrete random variables	T1,R2
4	Continuous probability Distributions	**Contrast** continuous Random variables and calculate the mean and variance of continuous Random variables	T1,R2
5	Density function of a probability Distribution	**Recall** the continuous probability function	T1,R2
6	Mathematical expectation, moment about origin	**Identify** mathematical mean and find moment about origin	T1,R2
7	Central moments, moment generating function of a probability distribution	**Generalize** central moments and moment generating functions of a probability distribution	T1,R2
8-9	Binomial distribution	**Recall** characteristics of the Binomial Distribution and find mean , variance	T1,R2
10-11	Poisson distribution	**Recognize** cases where Poisson Distribution could be appropriate model to find mean and variance	T1,R2
12-14	Normal distribution and their Properties	**Apply** Normal Distributions find the probability over a set of values, mean and variance	T1,R2
15	Moment generating functions of three distributions	**Apply** probability distribution to find moment generating functions	T1,R2
16	Multiple random variables, correlation and regression: Introduction joint probability Distribution	**Recall** the properties of sample correlation and identify which variable in Regression Analysis	T1,R2
17	Joint probability mass or density Function	**Apply** probability distribution	T1,R2
18-19	Marginal probability mass or density function	**Apply** marginal probability density function	T1,R2
20	Covariance of two random Variables	**Identify** the covariance of two random variables	T1,R2
21	Coefficient of correlation	**Recognize** the limitation of correlation as a summary of bivariate data.	T1,R2

22	Rank correlation	**Interpret** the correlation between the bivariate data by allotting ranks.	T1,R2
23-24	Regression coefficient	**Define** the concept of least squares estimation in linear regression	T1,R2
25-26	The lines of regression	**Estimate** the linear model to a bivariate data	T1,R2
27-28	Multiple correlation and regression	**Recognize** the multiple correlation of bivariate data	T1,R2
29	Sampling distribution and testing of hypothesis: definitions of sampling distributions	**Recall** the sampling distribution of the sample mean in general situation	T1,R2
30-31	Types of sampling, expected values of sample mean and Variance	**Distinguish** between a population and a sample and between parameters & statistics	T1,R2
32-33	Sampling distributions of means and variance	**Recall** the sampling distribution of the sample mean in general situation	T1,R2
34-35	Estimations	**Interpret** the confidence interval and confidence level	T1,R2
36	Testing of hypothesis	**Understand** the foundation for classical inference involving hypothesis testing	T1,R2
37	Procedure for testing of hypothesis	**Explain** the procedure and two types of errors possible	T1,R2
38	Testing of hypothesis with single Mean	**Identify** the confidence interval with single mean	T1,R2
39-40	Testing of hypothesis with difference of means	**Identify** the confidence interval with difference between the mean	T1,R2
41-42	Testing of hypothesis with single Proportion	**Identify** the confidence interval with difference between the proportions	T1,R2
43-44	Testing of hypothesis with difference of proportions	**Identify** the confidence interval with difference between the proportions	T1,R2
45-46	Student"s t-tests and its properties	**Recall** the definition of a t-statistics in terms of statistics of sample from a normal distribution	T1,R2
47-48	F-test	**State** and apply the definition of F-distribution	T1,R2
49-50	χ^2-test	**State** and apply the definition of χ^2– Distribution	T1,R2
51	Queuing theory: Introduction to queuing theory	**Apply** Poisson process in finding arrival and departure rates.	T3,R2
52	Structure of queuing system	**Define** and explain basic concepts in the theory Markov processes, M/M/1 queuing systems	T3,R2
53	Characteristics of queuing system	**Derive** and apply main formulas for some properties (such as stationary probabilities, average waiting and system time, expected number of customers in the queue, etc.) of M/M/1 queuing systems.	T3,R2
54	Transient and steady state	**Analyse**and solve problems	T3,R2
55	Pure birth and death process	**Calculate** the traffic intensity, blocked traffic and the utilization of some queuing systems	T3,R2

56	M/M/1-model -1	**Define** and explain basic concepts in the theory Markov processes, M/M/1 queuing systems	T3,R2
57	M/M/1-model -2	**Define** and explain basic concepts in the theory Markov processes, M/M/1 queuing systems	T3,R2
58	Stochastic process: introduction to stochastic processes	**Understand** the theory of multivariate data	T3,R2
59	Classification of random processes	**Classify** different types of random processes	T3,R2
60	Markov process	**Define** and explain basic concepts in the theory Markov processes	T3,R2
61	Classification of state	**Classify** different states of Markov process	T3,R2
62	Markov chains	**Understand** the concept of Markov chain	T3,R2
63	Stochastic matrix	**Define** stochastic matrix and apply the process to practical problems	T3,R2

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Program outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO 1**	**PSO 2**	**PSO 3**
C213.1	3	3	3	3	0	0	0	0	0	0	0	1	0	0	3
C213.2	3	3	3	3	0	0	0	0	0	0	0	1	2	3	0
C213.3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
C213.4	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
C213.5	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
Average	3	3	3	3								1	2	3	3

COMPUTER SCIENCE AND ENGINEERING

ASSIGNMENT

Course Name	**PROBABILITY AND STATISTICS**
Course Code	2030004
Class	II B. Tech I Semester
Branch	Computer Science and Engineering
Year	2022-2023
Course Faculty	B. Sreedar Reddy , Asst.Prof

OBJECTIVES:

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner‟s learning process.

ASSIGNMENT – I

S.No	QUESTION	Blooms Taxonomy Level	Course Outcome
	UNIT – I (SHORT QUESTIONS)		
1	Define Random Variable with suitable examples	Understand	2
2	Explain mathematical expectation	Analyze	3
3	If X & Y is a random variable then Prove E[X+Y] = E[X]+E[Y]	Understand	3
4	If X & Y is a random variable then Prove E[XY] = E[X].E[Y] if X & Y are independent	Understand	3
5	If X is a random variable then Prove E[X-μ]= 0 ,where μ is the Mean of the variable X	Understand	3
6	Define Binomial Distribution and give example	Evaluate	4
7	Derive mean of binomial distribution	Evaluate	4
8	Derive variance of binomial distribution	Evaluate	4
9	Define Poisson distribution and give example	Understand & Create	4
10	Write the conditions of Poisson distribution	Analyze	4
	UNIT – I (LONG QUESTIONS)		
1	If a random variable has the probability density $f(x)=2e^{x}$ for $x>0$ and 0 for $x \leq 0$ find probability that it will take on value i) between 1 and3 ii) greater than 0.5	Apply	3
2	A player tosses 3 fair coins. He wins Rs 800 if 3 tails occur, Rs 500 if 2 tails occur, Rs 300 if one tail occurs. On the other hand, he loses Rs 1000 if 3 heads occur. Find the Value of the game to the player. Is it favorable?	Apply	3
3	Determine the discrete probability distribution, expectation, variance, s.d. of a D.R.V X Which denotes the minimum of the two numbers that appear when a	Evaluate	3

S.No	QUESTION	Blooms Taxonomy Level	Course Outcome
	pair of fair dice is? Thrown once.		
4	In a Normal distribution, 31% of the items are under 45 and 8% are over 64 find the Mean and variance of distribution	Evaluate	1
5	A manufacturer of cotter pins knows that 5% of his product is defective. Pins are soldIn boxes of 100. He guarantees that not more than 10 pins will be defective. Determine the probability that a box will fail to meet the guarantee.	Apply	4
6	The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Find $P(X \geq 1)$ and $P(X > 2)$	Evaluate	4
7	Fit binomial distribution for the following data X: 0, 1, 2, 3, 4 f: 30, 62, 46, 10, 2	Evaluate	4
8	Fit a Poisson distribution to the following data X: 0, 1, 2, 3, 4, 5 F: 2, 14, 20, 34, 22, 8	Evaluate	4
9	If F[X] = $\begin{cases} 0, if x \leq 1 \\ k(x-1)^4, if\ 1 \leq x \leq 3 \\ 1, if x > 3 \end{cases}$ then determine (i) f(x) (ii) k (iii) Mean	Apply	3
10	Obtain the moment generating function of the random variable having probability density function f(x)=$\begin{cases} x, 0 \leq x < 1 \\ 2-x, 1 \leq x < 2 \\ 0, elsewhere \end{cases}$	Evaluate	3
	UNIT – II (SHORT QUESTIONS)		
1	what is meant by joint probability distribution function	Analyze	1
2	Define joint density function	Remember	1
3	State the properties of joint distribution function of two random variable	Understand	1
4	What are marginal distribution function	Analyze	2
5	What are marginal density function	Analyze	2
6	What are the necessary properties to test a valid joint density function	Analyze	2
7	Define correlation	Understand	3
8	Write the different methods of studying correlation	Create	3
9	Show that correlation coefficient lies between -1 and1	Understand	3
10	Explain Rank correlation coefficient	Analyse	4
	UNIT – II (LONG QUESTIONS)		
1	If x=2y+3 and y=kx+6are the regression lines of x and y on x respectively show that i)show that $0 \leq k \leq 1/2$ ii)k=1/8 find r and $(\bar{x}, \bar{y})$	Understand	4
2	Ifθ is angle between two regression lines of y on x and x on y then prove that $\tan\theta = \frac{1-r^2}{r}\left\lfloor \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2} \right\rfloor$.	Understand	3
3	The joint probability density function is	Apply	2

S.No	QUESTION	Blooms Taxonomy Level	Course Outcome
	f(x,y) = $\begin{cases} Ae^{-x-y}, & o < x < y, o < y < \infty \\ 0 \quad , & otherwise \end{cases}$ Determine A.		
4	Let X and Y random variables have the joint density function f(x,y)=2,0<x<y<1then find marginal density function	Evaluate	1
5	Find the rank correlation coefficient for the following data X: 68, 64, 75, 50, 64, 80, 75, 40, 55, 64 Y: 62, 58, 68, 45, 81, 60, 68, 48, 50, 70	Evaluate	2
6	Find the Multiple regression line to the following data X: 3, 5, 6, 8, 12, 14 Y: 16, 10, 7, 4, 3, 2 Z: 90, 72, 54, 42, 30, 12	Evaluate	3
7	Find the Regression lines for the following data X: 65, 66, 67, 67, 68, 69, 70, 72 Y: 67, 68, 65, 68, 72, 72, 69, 71	Apply	4
8	Find the coefficient of correlation for the following data X: 65, 66, 67, 67, 68, 69, 70, 72 Y: 67, 68, 65, 68, 72, 72, 69, 71	Apply	3
9	Derive the rank correlation coefficient formula	Evaluate	2
10	Two independent variable X and Y have means 5 and 10 and variances 4 and 9 respectively. Find the coefficient of correlation between U and V where U=3x+4y, V=3x-y	Evaluate	1
	UNIT – III (SHORT QUESTIONS)		
1	Write a short note on Sampling	Understand	1
2	Explain about Level of Significance, critical region.	Analyze	1
3	Explain about Estimation,	Analyze	2
4	Prove that sample Mean is Unbiased Estimation of Population Mean	Understand	2
5	Write the working procedure for the testing of Hypothesis	Evaluate	2
	UNIT – III (LONG QUESTIONS)		
1	A sample of 100 electric bulbs produced by manufacturer „A" showed a mean life timeOf 1190 hrs and an s .d. of 90 hrs A sample of 75 bulbs produced by manufacturer „B" Showed a mean life time of 1230 hrs with s.d. of 120 hrs. Is there difference between the mean life times of the two brands at a significance level of 0.05	Apply	1
2	In a random sample of 60 workers, the average time taken by them to get to work is 33.8 minutes with a standard deviation of 6.1 minutes .Can we reject the null hypothesis $\mu = 32.6$ minutes in favor of alternative null hypothesis $\mu > 32.6$ at $\alpha = 0.025$ level of significance	Apply	1
3	On the basis of their total scores, 200 candidates of a civil service examination are divided into two groups, the upper 30% and the remaining 70%. Consider the first question of the examination. Among the first group, 40 had the correct answer, whereas among the second group, 80 had the correct answer. On the basis of these results, can one conclude that the first question is not good at discriminating ability of the type being examined here	Apply	2
4	A cigarette manufacturing firm claims that brand A line of cigarettes outsells its brand B by 8% .if it is found that 42 out of a sample of 200 smokers prefer brand A and 18 out of another sample of 100 smokers prefer brand B. Test whether 8%	Apply	3

<table>
<tr><th>S.No</th><th>QUESTION</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td></td><td>difference is a valid claim.</td><td></td><td></td></tr>
<tr><td>5</td><td>If 48 out of 400 persons in rural area possessed „cell“ phones while 120 out of 500 in urban Area. Can it be accepted that the proportion of „cell“ phones in the rural area and Urban area is same or not. Use 5% of l .o .s</td><td>Apply</td><td>4</td></tr>
<tr><td colspan="4">ASSIGNMENT – II
UNIT – III (SHORT QUESTIONS)</td></tr>
<tr><td>1</td><td>Explain about two tailed and single tailed tests</td><td>Remember</td><td>1</td></tr>
<tr><td>2</td><td>Explain about t-Distribution</td><td>Remember</td><td>1</td></tr>
<tr><td>3</td><td>Explain about F-Statistic</td><td>Remember</td><td>2</td></tr>
<tr><td>4</td><td>Write Properties of F-Statistic distribution</td><td>Analyze</td><td>2</td></tr>
<tr><td>5</td><td>Write Properties of Chi- Square distribution</td><td>Analyze</td><td>3</td></tr>
<tr><td colspan="4">UNIT – III (LONG QUESTIONS)</td></tr>
<tr><td>1</td><td>In an investigation on machine performance the following results are obtained<table><tr><th></th><th>No. of units inspected</th><th>No. of defectives</th></tr><tr><td>Machine I</td><td>375</td><td>17</td></tr><tr><td>Machine II</td><td>450</td><td>22</td></tr></table>Test whether there is any significance performance of two machines at $\alpha = 0.05$.</td><td>Apply</td><td>4</td></tr>
<tr><td>2</td><td>Producer of „gutkha“ claims that the nicotine content in his „gutkha“ on the average is83 mg. can this claim be accepted if a random sample of 8 „gutkhas“ of this typehave the nicotine contents of 2.0,1.7,2.1,1.9,2.2,2.1,2.0,1.6 mg.</td><td>Apply</td><td>4</td></tr>
<tr><td>3</td><td>A sample of 26 bulbs gives a mean life of 990 hrs with S.D of 20hrs. The manufacturer claims that the mean life of bulbs 1000 hrs. Is the sample not upto the standard?</td><td>Apply</td><td>3</td></tr>
<tr><td>4</td><td>A random of 10 boys had the following I.Q“s 70,120,110,101,88,83,95,98,107,100. Do the data support the assumption of population means I.Q of 100 . Test at 5% level of significance?</td><td>Apply</td><td>2</td></tr>
<tr><td>5</td><td>In one sample of 8 observations the sum of squares of deviations of the sample is 84.4 and other sample of 10 observations was 102.6 .test the difference is significant at 5% level</td><td>Apply</td><td>1</td></tr>
<tr><td colspan="4">UNIT – IV (SHORT QUESTIONS)</td></tr>
<tr><td>1</td><td>What is queuing problem</td><td>Analyse</td><td>1</td></tr>
<tr><td>2</td><td>Explain representation of queuing models</td><td>Remember</td><td>2</td></tr>
<tr><td>3</td><td>Give examples of different types of queuing models</td><td>Create</td><td>2</td></tr>
<tr><td>4</td><td>Derive expected number of queue</td><td>Evaluate</td><td>2</td></tr>
<tr><td>5</td><td>Derive average waiting time in system</td><td>Evaluate</td><td>2</td></tr>
<tr><td>6</td><td>Define service discipline</td><td>Understand</td><td>2</td></tr>
<tr><td>7</td><td>Define idle and busy time</td><td>Understand</td><td>3</td></tr>
<tr><td>8</td><td>Explain M/M/1 model</td><td>Analyse</td><td>3</td></tr>
<tr><td>9</td><td>Explain M/M/1 with infinite population</td><td>Analyse</td><td>3</td></tr>
<tr><td>10</td><td>Derive probability of having n customers P_n in a queue M/M/1, having poisson arrival</td><td>Evaluate</td><td>3</td></tr>
<tr><td colspan="4">UNIT-IV (LONG QUESTIONS)</td></tr>
</table>

S.No	QUESTION	Blooms Taxonomy Level	Course Outcome
1	Telephone users arrive at a booth following a Poisson distribution with average time of 5 minute between two successive arrivals. The time taken for a telephone call is on an average 3 min. what probability that the booth is busy is. It is proposed to reduce the average waiting time to less than or half the present waiting time for completion of the call by establishing a new booth. What has to be arrival rate so as to warrant the establishment of new booth.	Apply	4
2	Assume that the both arrival rate service rate following Poisson distribution .the arrival rate and service rate are 25 and 35 customers/hour respectively then find the following L_s ,L_q, w_s, w_q	Evaluate	4
3	Consider a self service store with one cashier. Assume Poisson arrivals and exponential service time. Suppose that a customer‟s arrive on average of every 5 minutes and the cashier can serve in 5 minutes. Find The average number of customers queuing for service, The probability of having more than 10 customers in the system, The probability that the customer has to queue for more than 2 minutes	Apply	4
4	At a one man barber shop, customers arrive according to Poisson distribution with a mean arrival rate of 5 per hour and the hair cutting time is exponentially distributed, with an average hair cut taking 10 minutes. It is assumed that because of his excellent reputation, customers are always willing to wait. Calculate Average number of customers in the shop, Average number of customers waiting for hair cut, The percent of time on arrival can walk right in without waiting. The percent of customers who have to wait prior to getting into the barber‟s chair	Apply	4
5	A TV repair man finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. He repairs sets in the order in which they arrive. The arrival of the sets is approximately Poisson with an average of 10 per eight hour day. Find the repairman‟s idle time each day. How many jobs are ahead of the average set just brought in?	Apply	3
6	Workers come to a tool store room to enquiry about the special tools (required by them) for a particular job. The average time between the arrivals is 60 seconds and the arrivals are assumed to be in Poisson distribution. The average service time is 40 seconds. Find Average queue length Average length of non-empty queue	Evaluate	3
7	Arrival rate of telephone calls at a telephone booth are according to Poisson distribution With an average time of 12 minutes between two consecutive call arrivals. The Length of telephone calls is assumed to be exponentially distributed with mean 4 minutes. Find the probability that a caller arriving at the booth will have to wait Find the average queue length that forms from time to time Find the fraction of a day that the phone will be in use When convinced that an arrival would expect to have to wait at least five minutes for making the call.	Apply	3
8	Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service time. Suppose that a customer‟s arrive on average of every 5 minutes and the cashier can serve in 5 minutes. Find :(a) The average number of customers queuing for service.(b) The probability of having more than 10 customers in the system.(c) The probability that the customer has to queue for more than 2 minutes	Apply	1
9	A computer shop has a laser printer. The jobs for laser printing are randomly distributed approximately a Poisson distribution with mean service rate of 10 jobs per hour, since pages vary in length (pages to be printed). The jobs arrive at a rate of 6 per hour during the entire 8 hours work day. If the laser printer is valued Rs 30/- per hour, determine (a) the percent time an arriving jobs has to wait (b) Average system time (c) Average dle time cost of the printer per day	Apply	1
10	Customers arrive at a sales counter manned by a single person according to a poisson process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution with a mean of 100 seconds. Find the	Apply	2

S.No	QUESTION	Blooms Taxonomy Level	Course Outcome
	average waiting time of the customer.		
	UNIT – V (SHORT QUESTIONS)		
1	Define ergodic chain	Understand	1
2	Define regular chain	Understand	1
3	Define transient state	Understand	1
4	Define return state	Understand	2
5	Define absorbing state	Understand	2
6	Define periodic and aperiodic states	Understand	2
7	Explain about reducable and irreducible matrices	Understand	3
8	Define persistent state	Understand	3
9	Find the transition diagram for the transition probability matrix$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 1/2 & 1/2 \\ 1/3 & 0 & 2/3 \end{bmatrix}$	Evaluate	4
10	Define stochastic process	Understand	4
	UNIT-V (LONG QUESTIONS)		
1	Show that the probability that the game never ends is zero.	Understand	1
2	Find the probabilities of gambler ruin.	Evaluate	1
3	a) If $p = \frac{1}{2}, q = \frac{1}{2}, z = 1, a = 500$ Then find the expected duration of the game. b) If $p = \frac{1}{2}, q = \frac{1}{2}, z = 1, a = 1000$ Then find the expected duration of the game	Apply	1
4	Is the Matrix $\begin{bmatrix} 0.4 & 0.6 & 0 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ irreducible?	Analyse	2
5	Is the Matrix $p=\begin{bmatrix} 0 & 1 & 0 \\ 1/2 & 1/6 & 1/3 \\ 1/3 & 2/3 & 0 \end{bmatrix}$ Stochastic?	Analyse	2
6	Which of the following Matrices are Regular i)$\begin{bmatrix} 1/2 & 1/2 \\ 0 & 1 \end{bmatrix}$ ii) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ iii)$\begin{bmatrix} 1/2 & 1/4 & 1/4 \\ 0 & 1 & 0 \\ 1/2 & 1/2 & 0 \end{bmatrix}$	Evaluate	2
7	Find periodic and aperiodic states in each of the following transition probability matrices. i)$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ ii)$\begin{bmatrix} 1/4 & 3/4 \\ 1/2 & 1/2 \end{bmatrix}$	Evaluate	3
8	Consider a two state Markov chain with the transition probability matrix P=$\begin{bmatrix} 3/4 & 1/4 \\ 1/2 & 1/2 \end{bmatrix}$, find P^n when n→∞	Evaluate	3
9	Consider a two state Markov chain with the transition probability matrix P=$\begin{bmatrix} 1-a & a \\ b & 1-b \end{bmatrix}$, 0<a<1 , 0<b<1find P^n when n→∞	Evaluate	3
10	A fair die is tossed repeatedly if X_n denotes the maximum of the numbers occurring in the first n tosses. Find the transition probability matrix P of the markov chain	Apply	4

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Name	**PROBABILITY AND STATISTICS**
Course Code	**2030004**
Class	II-I B. Tech
Branch	Computer Science Engineering
Year	2022 - 2023
Course Faculty	B. Sreedar Reddy , Asst.Prof

OBJECTIVES

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UNIT-I
SINGLE RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS

Part - A (Short Answer Questions)

S. No	Question	Blooms Taxonomy Level	Course Outcome
1	If X is Poisson variate such that p(x=1)=24p(x=3). Find the mean	Evaluate	4
2	Find the probability distribution for sum of scores on dice if we throw two dice	Evaluate	4
3	Out of 24 mangoes, 6 mangoes are rotten . If we draw two mangoes . Obtain probability distribution of number of rotten mangoes that can be drawn.	Analyze	4
4	Determine the binomial distribution for which the mean is 4 and variance 3	Understand	4
5	If X is normally distributed with mean 2 and variance 0.1, then find $P(\lvert x-2\rvert \geq 0.01)$?	Evaluate	4
6	If X & Y is a random variable then Prove E[X+K]= E[X]+K ,where „K“ constant	Understand	2
7	Prove that $\sigma^2 = E(X^2) - \mu^2$	Understand	2
8	Explain probability distribution for discrete and continuous	Analyze	3
9	If X is Discrete Random variable then Prove that Var (a X +b) = a^2 var(X)	Understand	3
10	Write the properties of the Normal Distribution	Analyze	1
11	Write the importance and applications of Normal Distribution	Apply	1
12	Define different types of random variables with example	Remember	3

13	Derive variance of binomial distribution	Evaluate	4
14	Derive mean of Poisson distribution	Evaluate	4
15	Explain about Moment generating function	Analyze	2
			2

Part - B (Long Answer Questions)

1	A random variable x has the following probability function: x 0 1 3 4 5 6 7 P(x) 0 k 2k 2k 3k k^2 $7k^2$+k Find the value of k (ii) evaluate p(x<6), p(x>6)	Evaluate	3
2	Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution (ii) Expectation (iii) Variance	Understand & Evaluate	3
3	A random variable X has the following probability function: X -2 -1 0 1 2 3 P(x) 0.1 K 0.2 2K 0.3 K Then find (i) k (ii) mean (iii) variance (iv) P(0 < x < 3)	Evaluate	3
4	A continuous random variable has the probability density function $f(x) = \begin{cases} kxe^{-\lambda x}, for\ x \geq 0, \lambda > 0 \\ 0, otherwise \end{cases}$ Determine (i) k (ii) Mean (iii) Variance	Evaluate	3
5	If the PDF of Random variable f(x) = $k(1-x^2), 0 < x < 1$ then find (i) k (ii) p[0.1<x<0.2] (iii) P[x>0.5]	Evaluate	3
6	If the masses of 300 students are normally distributed with mean 68 kg and standard deviation3 kg how many students have masses: greater than 72 kg (ii) less than or equal to 64 kg (iii) between 65 and 71 kg inclusive	Analyze	1
7	Out of 800 families with 5 children each, how many would you expect to have (i)3 boys (ii)5 girls (iii)either 2 or 3 boys ? Assume equal probabilities for boys and girls.	Understand & Evaluate	1
8	If a Poisson distribution is such that $P(X = 1) \cdot \frac{3}{2} P(X = 3)$, find (i) $P(X \geq 1)$ (ii) $P(X \leq 3)$ (iii) $P(2 \leq X \leq 5)$.	Evaluate	1
9	Average number of accidents on any day on a national highway is 1.8. Determine the probability that the number of accidents is (i) at least one (ii) at most one	Analyze	1

10	In a Normal distribution, 7% of the item are under 35 and 89% are under 63. Find the mean and standard deviation of the distribution.	Evaluate	2

Part - C (Problem Solving and Critical Thinking Questions)

1	When the classical definition of probability fails.	Analyze	2
2	The function $f(x)=Ax^2$ In $0<x0<1$ is valid probability density function then find the value of A.	Evaluate	3
3	Define Normal distribution	Understand	1
4	Explain about Moments	Analyze	1
5	Derive mean deviation from the mean for Normal Distribution	Evaluate	1
6	What is the area under the whole normal curve?	Analyze	1
7	In which distribution the mean, mode and median are equal.	Analyze	2
8	The mean and variance of a binomial variable X with parameters n and p are 16 and Find $P(X \geq 1)$	Evaluate	2
9	Where the traits of normal distribution lies.	Analyze	3
10	Write the properties of continuous random variable	Understand	2

UNIT-II
MULTIPLE RANDOM VARIABLES, CORRELATION &REGRESSION

Part - A (Short Answer Questions)

1	State the properties of joint distribution function of two random variable	Analyze	4
2	The equations of two regression lines obtained in a correlation analysis are 3x+12y=19,3y+9x=46. Find means of x and y	Evaluate	4
3	Given n=10,$\sigma_x = 5.4, \sigma_y = 6.2$ and sum of the product of deviation from the mean of X and Y is 66 find the correlation co-efficient	Evaluate	4
4	From the following data calculate (i) correlation c coefficient (ii) standard deviation of Y bxy=0.85, byx=0.89, $\sigma_x = 3$	Evaluate	4
5	If $r_{12} = 0.77, r_{13} = 0.72, r_{23} = 0.52$ Find the multiple correlation coefficient.	Evaluate	2
6	Determine the probability of getting at least 60 heads when 100 coins are tossed.	Understand & Evaluate	2
7	Explain about random vector concepts	Analyze	1
8	If a random variable W=X+Y where X and Y are two independent random variables what is the density function of W	Analyze	1
9	Explain types of correlations	Remember	1
10	Write the properties of rank correlation coefficient	Analyze	1

11	Write the properties of regression lines	Analyze	1
12	Write the difference between correlation and regression	Remember	1
13	The rank correlation coefficient between the marks in two subjects is 0.8.the sum of the squares of the difference between the ranks is 33.find the number of students	Evaluate	1
14	Find the angle between the regression lines if S.D of Y is twice the S.D of X and r=0.25	Evaluate	2
15	Derive the angle between the two regression lines	Evaluate	2

Part - B (Long Answer Questions)

1	Consider the joint probability density function f(x, y) = xy, 0 < x < 1, 0 < y < 2. Find marginal density function	Evaluate	2
2	Two independent variable X and Y have means 5 and 10 and variances 4 and 9 respectively. Find the coefficient of correlation between U and V where U=3x+4y, V=3x-y	Understand & Evaluate	3
3	The probability density function of a random variable x is $f(x) = \frac{1}{2}\exp\left[-\frac{x}{2}\right]$, $x > 0$. Find the probability of 1 < x < 2.	Evaluate	4
4	Let X and Y random variables have the joint density function f(x, y)=2,0<x<y<1then find marginal density function	Evaluate	4
5	**Find** the rank correlation coefficient for the following ranks of 16 students (1,1),(2,10),(3,3),(4,4),(5,5),(6,7),(7,2),(8,6),(9,8),(10,11),(11,15),(12,9),(13 ,14),(14,12),(15,16) (16,13)	Apply	4
6	**Calculate** the coefficient of correlation between age of cars and annual maintain cost and comment:	Apply	1
7	If $\sigma_x = \sigma_y = \sigma$ and the angle between the regression lines is $\tan^{-1}(4/3)$. **Find** r.	Apply	2
8	For 20 army personal the regression of weight of kidneys (Y) on weight of heart (X) is Y=3.99X+6.394 and the regression of weight of heart on weight of kidneys is X=1.212Y+2.461. **Find** the correlation coefficient between the two variable and also their means	Apply	3
9	From 10 observations on price X and supply Y the following data was obtained **Find** coefficient of correlation, line of regression of Yon X and X on Y	Apply	4
10	If the variance of X is 9.The two regression equations are 8X-10Y+66=0 and 40X-18Y-214=0. **Find** correlation coefficient between X and Y and standard deviation of Y	Apply	1

Years	2	4	6	7	8	10	12
Rupees	1600	1500	1800	1900	1700	2100	2000

Part - C (Problem Solving and Critical Thinking Questions)

1	Derive the angle between the two regression lines	Evaluate	1
2	If θ is the angle between two regression lines then show that $\sin\theta \leq 1-r^2$	Apply	1
3	What is the marginal distributions of X and Y.	Analyze	2
4	Write the normal equations of straight line	Analyze	3

5	Find mean value of the variables X and Y and coefficient of correlation from the following regression equations 2Y-X-50=0, 3Y-2X-10=0	Evaluate	4
6	Define regression and give its uses	Remember	1
7	What are normal equations for regression lines?	Analyze	2
8	When the Regression coefficient is independent	Analyze	2
9	Find correlation coefficient if bxy=085y, byx=089x σ_x=3	Evaluate	2
10	When the coefficient of correlation is maximum	Analyze	3

UNIT-III
SAMPLING DISTRIBUTIONS AND TESTING OF HYPOTHESIS

Part - A (Short Answer Questions)

1	Explain different Types and Classification of sampling	Analyze	4
2	Write about Point Estimation, Interval Estimation	understand	4
3	What is the maximum error one can expect to make with probability 0.9 when using mean of a random sample of size n=64 to estimate the means of a population with σ^2=256	understand	4
4	A random sample of 500 apples was taken from a large consignment and 60 were found to be bad, find the standard error.	Evaluate	4
5	Three masses are measured as 62.34,20, 48, 35. 97 kgs with S.D 0.54,0.21,0.46 kgs. Find the mean and S.D of the sum of masses.	Evaluate	1
6	What is the value of correction factor if n=5 and N=200.	Apply	1
7	Find the value of finite population correction factor for n=10 and N=100.	Evaluate	2
8	Write a short note on Hypothesis, Null and Alternative with suitable examples	understand	2
9	Write a short Note on Type I & Type II error in sampling theory	understand	2
10	Prove that Sample Variance is not an Unbiased Estimation of Population Variance	understand	1
11	Write Properties of t-distribution	Analyze	1
12	Explain about Chi-Square	Analyze	1
13	Write a short note on Distinguish between t, F, Chi square test	understand	2
14	Explain about Bayesian estimation	Analyze	2
15	Compare Large Samples and Small sample tests	Create	2

Part - B (Long Answer Questions)

1	The mean of a random sample is an unbiased estimate of the mean of the population 3,6, 9,15,27. (i) List of all possible samples of size 3 that can be taken without replacement from the finite population. (ii) Calculate the mean of the each of the samples listed in (iii) And assigning each sample a probability of 1/10.	Apply	1
2	An ambulance service claims that it takes on the average 8.9 minutes to	Apply	2

	reach its destination In emergency calls. To check on this claim the agency which issues license to Ambulance service has then timed on fifty emergency calls getting a mean of 9.2 minutes with 1.6 minutes. What can they conclude at 5% level of significance?		
3	A sample of 400 items is taken from a population whose standard deviation is 10.The mean of sample is 40.Test whether the sample has come from a population with mean 38 also calculate 95% confidence interval for the population	Apply	1
4	The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches	Apply	2
5	Experience had shown that 20% of a manufactured product is of the top quality. In one day‟s production of 400 articles only 50 are of top quality .Test the hypothesis at 0.05 levels.	Analyze & Evaluate	3
6	A sample of 26 bulbs gives a mean life of 990 hrs. With S.D. of 20 hours. The manufacture claims that the mean life bulb is 1000 hrs. is the sample not up to the standard	Apply	4
7	In a one sample of 10 observations the sum of squares of deviations from mean was 90 and other sample of 12 observations it was 108 .test whether the difference is significant at 5% level of significance.	Apply	1
8	The no. of automobile accidents per week in a certain area as follows: 12,8,20,2,14,10,15,6,9,4 are these frequencies in agreement with the belief that accidents were same in the during last 10 weeks.	Apply	1
9	Two independent samples of 7 items respectively had the following values Sample I: 11, 11, 13, 11, 12, 9, 12, 14 Sample II: 9, 11, 10, 13, 9, 8, 10, -	evaluate	2
10	A die is thrown 264 times with the following results .show that the die is unbiased No appeared on die: 1, 2, 3, 4, 5, 6 Frequency: 40, 32, 28, 58, 54, 52	Understand	2

Part - C (Problem Solving and Critical Thinking Questions)

1	Which error is called producer‟s risk?	Understand	1
2	Which error is called consumer‟s risk.	Understand	1
3	When the single tailed test is used.	Analyze	1
4	What is test statistics for testing single mean?	Analyze	1
5	How to calculate limit for true mean.	Analyze	1
6	If p=0.15 q=0.85 n=10 find confidence limits	Evaluate	2
7	What must be sample size to apply t test.	Analyze	2
8	If $\bar{x}$=47.5, $\mu = 42.1, s = 8.4, n = 24$ find t. What is shape of t	Evaluate	2

9	What is the range of F distribution?	Understand	3
10	Which distribution is used to test the equality of population means?	Analyze	3

UNIT-IV
QUEUING THEORY

Part - A (Short Answer Questions)

1	Explain queue discipline	Analyze	1
2	Define Balking.	Remember	1
3	Calculate traffic intensity if inter arrival time is 125 minutes and inter service time is 10 minutes.	Evaluate	1
4	If average number of arrivals is 4 per hour and average number of services is 6 per hour. What is the probability that a new arrival need not wait for the service.	Understand	1
5	If $\lambda = 8$ *and* $\mu = 12$ per hour. Calculate the average time spent by a customer in the system	Apply	2
6	What is the probability that there are more than or equal to 10 customers in the system.	Understand	2
7	Explain pure birth process	Analyze	2
8	Explain pure death process	Analyze	2
9	Derive expected number of customers	Evaluate	3
10	Derive average waiting time in queue	Evaluate	3
11	If $\lambda = 6$ *and* $\mu = 18$ per hour. Calculate the service time.	Evaluate	4
12	Define transient state and steady sate	Remember	4
13	Explain M/M/1 model	Analyze	4
14	Explain M/M/1 with infinite population	Analyze	4
15	Derive probability of having n customers P(n) in a queue M/M/1, having Poisson arrival	Evaluate	4

Part - B (Long Answer Questions)

1	Consider a box office ticket window being managed by a single server. Customer arrive to purchase ticket according to Poisson input process with a mean rate of 30 per hour. The time required to serve a customer has an exponential distribution with a mean of 910 sec. Determine the following: a)Fraction of the time the server is busy b)The average number of customers queuing for service	Apply	1
2	Patients arrive at a clinic in a Poisson manner at an average rate of 6 per hour. The doctor on average can attend to 8 patients per hour. Assuming that the service time distribution is exponential, find Average number of patients waiting in the queue, Average time spent by a patient in the clinic	Evaluate	1
3	A bank plans to open a single server drive in banking facilities at a particular centre. It is estimated that 20 customers will arrive each hour on an average. If on an average, it required 2 minutes to process a customers transaction, determine 1.The proportion of time that the system will be idle 2.On the average how long a customer will have to wait before	Analyze	1

	reaching the server? 3. Traffic intensity of Bank? 4.The fraction of customers who will have to wait		
4	A car park contains five cars .The arrival of cars in Poisson with a mean rate of 10 per/hour. The length of time each car spends in the car park has negative exponential distribution with mean of two hours. how many cars are in the car park on average and what is the probability of newly arriving costumer finding the car park full and having to park his car else where	Evaluate	1
5	Consider a self service store with one cashier. Assume Poisson arrivals and exponential service time. Suppose that 9 customers arrive on the average of every 5 minutes and the cashier can serve 19 in 5 minutes. Find (i) the average number of customers queuing for service. (ii)the probability of having more than 10 customers in the system. (iii) the probability that the customer has to queue for more than 2 minutes	Evaluate	2
6	A self service canteen employs one cashier at its counter. 8 customers arrive per every 10 minutes on an average. The cashier can serve on average one per minute. Assuming that the arrivals are Poisson and the service time distribution is exponential, determine: (i)the average number of customers in the system; (ii) the average queue length; (iii) average time a customer spends in the system; (iv) average waiting time of each customer	Evaluate	3
7	Customers arrive at a one window drive in bank according to a Poisson distribution with mean 10 per hour. Service time per customer is exponential with mean 5 minutes The car space in front of the window including that for the serviced can accommodate a maximum of 3 cars. Other cars can wait outside the space. i) What is the probability that an arriving customer can drive directly to the space in front of the window? Ii) What is the probability that an arriving customer will have to wait outside the indicated space? Iii) How long is an arriving customer expected to wait before starting service	Apply	4
8	A fast food restaurant has one drive window. Cars arrive according to a Poisson process. Cars arrive at the rate of 2 per 5 minutes. The service time per customer is 1.5 minutes. Determine i) The Expected number of customers waiting to be served. ii) The probability that the waiting line exceeds 10iii) Average waiting time until a customer reaches the window to place an order. iv) The probability that the facility is idle	Q6 Apply	3
9	At a railway station, only one train is handled at a time. The railway yard is sufficient only for two trains to wait while other is given signal to leave the station. Trains arrive at an average rate of 6 per hour and the railway station can handle them on an average of 12 per hour. Assuming Poisson arrivals and exponential service distribution, find the steady state probabilities for the various number of trains in the system. Find also the average waiting time of a new train coming into the yard	Apply	3
10	Consider a single server queuing system with Poisson input and exponential service time. Suppose the mean rate is 3 calling units per hour with the expected service time as 0.25 hours and the maximum permissible number of calling units in the system is two. Obtain the steady state probability distribution of the number of calling units in the system and then calculate the expected number in the system	Apply	3

Part - C (Problem Solving and Critical Thinking Questions)

1	What is probability of arrivals during the service time of any given customer?	Analyze	1
2	What is FIFO means?	Remember	1

3	Define Jack eying.	Understand	1
4	Define reneging.	Understand	1
5	Define m/m/1:FIFO	Understand	1
6	Model of queuing system.	Analyze	2
7	Define balking.	Understand	2
8	What is the pattern according to which customers are served?	Analyze	1
9	What is variance of queue length?	Analyze	1
10	How to calculate the idle time of the server according to queue theory	Evaluate	1

UNIT-V
STOCHASTIC PROCESSES
Part - A (Short Answer Questions)

1	Define stochastic process	Remember	2
2	Define a regular Markov chain	Remember	2
3	Find whether the matrix $\begin{bmatrix} 0.75 & 0.25 & 0 \\ 0 & 0.5 & 0.5 \\ 0.6 & 0.4 & 0 \end{bmatrix}$ is a regular transition matrix or not.	Evaluate	2
4	Find periodic and aperiodic states in each of following transition probability matrices. (i) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (ii) $\begin{bmatrix} \frac{1}{4} & \frac{3}{4} \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$	Evaluate	4
5	Define reducible and non-reducible states.	Remember	4
6	Consider the Markov chain with transition probability matrix $\begin{bmatrix} 0 & 0 & 1 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ is this matrix irreducible?	Analyze	4
7	Explain different types of stochastic process	Analyze	3
8	Give examples of stochastic process	Create	3
9	Find the expected duration of the game for double stakes	Evaluate	3
10	Define Markov‟s chain	Understand	2

11	Explain Markov"s property	Understand	1
12	Explain transition probabilities	Understand	1
13	Explain stationary distribution	Understand	1
14	Explain limiting distribution	Understand	2
15	Explain irreducible and reducible	Understand	2

Part - B (Long Answer Questions)

1	The transition probability matrix is given by $P = \begin{bmatrix} 0.1 & 0.4 & 0.5 \\ 0.2 & 0.2 & 0.6 \\ 0.7 & 0.2 & 0.1 \end{bmatrix}$ and $P_0 = [0.4 \quad 0.4 \quad 0.2]$ (a) Find the distribution after three transitions. (b) Find the limiting probabilities.	Evaluate	1
2	If the transition probability matrix of market shares of three brands A,B, and C is $\begin{bmatrix} 0.4 & 0.3 & 0.3 \\ 0.8 & 0.1 & 0.1 \\ 0.35 & 0.25 & 0.4 \end{bmatrix}$ and the initial market shares are 50%,25% and 25%, Find (a) The market shares in second and third periods (b) The limiting probabilities.	Evaluate	1
3	Define the stochastic matrixes which of the following stochastic matrices are regular. (a) $\begin{bmatrix} 1/2 & 1/4 & 1/4 \\ 0 & 1 & 0 \\ 1/2 & 0 & 1/2 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 1/2 & 0 \\ 1/2 & 1/2 & 0 \\ 1/4 & 1/4 & 1/2 \end{bmatrix}$	Remember & Evaluate	1
4	Three boys A, B, C are throwing a ball to each other. A always throws the ball to B; B always throws the ball to C; but C is just as likely to throw the ball to B as to A. Show that the process is Markovian. Find the transition matrix and classify the states. Do all the states are ergodic	Understand & Apply	2
5	A gambler has Rs.2. He bets Rs.1 at a time and wins Rs.1 with probability 0.5. He stops Playing if he loses Rs.2 or wins Rs.4.i)What is the Transition probability matrix of the related markov chain? (b) What is the probability that he has lost his money at the end of 5 plays	Understand & Apply	3
6	Check whether the following markov chain is regular and ergodic?$\begin{bmatrix} 1 & 1/2 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1/2 \\ 1/2 & 0 & 0 & 1/2 \\ 0 & 1/2 & 1/2 & 1/2 \end{bmatrix}$	Apply	3
7	The transition probability matrix of a marker chain is given by $\begin{bmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{bmatrix}$ irreducibleor not?	Evaluate	3
8	. Which of the following matrices are Stochastic i)$\begin{bmatrix} 1/2 & 0 \\ 0 & 1 \end{bmatrix}$ ii) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ iii)$\begin{bmatrix} 1/2 & 1/4 & 1/4 \\ 1 & 1 & 0 \\ 1/2 & 1/2 & 0 \end{bmatrix}$	Apply	4
9	Which of the following Matrices are Regular i)$\begin{bmatrix} 1/2 & 1/2 \\ 0 & 1 \end{bmatrix}$ ii) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ iii)$\begin{bmatrix} 1/2 & 1/4 & 1/4 \\ 0 & 1 & 0 \\ 1/2 & 1/2 & 0 \end{bmatrix}$	Apply	4

10	a) Is the Matrix $\begin{bmatrix} 0.4 & 0.6 & 0 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ irreducible? (b) Is the Matrix $p=\begin{bmatrix} 0 & 1 & 0 \\ 1/2 & 1/6 & 1/3 \\ 1/3 & 2/3 & 0 \end{bmatrix}$ Stochastic?	Evaluate	4

Part - C (Problem Solving and Critical Thinking Questions)

1	What do you call the random variable in stochastic process?	Analyze	1
2	When the state is said to be Ergodic.	Analyze	1
3	What is null persistent state?	Understand	1
4	What is Markov process?	Understand	2
5	Give an example of discrete parameter Markov chain.	Create	2
6	When a matrix is said to be regular.	Understand	2
7	What is the use of Markov process?	Understand	2
8	When the state is said to be commute with each other.	Understand	2
9	Let $p = \frac{1}{2}, q = \frac{1}{2}, z = 500, a = 1000$ then find the expected duration of the game	Evaluate	3
10	If the stakes are doubled while the initial capital remain unchanged the probability ruin decreases for the player whose probability of success is P<1/2 and increases for the adversary	Apply	4

Prepared By:

HOD, COMPUTER SCIENCE AND ENGINEERING

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	**DIGITAL LOGIC DESIGN**			
Course Code	**2030504**			
Regulation	**R20 - JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	1	-	4
Course Faculty	B N Srinivasulu, Prof			

I. COURSE OVERVIEW:

The course addresses the concepts, principles and techniques of designing digital systems. The course teaches the fundamentals of digital systems applying the logic design and development techniques. This course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessor through Interfacing and VLSI Design. Students will learn principles of digital systems logic design and distinguish between analog and digital representations. They will be able to analyze a given combinational or sequential circuit using k-map and Boolean algebra as a tool to simplify and design logic circuits. Construct and analyze the operation of a latch, flip-flop and its application in synchronous circuits.

II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	4	4	Engineering physics

III. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
Midterm Test There shall be two midterm examinations. Each midterm examination consists of subjective type and objective type tests. The subjective test is for 25 marks of 90 minutes duration. Subjective test of shall contain 10 questions, the student has to answer 10 questions, each carrying 1 mark. The long type test is for 15 marks. It consists the student has to answer all the questions and each carry two half mark. First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.	70	100

Sessional Marks	University End Exam marks	Total marks
commencement of the semester. These are of problem solving in nature with critical thinking. Marks shall be awarded considering the average of two midterm tests in each course.		

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	90 minutes	25
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	25
4.	II Assignment	-	5
5.	External Examination	3 hours	70

V. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

I. Be familiar with number systems and Boolean algebra principles.
II. Be familiar Boolean functions, simplification methods and realization.
III. Master in analyzing combinational logic circuits and implementations.
IV. Master in analyzing sequential logic circuits and implementations.
V. Be familiar with synchronous and asynchronous sequential circuits. VI. Be familiar with memories like ROM, RAM, PAL and PLA.
VII. Master in analyzing gate level circuits and implementations.

VI. COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

1. The students will be able to understand basic number systems codes and logical gates.
2. The students will be able to understand the design of combinational sequential circuits.
3. The students will be able to understand the basics of various memory.

VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineeringspecialization to the solution of complex engineering problems.

PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research- based knowledge and researchmethods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms ofthe engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader indiverse teams, and inmultidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineeringcommunity and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of theengineering and management principles and apply these to one‟s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning**: Recognize the need for, and have thepreparation and ability to engage inindependent and life-long learning in the broadest context of technological change.

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Applications of Computing: Ability to use knowledge in various domains to provide solution to new ideas and innovations.	1	Lectures, Assignments
PSO2	Programming Skills: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.	2	
PSO3	Make use of computational and experimental tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.	3	

VIII. SYLLABUS:

UNIT – I

Digital Systems - Binary Numbers, Octal, hexadecimal and other base numbers, number base conversions, complements, signed binary numbers, floating point number representation, binary codes, error detecting and correcting codes, digital logic gates(AND, NAND,OR,NOR, Ex-OR, Ex-NOR), Boolean algebra , basic theorems and properties, Boolean functions, canonical and standard forms.

UNIT – II

GATE LEVEL MINIMIZATION: Gate –Level minimization and combination circuits , The K-Maps methods, three variable, four variable, five variable , sum of products , product of sums simplification, don‟t care conditions , NAND and NOR implementation and other two level implantation..

UNIT – III

Combinational Circuits (CC): Design procedure, combinational circuit for different code converters and other problems, binary adder, subtractor, multiplier, magnitude comparator, decoders, encoders, multiplexers, de- multiplexers

UNIT – IV

Synchronous Sequential Circuits: latches, flip-flops, analysis of clocked sequential circuits, design of counters, up-down counters, ripple counters, registers, shift registers, synchronous counters. Asynchronous sequential circuits: reduction of state and follow tables, role free conditions.

UNIT – V

Memory: random access memory, types of ROM, memory decoding, address and data bus, sequential memory, cache memory, programmable logic arrays, memory hierarchy in terms of capacity and access time.

Text books:

1.M. Morris Mano, Michael D. Ciletti, ‘‘Digital Design”, 4e, Pearson Education/PHI, India, 2008.

References:

1. C.V.S. Rao, “Switching and Logic Design”, 3e, Pearson Education, India, 2009.
2. Donald D. Givone, “Digital Principles and Design”, Tata McGraw Hill, India, 2002.
3. Roth, “Fundamentals of Logic Design”, 5e, Thomson, 2004.

X. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes:

Lecture No.	Topics to be covered	Course Learning Outcomes	Reference
1 – 3	Introduction to digital systems, evolution and use of digital system, binary numbers, number base conversions, octal and hexadecimal numbers.	**Understand** the need for digital systems	T1: 1.3
4 – 6	Complements, signed binary numbers, binary codes, binary storage and registers, binary logic.	**Understand** the arithmetic operations carried by digital systems	T1: 1.5
7-10	Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra. Boolean functions, canonical and standard forms, logic operations in Boolean algebra.	**Learn** Boolean algebra and logical operations in Boolean algebra.	T1: 2.1
11 -14	Digital logic gates, product of sums simplification, don‟t-care conditions, sum of products simplification.	**Identify** basic building blocks of digital systems.	T1: 4.1, 4.2, 4.5, 4.8
15-16	NAND and NOR implementation, AND-ORINVERT,OR-AND-INVERT implementations, exclusive – OR function	**Design** functions using universal gates.	T1: 2.1, 2.2, 2.5, 4.7
17-19	Variable entered mapping, tabulation (Quine Mc Cluskey) method, determination and selection of prime implicants.	**Analyze** to avoid the redundant terms in Boolean functions.	T1: 3.1, 3.2, 4.3
20 - 23	Introduction, combinational circuits. Analysis procedure, design procedure of combinational logic circuits	**Discuss** the availability of different logic circuits.	T1: 3.6
24-27	Binary adder, binary subtractor, decimal adder, binary multiplier, magnitude comparator, decoder, encoders, multiplexers, sequential circuits, latches, flip-flops, analysis of clocked sequential circuits.	**Design**different combinational and sequential logic circuits.	T1: 3.3, 4.3
28-31	State reduction and assignment design procedure. clocked sequential circuits, registers, shift registers.	**Demonstrate** the design of sequential logic circuits..	T1: 3.4, 4.3
32-37	Ripple counters, synchronous counters, counter with unused states, ring counter, Johnson counter.	**Differentiate** types of counters.	T1: 5.1, 5.2

38-39	Introduction, Random-access memory, memory decoding	**Learn** various types of data storages.	T1: 5.3, 5.5
40-44	Error detection and correction, read-only memory, programmable logic array, programmable array logic.	**Discuss** error detection and correction in digital systems.	T1: 5.6
45-47	Sequential programmable devices. Flip-flops, latches and counters.	**Understand** construction of sequential programmable devices.	T1: 6.1, 6.2
48-49	Timing considerations, design with multiplexers, demultiplexers, encoders, decoders.	**Analyze** the concepts of multiplexers, encoders	T1: 1.3
50-52	Introduction, analysis procedure of asynchronous sequential logic, circuits with latches, design procedure, reduction of state and flow tables, race- free state assignment hazards.	**Demonstrate**the working of asynchronous sequential circuits.	T1: 8.2
53-55	Random access memory, types of ROM, memory decoding, address and data bus, sequential memory, cache memory, programmable logic arrays, memory hierarchy in terms of capacity and access time.	**Understand** the concept of memory hierarchy.	T1: 1.3, 7.2, 7.3, 7.6, 7.9

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Program outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO 1**	**PSO 2**	**PSO 3**
C214.1	3	2	2	0	0	0	0	0	0	0	0	0	3	0	2
C214.2	3	2	2	0	0	0	0	0	0	0	0	0	3	0	2
C214.3	3	2	2	0	0	0	0	0	0	0	0	0	3	0	2
C214.4	3	2	2	0	0	0	0	0	0	0	0	0	3	0	2
C214.5	3	2	2	0	0	0	0	0	0	0	0	0	3	0	2
Total	15	10	10	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	15	**0**	10
Average	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**

COMPUTER SCIENCE AND ENGINEERING

ASSIGNMENT

Course Name	**DIGITAL LOGIC DESIGN**
Course Code	2030504
Class	II B. Tech I Semester
Branch	Computer Science Engineering
Year	2022-2023
Course Faculty	B N Srinivasulu Prof

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner‟s learning process.

ASSIGNMENT – I & II

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT-I **DIGITAL**		
1	**Convert** the following to Decimal and then to Hexadecimal, Octal and Binary? (i) 744_8 (ii) 1552_8(iii) 10110001_2 (iv) 11110011_2 (v)$DEC6_{16}$	understand	1
2	**Solve** the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend: i. 100 – 110000 ii. 11010 - 1101.	Apply	1
3	**Convert** the following numbers: i. 10101100111.0101 to Base 10 ii. $(153.513)_{10}$ = ( )8	Understand	1
4	**Write** the gray code equivalent of the Hex Number 3A7?	Analyze	1
5	**Find** the biquinary of number code for the decimal numbers from 0 to 9?	Apply	1
6	**Find** (72532 - 03250) using 9's complement?	Apply	1
7	**Construct** a sum of 3 terms: A'B'C' +ABD+A'C +A'CD' +AC'D +	Apply	2
8	**Find** the possible terms which could be added to the expression using the consensus theorem. Then reduce to a minimum SOP A'C'D' + BCD + AB'C'	Apply	3
9	**State** and prove any 4 Boolean theorems with examples?	Knowledge	3
10	**Construct** a sum of 3 terms: A'C'D' +AC' +BCD + A'CD' + A'BC +	Apply	2
11	**Solve** and add $(28)_{10}$ and $(15)_{10}$ by converting them into binary?	Apply	2
12	**Solve** and multiply $(101.11)_2$ and $(110.01)_2$ using binary multiplication method?	Apply	2
13	**Solve** and add two decimal numbers 123 and 658 in exces-3 code?	Apply	2
14	**Define** unit distance code. Explain binary to grey conversion with an example?	Knowledge	3
15	**Show** that grey code is both unit distance and reflective code?	Apply	3

UNIT-II **GATE LEVEL**			
1	**Analyze** the function T(w,x,y,z)= ∑(0,1,2,3,4,6,7,8,9,11,15): Find all prime implicants and indicate which are essential through the K- map	Apply	1
2	**Solve** the following expression using sum of products method. (abc)‟+a(bc)‟ +don‟t cares abc+a‟bc‟+a‟b‟c	Apply	2
3	**Construct** the Boolean algebra expression for a getting network that will have outputs 0 only when X=1, Y=0, Z=0. The outputs are to be 1 for all other cases.	Apply	3
4	**Solve** the expression when f =∑ (5,6,13) and f1=∑(0,1,2,3,5,6,8,9,10,11,13).Find f2 such that f=f1 x	Understand	3
5	**Develop** the following Boolean function for minimal SOP form using k-map and implementation using NAND gates F(w, x, y,	Apply	4
6	For the given function F(w, x, y, z)=∑(0,1,2,3,4,6,7,8,9,11,15) i)**Show** the map ii)**Find** all the prime implicants and indicate which are essential iii)**Find** the minimal expression for F and realize using basic	Apply	3
7	**Describe** don‟t care conditions and explain its advantage with example	Understand	1
8	**Summarize** the following Boolean function for minimal POS form using K- map and implementation using NOR gates F(w, x, y, z) = π(1,3,11,15) + d(0,2,5).	Apply	4
9	**Summarize** the five variable switching function F(e, d, c, b, a)=∑m(3,5,6,8,9,12,13,14,19,22,24,25,30)	Apply	3
10	**Define** K-map along with the advantages and disadvantages?	Knowledge	3
11	**Explain** any four basic theorems of Boolean algebra with necessary	Understand	3
UNIT-III **COMBINATIONAL**			
1	**Design** a combinational logic circuit with three input variables that will produce a logic 1 output when more than one input variables are logic 1?	Apply	1
2	**Design** a combinational circuit that generates the 9‟s complement of a BCD digit?	Apply	3
3	**Design** a 4-bit binary to BCD converter?	Apply	3
4	**Design** a logic circuit to convert BCD to gray code?	Apply	3
5	**Sketch** Half adder using i)NAND gates ii)NOR gates	Apply	3
6	**Sketch** full subtractor using NAND gates only.	Apply	3
7	A combinational circuit has 4 inputs(A,B,C,D) and three outputs(X,Y,Z)XYZ represents a binary number whose value equals the number of 1's at the input: i. Find the minterm expansion for the X,Y,Z ii. Find the maxterm expansion for the Y and Z	Apply	2
S. No	**Questio n**	**Blooms Taxonomy Level**	**Course Outcome**
8	**Explain** how you design a combinational circuit. Show a combinational circuit for a Binary multiplier.	Understand	1
9	**Explain** the working of carry look ahead generator	Understand	1
10.	**Solve** following Boolean function using decoder and logic OR gate F1=∑m(1,5,6,8,9) F2=∑m(2,3,12,13,14,15)	Understand	3
11	**Design** a 16:1 MUX using 8:1 MUX?	Apply	2
12	**Design** full adder circuit using 8:1 MUX?	Apply	1

13	**Design** a circuit with four inputs and one output where the output is 1 if the Input is divisible by 3 or 7?	Apply	3
14	Design a circuit with three inputs(A,B,C) and two outputs(X,Y) where the outputs are the binary count of the number of "ON" (HIGH) inputs?	Apply	3
	UNIT-IV **SYNCHRONOUS SEQUENTIAL**		
1	**Explain** the design of Sequential circuit with an example. Show the state reduction, state assignment?	Understand	1
2	**Explain** the analysis of clocked sequential circuits?	Understand	2
3	**Explain** with the help of a block diagram, the basic components of a Sequential Circuit?	Understand	3
4	**Explain** about RS and JK flip-flops?	Understand	2
5	**Define** T – Flip-flop with the help of a logic diagram and characteristic table. Derive a T-flip-flop from JK and D flip-flops?	Knowledge	1
6	**Define** Latch. Explain about Different types of Latches in detail?	Knowledge	2
7	**Explain** about all flip flops in detail with diagram?	Remember	2
8	**Describe** the characteristic equations for all Flip-Flops?	Understand	2
9	**Differentiate** combinational and sequential circuit?	Understand	2
10	**Explain** the working principle of JK Flip-Flop in detail?	Apply	3
11	**Explain** the state reduction and state assignment in designing sequential circuit. Consider one example in the above process?	Apply	3
12	**Design** a sequential circuit with two D ip-ops A and B. and one input x. when x=0, the state of the circuit remains the same. When x=1,the circuit goes through the state transition from 00 to 11 to 11 to 10 back to 00 and repeats?	Apply	3
13	**Explain** about Serial Transfer in 4-bit shift Registers?	Apply	3
14	**Explain** about Binary Ripple Counter?	Apply	1
15	**Define** BCD counter and draw its State table for BCD Counter?	Knowledge	1
16	**Explain** about 4-bit Universal Shift Registers?	Apply	1
17	**Design** a Modulo-12 up Synchronous counter using T-Flip Flops and draw the circuit diagram?	Apply	1
18	**Explain** the Ripple counter design. Also design a decade counter. ?	Apply	1
19	**Define** race around condition? How it can be avoided?	Knowledge	1
20	**Explain** how is race around condition satisfied by master slave flip-	Apply	1
21	**Explain** the difference between asynchronous and synchronous sequential circuits?	Apply	1
	UNIT-V		
1	**Explain** the block diagram of memory unit along with memory hierarchy concepts?	Apply	2
2	**Explain** in detail about RAM? Explain about types of RAM memories?	Apply	2
3	**Distinguish** between SRAM and DRAM .Also draw static RAM	Understand	2
4	**List** and explain the different types of ROM	Knowledge	2
5	**Design** 1K X 8 RAM using 2 1K X 4 IC"s	Apply	3
6	For 120 track tape with storage density per track of 100 kB/in and tape speed of 50 inches per second .calculate the maximum data transfer rate if tape length is 450 feet. Also **calculate** the storage capacity of the tape.	Apply	3
7	**State** the advantages and disadvantages of magnetic tape.	Knowledge	3
8	**Explain** the three types of mapping procedures related to cache memory organization at length.	Apply	3
9	**Explain** cache memory? Why has it become an integrated part of modern CPU"s? what is a hit and miss? What is meant by hit ratio?	Apply	1

10	**Explain** the main advantages and disadvantages of making the size of cache blocks larger or smaller?	Apply	1
11	**Design** a BCD to Excess-3 code converter and implement using suitable PLA.	Apply	1
12	"Memory hierarchy design is based on the principle of Locality of Reference". **Explain** the principle.	Apply	1

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Name	**DIGITAL LOGIC DESIGN**
Course Code	**2030504**
Class	II B. Tech I Sem
Branch	Computer Science Engineering
Year	2022-2023
Course Faculty	B N Srinivasulu Prof

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

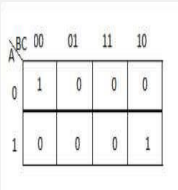
In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner‟s learning process.

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
	UNIT-I **DIGITAL SYSTEMS**		
	Part - A (Short Answer Questions)		
1	**Write** short notes on binary number systems?	Understand	1
2	**Discuss** 1‟s and 2‟s complement methods of subtraction?	Understand	1
3	**Discuss** octal number system?	Understand	1
4	**State** and prove transposition theorem?	Knowledge	1
5	**Explain** how do you convert AOI logic to NAND logic?	Understand	2
	Write a short note on five bit BCD codes?	Understand	2

7	**Explain** the specialty of unit–distance code? State where they are used?	Understand	2
8	**Write** a short note on error correcting codes?	Understand	2
9	**State** and prove De-Morgan theorem?	Knowledge	3
10	**Discuss** what a logic design is and what do u mean by positive logic system?	Understand	2
11	**Convert** (4085)9 into base-5?	Understand	1
12	**Write** the first 20 decimal digits in base 3?	Understand	1
13	**Write** the steps involved in unsigned binary subtraction using complements with examples?	Understand	2
14	**Explain** the addition of two signed binary number along with examples?	Understand	2
15	**Differentiate** between binary code and BCD code?	Understand	3
16	**Explain** how binary values are stored in memory?	Understand	2
17	**Write** the Axiomatic Definitions of Boolean Algebra?	Understand	3
18	**Write** a table stating all the postulates and theorems of Boolean Algebra that are required for logic minimization?	Understand	3
19	**Convert** f(x)= x + y'z into canonical form?	Understand	3
20	**State** and prove idempotent laws of Boolean algebra?	Knowledge	3
	Part - B (Long Answer Questions)		
1	a) **Solve** the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend: i.100 – 110000 ii. 11010 - 1101. b) **Construct** a table for 4 -3 -2 -1 weighted code and write 9154 using this code .Write short notes on binary number systems.	Apply	2
2	a) **Solve** arithmetic operation indicated below. Follow signed bit notation: i. 001110 + 110010 ii. 101011 - 100110. b) **Explain** the importance of gray code?	Apply	1
3	**Solve** (3250 - 72532)10using 10's complement?	Apply	1
4	As part of an aircraft's functional monitoring system, a circuit is required to indicate the status of the landing gears prior to landing. Green LED display turns on if all three gears are properly extended	Understand	1

	when the \gear down" switch has been activated in preparation for landing. Red LED display turns on if any of the gears fail to extend properly prior to landing. When a landing gear is extended, its sensor produces a LOW voltage. When a landing gear is retracted, its sensor produces a HIGH voltage. **Design** a circuit to meet this requirement?		
5.	**Solve** (a) Divide 01100100 by 00011001 (b) Given that (292)10 =(1204)b determine `b'	Apply	1
6.	**Solve** (a) What is the gray code equivalent of the Hex Number 3A7 (b) Find the biquinary number code for the decimal numbers from 0 to 9 (c) Find 9's complement (25.639)10	Apply	1
7.	**Solve** (a) Find (72532 - 03250) using 9's complement. (b) Show the weights of three different 4 bit self complementing codes whose only negative weight is - 4 and write down number system from 0 to 9.	Apply	1
8.	Decimal system became popular because we have 10 fingers. A rich person On earth has decided to distribute Rs. one lakh equally to the following persons from various planets. **Find** out the amount each one of them will get in their respective currencies: A from planet VENUS possessing 8 fingers B from planet MARS possessing 6 fingers C from planet JUPITER possessing 14 fingers D from planet MOON possessing 16 fingers	Apply	1
9.	**State** and prove any 4 Boolean theorems with examples?	Knowledge	3
10.	**Solve** a) Simplify to a sum of 3 terms: A'C'D'+AC'+BCD+A'CD'+A'+AB'C' b) Given AB' + AB = C, Show that AC' + A'C = B	Apply	2
11	**Convert** 10101101.0111 to octal equivalent and hexadecimal equivalent?	Understand	1
12	**Apply** the representation of +65 and -65 in sign magnitude, Sign 1"s complement and sign 2"s complement representation?	Apply	1
13	**State** different ways for representing the signed binary numbers?	Knowledge	2
14	**Solve** addition and subtraction of (456)8 and (341)8?	Apply	1
15	**Define** weighted codes and non weighted codes with examples?	Knowledge	1

16	**Explain** what do you mean by error detecting and correcting codes?	Understand	3
17	**Illustrate** the rules for XS3 addition and subtraction?	Apply	2
18	**Explain** error occurred in the data transmission can be detected using parity bit?	Understand	3
19	**Illustrate** IEEE standard floating formats for 32-bit and 64 bit with following examples?	Apply	1
20	**Explain** the truth tables of X-OR, NAND and NOR gates?	Understand	2
	Part - C (Problem Solving and Critical Thinking Questions)		
1.	In a 32 bit computer, what are the maximum and minimum possible binary numbers? **Convert** these into maximum and minimum possible positive decimal numbers?	Understand	1
2.	**Convert** the octal numbers into binary,decimal,BCD and Hexadecimal numbers (3600)octal,(1200)octal,(0200)octal,(0777)octal.	Understand	1
3.	**Convert** the decimal numbers into binary, BCD and Hexadecimal numbers (3600)d, (1200)d, (0200)d, (0777)d.	Understand	1
4.	Suppose you have a cheque for RS.10000/-.what is the number system used? **Define** base system used and what are the weights of the digits 1,0,0,0,0 and 0 now?	Knowledge	1
5.	**Illustrate** why is (0.5252)octal twice of (0.2525)octal when (0.5050)d is twice of (0.2525)d.	Apply	1
6.	**write** the octal representation of the following fractional numbers:(0.5)d,(1.5)d, (2.333)d,(3.875)d, (13.125)d, (14.666)d.	Understand	1
7.	**Find** the illegal representation in the following: (120A)d, (1010011)BCD, (0208)octal, (10102011)b, (GC0A)h.	Understand	1
8.	**Convert** the binary number to hexadecimal number: 0100001011010011,010110101001111.	Understand	1
9.	**Convert** the hexadecimal number to binary number: 0x5A9F, 42D3.	Understand	1
10	**Understand** by two examples that two‟s compliment of a number taken twice returns the original number?	Understand	2

UNIT-II GATE LEVEL MINIMIZATION AND COMBINATION CIRCUITS			
	Part - A (Short Answer Questions)		
1	**Define** K-map? Name its advantages and disadvantages?	Knowledge	1
2	**Write** the block diagram of 2-4 and 3-8 decoders?	Understand	1
3	**Define** magnitude comparator?	Knowledge	1
4	**Describe** what do you mean by look-ahead carry?	Understand	1
5	**Summarize** the Boolean function**x′yz + x′yz′ + xy′z′ + xy′z**using K-map?	Understand	1
6	**Explain** how combinatorial circuits differ from sequential circuits?	Understand	1
7	**Explain** what are the IC components used to design combinatorial circuits with MSI and LSI?	Understand	2
8	**Design** the two graphic symbols for NAND gate?	Understand	2
9	**Design** the two graphic symbols for NOR gate?	Understand	2
10	**Summarize** the Boolean function**x′yz + x′yz′ + xy′z′ + xy′z**without using K- map?	Understand	2
11	**Explain** the properties of EX-OR gate?	Understand	2
12	**Solve** the function of fig with AND-OR INVRET implementations? 	Apply	2
13	**Solve** the following using NAND gates? a) (A+B)(C+D) b) A.B+CD(AB^{I}+CD)	Apply	1
14	**Sketch** the following equation using k-map and realize it using NAND gate? Y=∑m(4,5,8,9,11,12,13,15)	Apply	3
15	**Solve Y=AB^{I}+CD+(A^{I}B+C^{I}D^{I})** using NAND gate?	Apply	3
16	**State** that AND-OR network is equivalent to NAND-NAND network?	Knowledge	3

17	**Show** both NAND and NOR gates are called Universal gates?	Apply	1
18	**Sketch** the following logic function using k-map and implement it using logic gates? Y(A,B,C,D)= ∑m(0,1,2,3,4,7,8,9,10,11,12,14)	Apply	2
19	**Summarize** the rules and limitations of K-map simplification?	Understand	3
20	**Analyze** the steps for simplification of POS expression?	Apply	1
	Part - B (Long Answer Questions)		
1.	A combinational circuit has 4 inputs(A,B,C,D) and three outputs(X,Y,Z)XYZ represents a binary number whose value equals the number of 1's at the input i**state** the minterm expansion for the X,Y,Z ii. **state** the maxterm expansion for the Y and Z	Knowledge	3
2.	A combinational circuit has four inputs (A,B,C,D), which represent a binarycoded-decimal digit. The circuit has two groups of four outputs - S,T,U,V(MSB digit) and W,X,Y,Z.(LSB digit)Each group represents a BCD digit. The output digits represent a decimal number which is five times the input number. **Illustrate** the minimum expression for all the outputs?	Apply	3
3.	**Summarize** the following Boolean expressions using K-map and implement them using NOR gates: (a) F (A, B, C, D) = AB‟C‟ + AC + A‟CD‟ (b) F (W, X, Y, Z) = W‟X‟Y‟Z‟ + WXY‟Z‟ + W‟X‟YZ + WXYZ.	Understand	1
4.	**Design** BCD to Gray code converter and realize using logic gates?	Understand	1
5.	**Design EX-OR** using NAND gates?	Understand	1
6.	**compile** the following expression using Karnaugh map (B „A + A‟B + AB‟)	Understand	2
7.	**Design** a circuit with three inputs(A,B,C) and two outputs(X,Y) where the outputs are the binary count of the number of “ON" (HIGH) inputs?	Understand	1
8.	**Implement** the INVERTER gate, OR gate and AND gate using NAND gate, NOR gate?	Understand	3
9.	**Design** a circuit with four inputs and one output where the output is 1 if the input is divisible by 3 or 7?	Understand	1
10.	**Implement** the Boolean function F = AB + CD + E	Understand	3
11	**Implement** the Boolean function F = AB + CD + E using NAND gates only?	Understand	3
12	**Summarize** the Boolean function F(w, x, y, z) = Σ(1, 3, 7, 11, 15) + d(w, x, y, z) = Σ(0. 2, 5)	Understand	3
13	**Construct** the logic diagram of a full subtractor using only 2-input	Apply	3

	NAND gates?		
14	**Construct** the logic diagram of a full subtractor using only 2-input NOR gates?	Apply	3
15	**Use** a multiplexer having three data select inputs to solve the logic for the function F = Σ (0, 1, 2, 3, 4, 10, 11, 14, 15)	Apply	2
16	**Identify** all the prime implicants and essential prime implicants of the following functions Using karnaugh map. F(A,B,C,D) = Σ(0,1,2,5,6,7,8,9,10,13,14,15).	Knowledge	2
	Part - C (Problem Solving and Critical Thinking Questions)		3
1.	**Use** De-morgan theorem to simplify F=A+B+C.D.E.	Apply	3
2.	**State** that for constructing XOR from NANDs we need four NAND gates?	Knowledge	3
3.	**State** X+ (Y.Z) = (X+Y). (X+Z) = (X+Y).(X+Y+Z) a distributive law using De-Morgan theorem?	Knowledge	1
4.	**Convert** A.B.C+A.D expression into standard SOP format?	Understand	2
5.	**Convert** (A+B+C).(A+D) expression into standard POS format?	Understand	2
6.	**Construct** XOR from NOR gates?	Understand	3
7.	**Construct** SOP expression and POS expression for a four input NAND gate?	Understand	2
8.	**Understand** Excess-3 codes for 3 and 7?	Understand	3
9.	**Find** the logic function F using AND-OR two level realization?	Understand	1
10	**Find** transmitted 11 bits for 0110001 when hamming code is used?	Understand	1
	UNIT-III **COMBINATIONAL CIRCUITS**		
	Part - A (Short Answer Questions)		
1	**Explain** the design procedure for combinational circuits?	Understand	2
2	**Apply** various code conversion methods?	Apply	1
3	**Design** a 4-bit binary to BCD converter?	Understand	3
4	**Design** and implement a 8421 Gray code converter?	Understand	2
5	**Design** a combinational logic circuit with 3 input variables that will produce logic 1 output when more than one input variables are logic 1?	Understand	2
6	**Compose** and explain the block diagram of 4-bit parallel adder?	Understand	1
7	**Design** a logic circuit to convert BCD and gray code?	Understand	1
8	**Design** a full adder using two half adders?	Understand	2
9	**Explain** magnitude comparator? Design a 3-bit comparator using logic gates?	Understand	3

10	**Compose** the circuit for 3 to 8 decoder and explain it with logic gate?	Understand	1
11	**Construct** the logic circuit for full subtractor using decoder?	Understand	2
12	**Define** binary decoder? Explain the working of 2:4 binary decoder?	Knowledge	3
13	**Design** Full adder using a suitable Decoder?	Apply	1
14	**Define** encoder? Design octal to binary encoder?	Knowledge	1
15	**Design** a 4-bit priority encoder?	Understand	1
16	**Design** the block diagram of a 4:1 multiplexer using 2:1 multiplexer?	Understand	1
17	**Summarize** the following Boolean function using 8:1 mux $F(A,B,C,D)=\pi M(0,3,5,8,9,10,12,14)$	Knowledge	1
18	**Explain** how decoder acts as a demultiplexer?	Understand	1
19	**Differentiate** multiplexer and demultiplexer?	Apply	2
20	**Explain** the working of 8:1 multiplexer?	Understand	2
	Part - B (Long Answer Questions)		
1.	**Design** a combinational circuit that generates the 9‟s complement of BCD digit?	Understand	2
2.	**Design** a combinational circuit to find the 2‟s complement of given binary number and realize using NAND gates?	Understand	2
3.	**Design** a logic circuit to convert gray code to binary code?	Understand	2
4.	**Design** circuit to detect invalid BCD number and implement using NAND gate only?	Understand	2
5.	**Explain** the design procedure for code converter with the help of example?	Understand	2
6.	**Construct** half subtractor using NAND gates?	Apply	3
7.	**Design** an 8-bit adder using two 74283?	Understand	3
8.	**Explain** the working of carry look-ahead generator?	Understand	3
9.	**Explain** carry propagation in parallel adder with neat diagram?	Understand	3
10.	**Explain** the circuit diagram of full subtractor and full adder?	Understand	3
11	**Construct** and explain the working of decimal adder?	Apply	2

12	**Design** 2-digit BCD adder with the help of binary adders?	Understand	1
13	**Design** Multiply 0112by 1102using binary multiplication method?	Understand	1
14	**Design** 4-bit comparator using logic gates?	Understand	1
15	**State** the procedure to implement Boolean function using decoder and also mention the uses of decoders?	Knowledge	2
16	**Design** and implement a full adder circuit using a 3:8 decoder?	Understand	2
17	**Describe** the operation performed by the following logic circuit with an example. Encoder?		2
18	**Design** and Implement full adder circuit using Quadruple 2 to 1 multiplexer?	Understand	3
19	**Construct** 16:1 multiplexer using 8:1 and 2:1 multiplexer?	Apply	1
20	**Construct** a full adder using a suitable multiplexer?	Apply	2
	Part - C (Problem Solving and Critical Thinking Questions)		
1.	**Design** a combinational logic circuit that produces the product of 2 binary number ? A=(A1,A0)*B=(B2, B1, B0)	Understand	2
2.	**Solve** the function using multiplexer F(x,y,z)=∑(0,2,6,7)	Apply	2
3.	A combinational circuit has 4 inputs(A,B,C,D) and three outputs(X,Y,Z)XYZ represents a binary number whose value equals the number of 1's at the input: i. **Find** the minterm expansion for the X,Y,Z ii. **Find** the maxterm expansion for the Y and Z	Understand	2
4.	**Design** a combinational logic circuit with 4 inputs A, B, C, D. The output Y goes High if and only if A and C inputs go High. Draw the truth table. Minimize the Boolean function using K-map. Draw the circuit diagram?	Understand	2
5.	**Design** a logic circuit to convert excess-3 code to BCD code?	Understand	1
6.	**Design** a 24-bit group ripple adder using 74X283 ICs?	Understand	3
7.	**Design** a multiple circuit to multiply the following binary number A=A0A1A2 and B=B0B1B2B3 using required number of binary parallel adders?	Understand	2
8.	**Solve** the following Boolean functions using decoder and OR gates: F1(A,B,C,D)=∑(2,4,7,9)	Apply	1

	F2(A,B,C,D)=∑(10,13,14,15)		
9.	**Design** the interfacing diagram of 10 key keypad interfaces to digital system using decimal to BCD encoder?	Understand	2
10	**Solve** the following Boolean function using 4:1 mux F(A,B,C,D)=∑m(1,3,5,7,8,9,0,2,10,12,13)	Apply	3
	UNIT-IV **SYNCHRONOUS SEQUENTIAL CIRCUITS**		
	Part - A (Short Answer Questions)		
1	**Differentiate** combinational and sequential logic circuits?	Apply	2
2	**Explain** basic difference between a shift register and counter?	Understand	3
3	**Illustrate** applications of shift registers?	Apply	1
4	**Define** bidirectional shift register?	Knowledge	1
5	**Describe** dynamic shift register?	Knowledge	1
6	**Define** What is a UART?	Knowledge	1
7	**Classify** the basic types of counters?	Understand	1
8	**Differentiate** the advantages and disadvantages of ripple counters?	Apply	2
9	**Explain** what do you mean by terminal count?	Understand	2
10	**Explain** what is a variable modulus counter?	Understand	2
11	**Design** and explain gated latch logic diagram?	Understand	2
12	**Define** race around condition? How it can be avoided?	Knowledge	2
13	**Convert** a JK Flip Flop to i) SR ii) T iii) D	Understand	3
14	**Convert** a SR Flip-Flop to i) JK ii) D iii) T	Understand	3
15	**Explain** what is a synchronous latch?	Understand	3
16	**Construct** a latch using universal gates?	Apply	3
17	**Explain** what do you mean a stable state?	Understand	2
18	**Define** a Flip-Flop?	Knowledge	2
19	**Define** applications of Flip-Flops?	Knowledge	2

20	**Explain** what is meant by clocked flip-flop?	Understand	1
	Part - B (Long Answer Questions)		
1.	**Explain** the design of Sequential circuit with an example. Show the state reduction, state assignment?	Understand	2
2.	**Write** short notes on shift register? Mention its application along with the Serial Transfer in 4-bit shift Registers?	Understand	2
3.	**Explain** about Binary Ripple Counter? What is MOD counter?	Understand	1
4.	**Define** BCD Counter and Draw its State table for BCD Counter?	Knowledge	3
5.	**Explain** the state reduction and state assignment in designing sequential circuit. Consider one example in the above process?	Understand	2
6.	**Design** a sequential circuit with two D flip-ops A and B. and one input x. when x=0,the state of the circuit remains the same. When x=1,the circuit goes through the state transition from 00 to 11 to 11 to 10 back to 00.and repeats?	Understand	1
7.	**Design** a Modulo-12 up Synchronous counter Using T-Flip Flops and draw the Circuit diagram?	Understand	2
8.	**Explain** the Ripple counter design. Also the decade counter design?	Understand	3
9.	**Design** a 3 bit ring counter? Discuss how ring counters differ from twisted ring counter?	Understand	1
10	**Design** a left shift and right shift for the following data 10110101?	Understand	2
11	**Design** Johnson counter and state its advantages and disadvantages?	Understand	3
12	**Explain** with the help of a block diagram, the basic components of a Sequential Circuit?	Understand	2
13	**Explain** about RS and JK flip-flops?	Understand	1
14	**Define** T–Flip-flop with the help of a logic diagram and characteristic table?	Knowledge	1
15	**Define** Latch. Explain about Different types of Latches in detail?	Knowledge	1
16	**Illustrate** pulse mode asynchronous circuit?	Apply	1
17	**List** the characteristic equations for all Flip-Flops?	Knowledge	1

	Construct the transition table for the following flip-flops		
18	i) SR FF ii) D FF	Apply	1
19	**Describe** the steps involved in design of asynchronous sequential circuit in detail with an example?	Understand	1
20	**Differentiate** critical and non critical race conditions?	Apply	2
	Part - C (Problem Solving and Critical Thinking Questions)		
1.	**Explain** the output frequency of T filp-flop if the input clock frequency is 10khz? Give its timing waveform?	Apply	2
	I. A sequential circuit has 3 flip-flops, A,B and C and one input ,X .it is described by the following flip flop input functions? $DA=(BC^{I}+B^{I}C)x+(BC+B^{I}C^{I})x^{I}$ DB=A	Apply	2
	DC=B i)**Derive** the state table for circuit ii)**Draw** two state diagrams: One for x=0 and for x=1		
3.	**Design** and implement 4-bit binary counter(using D flip flops) which counts all possible odd numbers only?	Understand	3
4.	**Find** the state assignments for sequence 1101011?	Understand	3
5.	**Design** 2"s complementer with a shift register and flip flop. The binary number is shifted outside and its 2"s complement shifted other side of the shift register?	Understand	1
6.	**Design** a MOD-5 synchronous counter using flip flops and implement it? Also draw the timing diagram?	Understand	1
7.	**Design** a divide-by-128 counter using 7493 IC"s?	Understand	1
8.	**Design** an asynchronous sequential circuit with two inputs X and Y and with one output Z. Whenever Y is 1, input X is transferred to Z. When Y is 0 , The output does not change for any change in X?	Understand	1
9.	**Design** an asynchronous D-type latch with two inputs G and D output Q. Assume fundamental mode of operation?	Understand	1

10	**Design** a T flip flop from logic gates?	Understand	1

UNIT-V
MEMORY

Part - A (Short Answer Questions)

1	**Explain** the block diagram of memory unit?	Understand	2
2	**Explain** in detail about RAM and types of RAM?	Understand	2
3	**Illustrate** the features of a ROM cell?	Apply	2
4	**Explain** in detail about ROM and types of ROM?	Understand	3
5	**Explain** coincident memory decoding?	Understand	3
6	**Describe** what is meant by memory expansion? Mention its limits?	Understand	3
7	**List** a note on magnetic tape?	Knowledge	3
8	**State** the advantages and disadvantages of magnetic tape and magnetic disk?	Knowledge	3
9	**Differentiate** static and dynamic RAM?	Apply	3
10	**Explain** what is the use of cache memory?	Understand	2
11	**Design** and explain the following mapping techniques of cache: a) Direct mapping b) Associative mapping	Understand	2
12	**Explain** different replacement algorithms in detail?	Understand	2
13	**Explain** LRU algorithm in detail?	Understand	2
14	**List** and explain write policies used with cache memory?	Knowledge	2
15	**List** a note on performance issues of multilevel memory?	Knowledge	2
16	**Explain** HIT and MISS ratio in cache memory?	Understand	1
17	**Explain** the use of an associative-mapped TLB?	Understand	1
18	**Design** and explain how cache read operation is executed?	Understand	1
19	**Explain** PLA with the help of block diagram?	Understand	1
20	**Explain** the advantage of PLA over ROMs?	Understand	2

Part - B (Long Answer Questions)

1.	**List** How many address bits are needed to operate a 2 K *8 ROM?	Knowledge	3
2.	**Construct** a logic diagram of memory cell?	Apply	2
3.	**Distinguish** between SRAM and DRAM and draw static RAM cell?	Understand	1
4.	**Explain** the read and write operation a RAM can perform?	Understand	3
5.	**Explain** the DRAM organization of 2M*8 memory chip?	Understand	1
6.	**Constuct**the signals of a 32*8 RAM with control input. Show the external connections necessary to have a 128*8 RAM using decoder and replication of this RAM?	Apply	1
7.	A block set associative cache consists of 64 blocks divided into 4 block sets. The main memory contains 4096 blocks, each consists of 128 words of 16 bits length? **list** many bits are there in main memory **list**many bits are there in each of TAG,SET, and WORD fields?	Knowledge	1
8.	**Explain** the following terms: i) Cache updation policies. ii)cache hit and cache miss.	Understand	2
9.	**Explain** two way set associative mapping and four way set associative mapping techniques with an example for each?	Understand	2
10.	**Explain** how a program gets executed faster using a cache memory?	Understand	3
11	**Design** a BCD to Excess-3 code converter and implement using Suitable PLA?	Understand	1
12	**Construct** the block diagram of PLA. Which are the teams programmable? How inverter is useful in PLA construction at the output?	Apply	2
13	**Sketch** the PLA program table for the four Boolean functions. Minimize the number of product terms? $A(x,y,z)=\sum(0,1,3,5)$ $B(x,y,z)=\sum(2,6)$ $C(x,y,z)=\sum(1,2,3,5,7)$ $D(x,y,z)=\sum(0,1,6)$	Apply	3
14	**Sketch** a PLA circuit to implement the logic functions $A^IBC+AB\ ^IC+AC^I$ and $A^I\ B^I\ C^I+BC$.	Apply	3
15	**Explain** in detail various cache memory organizations?	Understand	1
16	In many computers the cache block size is in the range 32 to 128 bytes.	Understand	2

17	**Explain** What would be the main advantages and disadvantages of making the size of cache blocks larger or smaller?		3
18	**Explain** the techniques used to perform the write operations in cache memory?	Understand	2
19	**Explain** about the cache replacement algorithms?	Understand	1
20	**Differentiate** PAL with PLA with following examples?	Understand	1
21	"Memory hierarchy design is based on the principle of Locality of reference". **Explain** the principle?	Understand	2
	Part - C (Problem Solving and Critical Thinking Questions)		
1.	**Solve** the following two Boolean functions using a PLA having 3-inputs,4 product terms and 2 outputs? F1(A,B,C)=∑(0,1,2,4) F2(A,B,C)=∑(0,5,6,7)	Apply	2
2.	**Design** 1k*8 RAM using two 1k*4 IC?	Understand	2
3.	**Solve** 2048*8 memories using 256*8 memory chip .Also show the memory address associated with each memory chip?	Apply	3
4.	**Calculate** the utilization factor of tape, if the gap length is 0.5 in, the storage density S=3000 bytes/in and data storage capacity is 6 k bytes?	Apply	1
5.	A two way set associative cache memory uses block of four words. The cache accommodate a total of 2048 words from main memory. The main memory size is 128k*32 i)**Find** how many bits are there in tag index, block and word field of address format? ii)**Find** the size of cache memory?	Understand	2
6.	**Solve** the following multi boolean function using 3*4*2 PLA PLD? F1(a2, a1, a0)=∑m(0,1,3,5) F2(a2, a1, a0)=∑m(3,5,7)	Apply	3
7.	**Design** and implement 3-bit binary to gray code converter using PLA?	Understand	2
8.	**Calculate** the average access time of memory for a computer with cache access time of 100ns,a main memory access of 1000ns and a hit ratio is 0.9?	Apply	3
10	**Design** a combinational circuit using PLA. The circuit accepts 3-bit number and generates an output binary number equal to square of input number?	Understand	2

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	**PYTHON PROGRAMMING**			
Course Code	**2030505**			
Regulation	**R20- JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	3	0	-	3
Course Faculty	B Prasad Assoc.Prof			

J. COURSE OVERVIEW:

The World Wide Web continues to provide a foundation for the development of a broad range of increasingly influential and strategic technologies, supporting a large variety of applications and services, both in the private and public sectors. There is a growing need for management and decision makers to gain a clearer understanding of the application development process, from planning through to deployment and maintenance. This module will give you an insight into architectures, protocols, standards, languages, tools and techniques; an understanding of approaches to more dynamic and mobile content; and demonstrate how you can analyze requirements, plan, design, implement and test a range of web applications.

K. PREREQUISITES:

Level	Credits	Periods/Week	Prerequisites
UG	3	4	Nill - (C added advantage)

III. COURSE ASSESSMENT METHODS:

a) Marks Distribution

Session Marks	University End Exam Marks	Total Marks
There shall be two midterm examinations. Each midterm examination consists of subjective type and objective type tests. The subjective test is for 25 marks of 90 minutes duration. Subjective test of shall contain 10 questions, the student has to answer 10 questions, each carrying 1 mark. The long type test is for 15 marks. It consists the student has to answer all the questions and each carry two half mark. First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.	70	100

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1	I Mid Examination	90 Minutes	25
2	I Assignment	-	5
3	II Mid Examination	90 Minutes	25
4	II Assignment	-	5
5	External Examination	3 Hours	70

Y. COURSE OBJECTIVES:

1.Handle Strings and Files in Python.

2. Understand Lists, Dictionaries and Regular expressions in Python.

3. Understand FILES, Multithread programming in Python.

4. Understand GUI in Python.

5. Examine the use of functions and modules

6. Demonstrate how to use the concepts of Strings and File Systems and understand how to handle the exceptions

VI. COURSE OUTCOMES:

Upon completion of this course, students will be able to:

CO	Course outcome	Blooms taxonomy level
C215.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.	Apply
C215.2	Demonstrate proficiency in handling Strings and File Systems.	Analyse
C215.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.	Apply
C215.4	Develop programs using graphical user interface and handle Strings and Files in Python.	Evaluate
C215.5	Understand GUI in Python.	Apply

VII. HOW PROGRAM OUTCOMES ARE ASSESSED

Program Outcomes	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate

Program Outcomes	
	techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes	
PSO1	Applications of Computing: Ability to use knowledge in various domains to provide solution to new ideas and innovations.
PSO2	Programming Skills: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.
PSO3	Make use of computational and experimental tools for creating innovative career paths, to be an entrepreneur and desire for higher studies.

IX. SYLLABUS:

2030505: PYTHON PROGRAMMING (Common to All Branches)

B. Tech. II Year I –SEM **L T P C**
3 0 0 3

Prerequisites: Nil

UNIT - I : Python Basics

Python Objects: Standard Types, Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types.
Python Numbers: Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions.

UNIT - II:

Conditionals and Loops-if, else, elif, for, while, break, continue, pass, List comprehensions, Generator expressions.
Sequences: Strings, Lists, and Tuples- Built-in Functions, Special features.
Mapping and Set Types: Dictionaries, Sets- Built-in Functions.

UNIT-III:

Files and Input / Output: File Objects, File Built-in Functions, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules.
Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management,Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Exceptions and the sys Module.

UNIT-IV:

Functions and Functional Programming –Calling Functions , Creating Functions, Passing Functions , Formal Arguments, Variable-Length Arguments, Functional Programming.
Modules–Modules and Files, Namespaces, Importing Modules, Module Built-in Functions, Packages, Related modules

UNIT – V:

Multithreaded Programming: Introduction, Threads and Processes, Python Threads, the Global Interpreter Lock, Thread Module, Threading Module.
GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Python Programming: A Modern Approach, VamsiKurama, Pearson
4. Learning Python, Mark Lutz, O˝Really.

X. COURSE PLAN:

Unit	Class	Subject Topics	Text/Ref Book	Date Planned	Date Conducted
Unit -1	LH 1	**Python Basics**	T1		
	LH 2	**Python Objects -** Standard Types, Built-in Types	T1		
	LH 3	Internal Types, Standard Type Operators	T1		
	LH 4	Standard Type Built-in Functions	T1		
	LH 5	Categorizing the Standard Types	T1		
	LH 6	Unsupported Types	T1		
	LH 7	**Python Numbers -** Intr to Numbers, Integer, Float, Complex	T1		
	LH 8	Operators	T1		
	LH 9	Built-in Functions	T1		
	LH 10	**Active Learning - 1 Flipped Class Room**	T1		
	LH 11	**TEST- I**	T1		
	LH 12	**PPT-I**	T1		
Unit -2	LH 13	**Controls and Loops :** if, else, elif, for, while,	T1		
	LH 14	break, continue, pass	T1		
	LH 15	List comprehensions	T1		
	LH 16	Generator expressions	T1		
	LH 17	**Sequences:** Strings, Lists,	T1		
	LH 18	Tuples	T1		
	LH 19	Built-in functions, special features	T1		
	LH 20	**Mapping and Set Types:** Dictionaries, Sets	T1		
	LH 21	Dictionaries/Sets - built-in functions,special features	T1		
	LH 22	**Active Learning - 2 Collaborative Learning**	T1		
	LH 23	**TEST- II**	T1		
	LH 24	**PPT-II**	T1		
Unit -3	LH 25	**Files and Input / Output:** File Objects	T1		
	LH 26	File Built-in Functions/Methods/Attributes, Standard Files	T1		
	LH 27	Command-line Arguments	T1		
	LH 28	File System, File Execution	T1		
	LH 29	Persistent Storage Modules	T1		
	LH 30	Related Modules	T1		
	LH 31	**Exceptions:** Exceptions in Python, Detecting and Handling Exceptions	T1		

	LH 32	Context Management, Exceptions as Strings, Raising Exceptions, Assertions	T1		
	LH 33	Standard Exceptions, Creating Exceptions, sys Module	T1		
	LH 34	**Active Learning 3 Muddest Point**	T1		
	LH 35	**TEST- III**	T1		
	LH 36	**PPT-III**	T1		
Unit -4	LH 37	**Functions and Functional Programming :** Creating Functions,Calling Functions	T1		
	LH 38	Passing Functions	T1		
	LH 39	Formal Arguments, Variable-Length Arguments	T1		
	LH 40	Functional Programming	T1		
	LH 41	Modules and Files	T1		
	LH 42	Namespaces, Importing Modules	T1		
	LH 43	**Modules -** Module Built-in Functions	T1		
	LH 44	Packages	T1		
	LH 45	Related modules	T1		
	LH 46	**Active Learning - 4 Think Pair Share**	T1		
	LH 47	**UNIT TEST- IV**	T1		
	LH 48	**PPT-IV**	T1		
Unit -5	LH 49	**Multithreaded Programming :** Threads and Processes	T1		
	LH 50	Python Threads	T1		
	LH 51	the Global Interpreter Lock	T1		
	LH 52	Thread Module	T1		
	LH 53	Threading Module	T1		
	LH 54	**GUI Programming:** Introduction to GUI Programming	T1		
	LH 55	Tkinter and Python Programming	T1		
	LH 56	Brief Tour of Other GUIs	T1		
	LH 57	Related Modules and Other GUIs	T1		
	LH 58	**Active Learning - 5 Stump Your Partner**	T1		
	LH 59	**UNIT TEST- V**	T1		
	LH 60	**PPT-V**	T1		
	LH 61	Revision	T1		
	LH 62	Revision	T1		
	LH 63	Revision	T1		

The course plan is meant as a guideline. There may probably be

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

Program outcomes	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
C215.1	3	3	2	3	3	0	0	0	0	0	0	2	3	3	3
C215.2	3	3	2	3	3	0	0	0	0	0	0	2	3	3	3
C215.3	3	3	2	3	3	0	0	0	0	0	0	2	3	3	3
C215.4	3	3	2	3	3	0	0	0	0	0	0	2	3	3	3
C215.5	3	3	2	3	3	0	0	0	0	0	0	2	3	3	3
Average	3	3	2	3	3							2	3	3	3

COMPUTER SCIENCE AND ENGINEERING

ASSIGNMENT

Course Name	:	**PYTHON PROGRAMMING**
Course Code	:	**2030505**
Class	:	II B. Tech I Semester
Branch	:	Computer Science and Engineering
Year	:	2022 - 2023
Course Faculty	:	B Prasad Assoc.Prof

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issu4567890e of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learners learning process.

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT-I		
1.	What three attributes are associated with all Python objects? Briefly describe each one	Remember	2
2.	Which Python types are Standard Types and which are not?	Remember	2
3.	Which Python types are Other Built-in Types in python?	Understand	3
4.	What does the Internal Types refer in python	Understand	2
5.	What are the different Standard Type Operators in python	Remember	2
6.	What is different Standard Type Built-in Functions in python?	Remember	2
7.	How are Type Factory Functions different than Standard Type Built-in Functions in python	Understand	3
8.	Name the different Categorizing the Standard Types in python	Understand	2
9.	Define Unsupported Types	Remember	2
10.	What does the type() built-in function do?	Remember	3
11.	Define Numbers in python	Understand	2

12.	Briefly explain integers in python	Understand	3
13.	Briefly explain integers in python	Remember	2
14.	What is Double Precision Floating Point Numbers	Remember	2
15.	What are Complex Numbers and how they are defined in python	Apply	3
16.	What are the Built-in and Factory Functions in python	Apply	3
17.	Determine Operators and how they are defined in python	Apply	3
18.	Give Other Numeric Types in python	Apply	2
19.	Determine the Related Modules	Understand	2
20.	Give unification of Integers and Long Integers	Understand	3
	UNIT-II		
21.	Briefly explain integers in python	Understand	1
22.	Briefly explain integers in python	Understand	4
23.	What is Double Precision Floating Point Numbers	Remember	4
24.	What are Complex Numbers and how they are defined in python	Understand	4
25.	What are the Built-in and Factory Functions in python	Understand	4
26.	Determine Operators and how they are defined in python	Remember	4
27.	Give Other Numeric Types in python	Remember	1
28.	**List** the elements in XML .Also different types of content of Elements.	Remember	4
29.	**How** do you define the elements of an XML document in an XML Schema?	Remember	4
30.	**How** do you set default and fixed values for simple Elements?	Remember	1
31.	What are regular expressions? How to find whether an email	Apply	4

<table>
<tr><td>32.</td><td>Convert the given information into a XML file and then convert this XML File data into HTML file as it is.
<table>
<tr><td>Roll No.</td><td>Name</td><td>Subject</td><td>Marks</td></tr>
<tr><td>11</td><td>Ram</td><td>Web Tech</td><td>78</td></tr>
<tr><td>12</td><td>Shyam</td><td>DBMS</td><td>65</td></tr>
<tr><td>13</td><td>Krishna</td><td>SE</td><td>82</td></tr>
</table></td><td>Understand</td><td>1</td></tr>
<tr><td>33.</td><td>Define the Document type Definition (DTD) in XML. What is difference between Internal and External DTD?</td><td>Remember</td><td>4</td></tr>
<tr><td>34.</td><td>What do you mean by Python? What are its Differences and similarities from HTML & CSS? Also explain the concept of Entities & Attributes in XML?</td><td>Remember</td><td>4</td></tr>
<tr><td>35.</td><td>Build a document with two links to an external document. The first link should lead to the beginning of the external document. The second link should lead to a particular section in the external document.</td><td>Apply</td><td>1</td></tr>
<tr><td>36.</td><td>How to write and read Python documents and How XML structures documents?</td><td>Remember</td><td>4</td></tr>
<tr><td>37.</td><td>How and why Python was developed. typical applications of XML, with examples</td><td>Remember</td><td>4</td></tr>
<tr><td>38.</td><td>Build XSLT code to display Employee details in a table from which is stored in XML.</td><td>Apply</td><td>4</td></tr>
<tr><td>39.</td><td>Explain how data types are represented in XML Schema.</td><td>Understand</td><td>4</td></tr>
<tr><td>40.</td><td>read() b) readline() c) readlines() d) tell() e) seek() f) write()</td><td>Remember</td><td>4</td></tr>
</table>

	UNIT-III		
41.	**Define** a session tracker that tracks the number of accesses and last access data of a particular web page.	Remember	1
42.	**What** is the security issues related to Servlets.	Remember	3
43.	**Explain** how dictionary in python	Understand	3
44.	**Explain** how cookies are used for session tracking?	Understand	2
45.	**Explain** about Tomcat web server.	Understand	3
46.	What three attributes are associated with all Python objects? Briefly describe each one	Remember	3
47.	Which Python types are Standard Types and which are not?	Remember	3
48.	Which Python types are Other Built-in Types in python? What does the Internal Types refer in python	Understand	1
49.	What are the different Standard Type Operators in python	Remember	2
50.	What is different Standard Type Built-in Functions in python?	Remember	2
51.	How are Type Factory Functions different than Standard Type Built-in Functions in python Name the different Categorizing the Standard Types in python	Apply	1
52.	Define the classes and interfaces of javax.servlet.http Unsupported Types What does the type() built-in function do?	Understand	4
53.	Define Numbers in python	Apply	4
54.	**Describe** about session tracking with relevant code snippet.	Knowledge	4
55.	"Servlet offer several advantages over CGI". **Justify.**	Evaluate	3
56.	**Explain** about Security Issues in Servlet	Understand	2

57.	**Explain** about Servlet? Explain lifecycle of a Servlet. Illustrate with an example program	Understand	1
58.	**Build** a Servlet program to illustrate parameter reading and	Apply	2
59.	**Explain** Cookies session tracking with relevant code snippet.	Understand	3
60.	What three attributes are associated with all Python objects? Briefly describe each one	Remember	3
	UNIT-1V		
61.	Which Python types are Other Built-in Types in python?	Understand	3
62.	What does the Internal Types refer in python	Understand	3
63.	What is different Standard Type Built-in Functions in python?	Understand	2
64.	How are Type Factory Functions different than Standard Type Built-in Functions in python	Remember	1
65.	Name the different Categorizing the Standard Types in python	Understand	5
66.	Define Unsupported Types	Remember	2
67.	What does the type() built-in function do?	Understand	3
68.	Define Numbers in python	Remember	3
69.	**Explain** the MVC architecture and write a JSP program which prints the current date?	Understand	4
70.	Write a Python GUI program to create three push buttons using Tkinter. The background color of frame should be different when different buttons are clicked. Write a python GUI program to implement calculator using Tkinter library.	Remember	2
71.	Explain encryption and decryption in Python using an example.	Remember	2
72.	**Explain** sharing and application data in Python application Develpment	Understand	2
73.	**List** the methods in request object.	Remember	3
74.	What are bugs? Write about different types of bugs.	Understand	1
75.	**Explain** JSP application design with suitable example?	Understand	1
76.	**Interpret** about the usage of JavaBeans Component in JSP.	Understand	4
77.	**Interpret** about the Scriplets in JSP?	Knowledge	2
78.	**List** the methods in request object.	Knowledge	2
79.	Write a Python program to implement the concept of inheritance.	Understand	2
80.	**Explain** about Python with a Bean in the session scope.	Understand	3
	UNIT-V		
81.	Define usage of following Type Object.	Apply	4
82.	What is meant by frameworks?	Apply	4
83.	What is database schema?	Understand	1
84.	**Explain** the need for scripting languages in web programming.	Understand	4
85.	What is the use of cursor.getrowid() method .	Understand	4
86.	Write the syntax to open a database in python?	Remember	4
87.	Discuss about Python Database Application Programmer's	Understand	4
88.	**What** is form validation? Explain with example?	Remember	4
89	Explain following connection objects.	Remember	4
90.	Name the different Categorizing the Standard Types in python	Understand	2

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**Python Programming**
Course Code	:	**5030505**
Class	:	II B. Tech I Semester
Branch	:	Computer Science and Engineering
Year	:	2020 - 2023
Course Faculty	:	B Prasad Assoc.Prof

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.
In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner"s learning process.

PART – A (SHORT ANSWER QUESTIONS)

S. No.	Questions	Bloom's Taxonomy Level	Course Outcome
	UNIT - I		
1	Define usage of following Type Object.	Remember	2
2	What is meant by frameworks?	Remember	2
3		Remember	2
4	What is database schema?	Remember	4
5	**Explain** the need for scripting languages in web programming.	Remember	2
6	What is the use of cursor.getrowid() method .	Remember	3
7	Write the syntax to open a database in python?	Remember	3
8	Discuss about Python Database Application Programmer's	Remember	2
9	**What** is form validation? Explain with example?	Remember	4
10	Explain following connection objects.	Remember	3
	UNIT – II		
1	Explain encryption and decryption in Python using an example.	Remember	4
2	**Explain** sharing and application data in Python application Develpment	Remember	4
3	**List** the methods in request object. What are bugs? Write about different types of bugs.	Remember	4
4	**Explain** JSP application design with suitable example?	Understand	1
5	**Interpret** about the usage of JavaBeans Component in JSP.	Remember	4
6	**Interpret** about the Scriplets in JSP?	Understand	1
7	**List** the methods in request object.	Remember	1
8	Write a Python program to implement the concept of inheritance.	Understand	4
8	**Explain** about Python with a Bean in the session scope.	Remember	2

10	**Distinguish** between SAX AND DOM?	Remember	4
	UNIT – III		
1	**List** out difference between web server and application server?	Remember	1
2	**Which** HTTP method is non-idempotent?	Remember	1
3	**Explain** difference between GET and POST method?	Understand	2
4	**List** out MIME Types?	Remember	2
5	**Discuss** the web application and what is its directory structure?	Remember	1
6	Explain encryption and decryption in Python using an example.	Understand	2
7	**Explain** sharing and application data in Python application Develpment	Remember	4
8	**List** the methods in request object.	Apply	1
9	What are bugs? Write about different types of bugs.	Understand	4
10	**Explain** JSP application design with suitable example?	Remember	3
11	**Interpret** about the usage of JavaBeans Component in python	Remember	3
12	**Interpret** about the Scriplets in python	Remember	4
13	**List** the methods in request object.	Remember	3
14	Write a Python program to implement the concept of inheritance.	Remember	3
15	**Explain** about Python with a Bean in the session scope.	3	2
	UNIT – IV		
1	**What** are the differences between custom JSP tags and Serlets?	Remember	4
2	**Explain** the difference between JSP include directive and JSP include action.	Understand	4
3	**Explain** about Scriptlet tag?	Understand	4
4	**Explain** the need for scripting languages in web programming.	Understand	3
5	What is the use of cursor.getrowid() method .	Understand	3
6	Write the syntax to open a database in python?	Remember	2
7	Discuss about Python Database Application Programmer's	Remember	4
8	**What** is form validation? Explain with example?	Remember	4
9	Explain following connection objects.	Understand	2
10	Name the different Categorizing the Standard Types in python	Remember	1
11	**Explain** the need for scripting languages in web programming.	Remember	2
12	What is the use of cursor.getrowid() method .	Understand	2
13	Write the syntax to open a database in python?	Understand	2
14	Discuss about Python Database Application Programmer's	Remember	4
15	**Define** how to open a database connection using JDBC.	Remember	4
	UNIT – V		
1	**Explain** how to embed JavaScript code in an HTML document.	Understand	1
2	**Define** arrays in JavaScript?	Remember	4
3	**List** the differences between Client side JavaScript Server side JavaScript?	Remember	4
4	**Define** how to create a Date Object?	Remember	1
5	**Explain** dynamic html? What is the main difference between	Understand	1

	DHTML and HTML?		
6	**Explain** the various control statements available with JavaScript.	Understand	2
7	What is the use of cursor.getrowid() method .	Understand	3
8	Write the syntax to open a database in python?	Understand	4
9	Discuss about Python Database Application Programmer's	Remember	3