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 II 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	CS404PC			
Regulation	**R18 - JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	3	1	-	4
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.	75	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	20
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

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
C224.1	Understand the basics of SQL and construct queries using SQL.	Analyze
C224.2	Understand the topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.	Understand
C224.3	Gain knowledge of fundamentals of DBMS, database design and normal forms	Remember
C224.4	Design the database with transaction processing and concurrency control.	Create
C224.5	Infer the database storage structures and access technique	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
No.Key Components	3	10	10	11	1	5	3	3	12	5	12	8	2	3	2
C224.1	2	1		6									1		
C224.2	2												1		
C224.3	3	5	5	6									2		2
C224.4	3	5	5	6	1								2		2
C224.5	3	5	5	6						3			2		2

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ASSIGNMENT QUESTIONS

Course Name : **DATABASE MANAGEMENT SYSTEMS**
Course Code : CS404PC
Class : II B. Tech II Semester
Branch : Computer Science and Engineering
Year : 2019-2020
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	:	CS404PC
Class	:	II B. Tech I Semester
Branch	:	Computer Science and Engineering
Year	:	2019-2020
Course Faculty	:	Y Appa Rao Assoc.Prof

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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	SM402MS			
Regulation	**R18– 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.	75	100

IV. ALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	90 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

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
C222.1	Understand the various Forms of Business and the impact of economic variables on the Business.	Create
C222.2	Analyze the demand, supplyfor the business	Analyze
C222.3	Understand the different type of production function and Identify the impact of the Economy on Business and Firms specifically.	Understand
C222.4	Analyze the Business from the Financial Perspective.	Understand
C222.5	Understand the firm's financial position by analyzing the Financial Statements of a Company.	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
C222.1	3	3	3	3	0	0	0	0	0	0	0	1	0	0	3
C222.2	3	3	3	3	0	0	0	0	0	0	0	1	2	3	0
C222.3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
C222.4	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
C222.5	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	:	SM402MS
Class	:	II - B. Tech I Semester
Branch	:	COMPUTER SCIENCE AND ENGINEERING
Year	:	2019- 2020
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. 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	Understand	7
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** **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	Apply	7
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.		

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

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	:	SM402MS
Class		II - B. Tech ISemester
Branch		COMPUTER SCIENCE AND ENGINEERING
Year	:	2019-2020
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 estimated 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. Using24%asthecostofcapitaldeterminethefollowing:(i)Net PresentValue@24%D.f. (ii)ProfitabilityIndex@24%D.f(iii)Pay-backPeriod(iv)DiscountedPay-backPeriod	Remember	6

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

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.	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

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.	Apply	6

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

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%whichprojectshould beundertaken?	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.4,000Jan 8th 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,0.50paisainarupeewascollectedfromhisestatetowardsfinalsettlementandthe remainingbalancebeingBadDebts. March10th GoodspurchasedfromKameshRs.20,000March11th GoodsreturnedtoKameshRs.2,000 March12th AmountofRs.17,500paidtoKameshinfullsettlementof hisAccount. March13th InsurancePremiumpaidtoLICofIndiabychequeRs.15,000 March14th CommissionreceivedfromNareshRs.5,000March15th GoodssoldtoPrasadoncreditRs.30,000March16th PrasadreturnedgoodstousRs.3,000	Remember	7
4	WriteJournalEntriesinthebooksofMr.SivaKumarfromthefollowingtransactions. 2010,Jan.1st BusinessstartedwithcashRs.30,000,Cheque Rs.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)givento Saratfor3monthsforRs.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.		
		To Opening Stock	30,000	By Net Sales	1,10,000		
		To Purchases	60,000	By Closing Stock	20,000		7
		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	Remember	
		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

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	**JAVA PROGRAMMING**			
Course Code	CS405PC			
Regulation	**R18-JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	3	1	-	4
Course Faculty	N PUSHPALATHA Assoc.Prof			

I. COURSE OVERVIEW:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves OOP concepts, java basics, inheritance, polymorphism, interfaces, inner classes, packages, Exception handling, multithreading, collection framework, files, JDBC and GUI components. This course is presented to students by power point projections, course handouts, lecture notes, course handouts, assignments, objective and subjective tests.

II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	4	5	C,C++

II. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
Midterm Test There shall be two midterm examinations. Each midterm examination consists of essay paper, objective paper and assignment. The essay paper is for 10 marks of 60 minutes duration and shall contain 4 questions. The student has to answer 2 questions, each carrying 5 marks. The objective paper is for 10 marks of 20 minutes duration. It consists of 10 multiple choice and 10 fill-in-the blank questions, the student has to answer all the questions and each carries 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.	75	100

Sessional Marks	University End Exam marks	Total marks
Five marks are earmarked for assignments. There shall be two assignments in every theory course. Assignments are usually issued at the time of 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	80 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	80 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

V. COURSE OBJECTIVES:

I. Understand object oriented programming concepts- and apply them in problem solving.

II. Understand the basics of java Console and GUI based programming.

III. Describe the basics of inheritance for reusing the program.

IV. Demonstrate how the multi tasking is performed by using threads.

V. Enumerate the types of exception handling.

VI. Describe the byte streams and character streams for file management.

VI. COURSE OUTCOMES:

At the end of the course the students are able to:

1. Understanding of OOP concepts and basics of java programming.
2. The skills to apply OOP and java programming in problem solving.
3. Should have the ability to extend his/her knowledge of java programming further on his/her own.
4. Ability to implement GUI based programming.

VII. HOW PROGRAMS ARE ACCESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering to the solution of complex engineering problems specialization	S	Assignments, Tutorials
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.	H	Assignments
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.	H	Mini Projects
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.	S	Projects
PO5	**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.	H	Mini Projects
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.	N	--
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.	N	--
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	S	--
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	H	Tutorials,Exams
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.	N	--
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.	H	Future scope or projects discussion
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.	S	Projects

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.	H	Lectures, Assignments
PSO2	**Programming Skills**: Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.	H	Projects

IX. SYLLABUS:

UNIT-1

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT-2

Packages- Defining a Package, CLASSPATH, Access protection, importing packages. Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

UNIT-3

Exception handling - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT-4

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable, Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

UNIT-5

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

Text books:

1. Java Fundamentals – A comprehensive Introduction- Herbert Schildt and Dale Skrien

References:

1. Java for programmers-P.J.Dietel and H.M.Dietel Pearson education(or)Java: How to program P.J.Dietel and H.M.Dietel-PHI
2. Object Oriented programming through Java -P.Radha Krishna -Universities Press
3. Thinking in Java- Bruce Eckel-Pearson Education
4. Programming in Java- S.Malhotra and S. Choudhary- Oxford University Press.

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
1-3	Data abstraction, encapsulation, inheritance, polymorphism dynamic binding, Need of Classes and objects, Benefits of OOP, procedural and object oriented programming paradigm.	**Understand** and use OOP concepts.	**T1, R2**
4-6	History of java, comments, data types Variables, constants, scope and life time of variables	**Understand** variable and program.	**T1,R2**
7-9	Operators, operator hierarchy, expressions type conversion and casting, Enumerated types, control flow control flow block scope conditional statements, loops, break and continue statements	**Understand** operators and expressions and program	**T1, R2**
10	Simple java program	**Understand** the program on expressions, operators	**T1**
11-13	Arrays, console input and output, formatting output, Constructors, methods, parameter passing overloading methods and constructors, static fields and methods,	**Use** constructors and methods	**T1, R2**
14-15	access control, this reference, Recursion, garbage collection- building strings, exploring string class.	**Use** methods and their applications	**T1, R2**
16-17	Inheritance, Inheritance hierarchies, super and Subclasses member access rules,	**Relate** the concept of class and to the sub class	**T1, R2**

18-19	super keyword, preventing inheritance: final classes and methods, the object class and its methods	**Explain** the concept of final keyword with their usage	**T1**
20	Polymorphism, dynamic binding method overriding, abstract classes and methods	**List** the methods of polymorphism	**T1**
21-22	Interface, Interfaces VS Abstract classes, defining an interface implements interfaces, accessing implementations through interface references, extending interface.	**Relate** interfaces and abstract classes	T1,R2
23-24	Inner classes Uses of inner classes, local inner classes, anonymous inner classes, static inner classes- examples	**Explain** the concept of inner classes	T1,R2
25	Packages, Defining creating and accessing a package, understanding CLASSPATH, importing packages.	**Define** basic concepts of packages	T1
26-27	Exception Handling , Dealing with errors, benefits of exception handling the	**Illustrate** the concept of exception handling	T1,R2
	classification of exceptions, exception hierarchy, checked exceptions and unchecked exceptions usage of try, catch, throw, throws and finally		
28-29	Re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.	**Understand** the concept of re-throwing exceptions	T1,R2
30-31	Multithreading , Differences between multiple processes and multiple threads, thread states	**Define** multithreading and able to explain the differences between multiple processes and states	T1
32-34	Creating threads, interrupting threads, thread priorities, synchronizing threads, inter , thread communication, producer consumer pattern	**Analyze** the problem of producer consumer pattern.	T1,R2
35-36	Collection Framework in java , Introduction to java collections, overview of java collection frame work	**Explain** the java collections and framework.	T1,R1
37	Generics, commonly used collection classes, Array List	**Define** generics, array list	T1,R2
38	Vector, hash table	**State** vector and hash table	T1
39-40	Stack, enumeration, iterator	**Generalize** the stack ,enumeration and iterator	T2,R2
41-42	String tokenizer , random, scanner,calendar and properties	**Describe** the concept of dividing the string into small token.	T1
43-44	Files , streams , byte streams, character stream	**Explain** files and their types of reading and writing data to the files	T1,R1
45	text input/output, binary input/output	**Understand** the concept of text and binary input/output.	T1
46	Random access file operations	**Identify** various random	**T1**
		access file operations.	

47	File management using file class.	**Analyze** the methods of file class	T1
48	Connecting to Database , JDBC Type 1 to 4 drivers	**Relate** java program to JDBC	**T2, R2**
49	Connecting to a database, querying a database	**Manage** the connection to the data bases	**T1, R2**
50	Processing the results, updating data with JDBC	**Understand** the process of updating the data bases using JDBC	R2
51-52	The AWT class hierarchy, introduction to swing, swing Vs AWT, hierarchy for swing components	**Classify** the AWT class hierarchy	T1
53-54	Containers, JFrame, JApplet, JDialog, Jpanel, overview of some swing components , JButton, JLabel , JTextField, JTextArea	**List** the swing compoents.	T1
55-56	Simple applications, Layout management , Layout manager types , border, grid and flow	**Explain** the types of layout managers	T1
57-58	Event Handling : Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners	**Apply** the techniques of event handling with listeners.	**T1,R2**
59-61	Delegation event model, Example: handling a button click, handling mouse events, Adapter classes.	**Explain** the concept of delegation event model.	**T1**
62	Inheritance ,hierarchy for applets, differences	**Explain** the differences	**T1**
	between applets and applications	between applets and applications	
63	Life cycle of an applet	**Understand** the life cycle of applet	**T1**
64	Passing parameters to applets	**Explain** the method of parameter passing to applets	**T1**
65	Applet security issues	**Understand** the applet security issues.	**T1**

X1. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Objectives	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
I	S												H	
II			H										H	H
III	S				H								H	
IV											H		H	
V	S								H				H	S
VI			H					H			S		H	

S = Supportive **H = Highly Related**

XI1. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	S										H			H
2					H									
3	S								H					
4			H					S						H

S = Supportive **H = Highly Related**

ASSIGNMENT

Course Name	:	**JAVA PROGRAMMING**
Course Code	:	CS405PC
Class	:	II B. Tech II Semester
Branch	:	Computer Science and Engineering
Year	:	2019 – 2020
Course Faculty	:	N PUSHPALATHA 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 – II		
1	**Describe** Inheritance? Discuss its uses, Hierarchical abstractions With an example.	Understand	1
2	**Describe** the types of inheritances in java? **Explain** each of them in detail.	Understand	1
3	**Explain** about Object class in detail.	Remember	1
4	**Explain** Uses of „Super‟ keyword, discuss accessing the member of a super class	Remember	1
5	**Describe** a package? Discuss its advantages? **Explain** with example.	Remember	1
6	**Explain** different Types of Packages. **Explain** in detail about Creating, importing packages.	Remember	1
7	**Describe** method overriding? **Explain** with an example?	Understand	1
8	**Describe** Abstract classes? **Explain** with an example? **Explain** final classes , methods and interfaces with an example	Understand	1
9	**Describe** interface? **Explain** with an example? **Explain** working procedure of CLASSPATH	Understand	1
10	**Describe** inner classes? **Explain** with an example? **Explain** Member access rules with an example.	Understand	1
	UNIT – III		

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1	**Explain** creation of thread using runnable interface with an example	Understand	3
2	**Write** a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and	Understand	2,3
	prints. If the value is odd, the third thread will print the value of cube of the number.		2
3	**Write** a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds**.**	Understand	2
4	**Explain** about thread interrupts with an example.	Understand	3
5	**Explain** about inter –thread Communication with an example.	Understand	3
6	**Explain** creation of thread using extending thread class with an example	Understand	3
7	**Explain** with an example how java performs thread synchronization?	Understand	3
8	**Explain** producer consumer problem with an example	Knowledge	3
9	**Explain** about thread interrupts with an example.	Knowledge	3
10	**Explain** the life cycle of a thread and multithreading.	Knowledge	3,4
	UNIT – I V		
1	**Explain** the Java Collection frame work with an hierarchy	Understand	3 3
2	**Explain** ArrayList and Vector with examples.	Understand	3
3	**Explain** hash table and stack with examples.	Understand	3
4	**Explain** enumeration and iterator with an example.	Understand	3
5	**Explain** StringTokenizer with an example.	Understand	3
6	**Explain** Random and scanner with examples.	Understand	3
7	**Explain** Calander class and properties with an example.	Analysis	3
8	**Write** a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes	Analysis	3
9	**Explain** binary input/output file operations and random access file operations and **Write** a Java program to implement character streams (reader classes).	Analysis	3
10	**Explain** different types of JDBC drivers with diagrams and **Write** a Java Program that connects to a database using JDBC and does add, delete, modify and retrieve operations.	Knowledge	3
	UNIT – V		
1	**Explain** in detail about hierarchy for swing and awt?	Knowledge	2
2	**Write** a program for passing parameters to applet?	Knowledge	2
3	**Develop** an applet that receives an integer in one text field and computes its	Create	2

	factorial value and returns it in another text field, when the button named "compute" is clicked using swing components?		
4	**Develop** an applet that receives an integer in one text field and computes its factorial value and returns it in another text field, when the button named "compute" is clicked using awt components?	Create	2
5	**Define** JFrame, JApplet, JDialog and Jpanel, Jbutton, JLabel, JTextField and JtextArea? **Write** a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button an appropriate message with "STOP" or "READY" or "GO" should appear above the buttons in selected color. Initially, there is no message shown	Create	1
6	**Describe** Layout manager types – border, grid, flow? **Write** a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*, % operations. Add a text field to display the result. Handle any possible exception like divided by zero	Create	1
7	**Describe** Delegation event model? **Describe** is the relationship between Event sources and Listeners?	Understand	1
8	**Describe** events for handling a button click and mouse events with an examples	Create	1
9	**Explain** applet life cycle? Difference between applet and application?	Understand	1
10	**Explain** applet security issues?	Understand	1

Tutorial Question Bank

Course Name	:	**JAVA PROGRAMMING**
Course Code	:	CS405PC
Class	:	II B. Tech II Semester
Branch	:	Computer Science and Engineering
Year	:	2019 – 2020
Course Faculty	:	N PUSHPALATHA Assoc.Prof

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PART – A (Short Answer Questions)

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT - I		
1	**Define** OOP?	Remembering	1,2,3
2	**Distinguish** between procedural language and OOPs?	Analyzing	1,2,3
3	**Define** Encapsulation?	Remembering	1,2,3
4	**Define** Inheritance?	Remembering	1,2,3
5	**Define** Polymorphism?	Remembering	1,2,3
6	**List** advantages of OOP?	Remembering	1,2,3
7	**List** disadvantages of OOP?	Remembering	1,2,3
8	**Explain** briefly out history of java?	Understanding	1,2,3
9	**Explain** briefly about different types of data types in java?	Understanding	1,2,3
10	**What** is constant? Explain different types of constants?	Remembering	1,2,3
11	**What** is Variable? **Describe** scope and life time of variables?	Remembering	1,2,3

S. No	Question	Blooms Taxonomy Level	Course Outcome
12	**List** and describe different types of operators?	Remembering	1,2,3
13	**Define** type conversion?	Remembering	1,2,3
14	**Define** type casting?	Remembering	1,2,3
15	**Define** enumerated types?	Remembering	1,2,3
16	**Define** an array?	Remembering	1,2,3
17	**Define** this reference?	Remembering	1,2,3
18	**Define** constructor?	Remembering	1,2,3
19	**Define** recursion?	Remembering	1,2,3
20	**Define** garbage collection?	Remembering	1,2,3
	UNIT – II		
1	**Define** Inheritance?	Understand	4
2	**List** types of inheritances in java?	Remembering	4
3	**What** are Member access rules in java?	Remembering	4
4	**Explain** the Uses of „Super‟ keyword	Understanding	4
5	**Explain** the Uses „final‟ keyword with inheritance	Understanding	4
6	**What** is Object class?	Understand	4
7	**Define** abstract classes?	Remembering	4
8	**Define** polymorphism?	Remembering	4
9	**Define** dynamic binding?	Remembering	4
10	**Define** method overriding?	Remembering	4
11	**Compare and Contrast** differences between interfaces vs. Abstract classes	Understanding	4
12	**Define** interface?	Remembering	4
13	**Define** inner classes?	Remembering	4
14	**Define** static inner classes?	Remembering	4
15	**Define** a package?	Remembering	4
16	**Define** various steps for creating and importing packages.	Understand	4
17	**Define** abstract methods?	Remembering	4
18	**Define** CLASSPATH?	Remembering	4
19	**List** advantages of inheritance?	Remembering	4
20	**How** we implement an interface write steps	Remembering	4
	UNIT - III		
1	**Define** Exception?	Remembering	1
2	**Distinguish** between exception and error?	Analyzing	2
3	**What** are the benefits of exception handling	Remembering	2
4	**Explain** the classification of exceptions	Understanding	2
5	**Define** checked exceptions?	Remembering	3
6	**Define** unchecked exceptions?	Remembering	3
7	**Define** built in exceptions?	Remembering	3

8	**Explain** the usage of try and catch	Understanding	3
9	**Explain** the usage of throw, throws and finally	Understanding	3
10	**Distinguish** between throw and throws?	Analyzing	3

S. No	Question	Blooms Taxonomy Level	Course Outcome
11	**Distinguish** between process and thread?	Analyzing	1
12	**What** are thread states? Explain.	Remembering	1
13	**What** are the different ways to create a thread?	Remembering	1
14	**Define** producer consumer problem?	Remembering	1
15	**Define** inter-thread communication?	Remembering	1
16	**How** threads are synchronized?	Remembering	2
17	**What** are different thread priorities	Remembering	2
18	**How** many ways can thread be Created?	Understanding	2
19	**Explain** about the alive() and join() method	Understanding	2
20	**Explain** about "thread class implements Runnable interface"	Understanding	2
	UNIT - IV		
1	**Define** collections?	Remembering	3
2	**Define** Java collection Frame work.	Remembering	3
3	**Define** Array **List** with syntax	Remembering	3
4	**Define** Vector with syntax.	Remembering	3
5	**Define** hash table with syntax.	Remembering	3
6	**Define** stack with syntax.	Remembering	4
7	**Define** enumeration with syntax.	Remembering	4
8	**What** is Iterator?	Remembering	1
9	**Explain** the function of StringTokenizer.	Understanding	1
10	**Define** random class.	Remembering	1
11	**Define** Scanner class.	Remembering	1
12	**Define** Calendar class.	Remembering	1
13	**Define** Properties class	Remembering	1
14	**Define** Stream?	Remembering	2
15	**Define** byte stream?	Remembering	2
16	**Define** character stream?	Remembering	2
17	**Define** text input/output file?	Remembering	2
18	**Define** JDBC?	Remembering	3
19	**List** types of JDBC drivers.	Understand	3
20	**Define** random access file?	Understand	4
	UNIT - V		

1	**Define** AWT class hierarchy?	Remembering	4
2	**Distinguish** between swings Vs AWT?	Analyzing	4
3	**Explain** the hierarchy for swing?	Understanding	4
4	**Define** components?	Remembering	4
5	**Define** containers?	Remembering	4
6	**Define** JFrame, JApplet, JDialog and Jpanel?	Remembering	4
7	**Define** some of swing components?	Remembering	4
8	**Define** Jbutton, JLabel, JTextField and JtextArea?	Remembering	4
9	**Define** Layout management?	Remembering	4

S. No	Question	Blooms Taxonomy Level	Course Outcome
10	**List** Layout manager types – border and grid flow?	Remembering	3
11	**Explain** about Events, Event sources, Event classes	Understanding	3
12	**Explain** about Event Listeners	Understanding	3
13	**Compare** and contrast the relationship between Event sources and Listeners?	Understanding	3
14	**Define** Delegation event model?	Remembering	1
15	**Explain** various events for handling a button click?	Understanding	1
16	**Explain** various events for handling mouse events?	Understanding	1
17	**Define** adapter class?	Remembering	2
18	**Distinguish** between applet and application?	Analyzing	2
19	Explain the life cycle of an Applet.	Understanding	2
20	**Describe** applet security issues?	Understand	2

PART – B (Long Answer Questions)

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	**Discuss** the various characteristics of object oriented programming concepts?	Creating	1,2,3
2	**Explain** briefly about the features (buzzwords) of Java.	Understanding	1,2,3
3	**Discuss** various Differences between Java and C++.	Creating	1,2,3
4	**Why** Java is a pure object oriented programming language	Remembering	1,2,3
5	**Distinguish** between applications and applets in Java?	Analyzing	1,2,3
6	**Explain** the importance of this keyword with an example.	Understanding	1,2,3
7	**What** is method overloading? Explain with an example.	Remembering	1,2,3
8	**Discuss** about the constructor overloading with an example.	Creating	1,2,3
9	**What** is Array? Explain the concept of arrays with an example.	Remembering	1,2,3
10	**Explain** briefly about String class and discuss various methods in String class with an example.	Understanding	1,2,3
11	**Explain** about the console input and output with an example.	Understanding	1,2,3
12	**Discuss** about various conditional statements with necessary examples	Creating	1,2,3
13	**Explain** about different loops with an example.	Understanding	1,2,3
14	**What** is the use of break and continue statements in java? Explain with an example.	Remembering	1,2,3
15	**Discuss** about the operator hierarchy with an example.	Creating	1,2,3
16	**What** is the use of the operators in java? Explain with an example.	Remembering	1,2,3
17	**Define** static field? Write with an example.	Remembering	1,2,3
18	**Define** static method? Write with an example.	Remembering	1,2,3
19	**What** is type conversion and casting? Explain with an example.	Remembering	1,2,3

20	**Explain** about foreach loop with an example	Understanding	1,2,3
	UNIT – II		
1	**Define** Inheritance? Discuss its uses and Hierarchical abstractions?	Remembering	4
2	**List** different types of inheritances in java? Explain each of them in	Remembering	4

S. No	Question	Blooms Taxonomy Level	Course Outcome
	detail with an example programs.		
3	**Discuss** about Object class in detail	Creating	4
4	**Explain** the Uses of „Super‟ keyword , discuss accessing the member of a super class	Understanding	4
5	**What** is package? Discuss its advantages?	Remembering	4
6	**Explain** different Types of Packages	Understanding	4
7	**Define** dynamic binding? Write with an example?	Remembering	4
8	**Define** method overriding? Write with an example?	Remembering	4
9	**Define** Abstract classes? Write with an example?	Remembering	4
10	**Define** interface? Write with an example?	Remembering	4
11	**Define** inner classes? Write with an example?	Remembering	4
12	**Discuss** in detail about creating and importing packages with an examples	Creating	4
13	**Discuss** in detail how packages are accessed	Creating	4
14	**Explain** different ways to extending interfaces with an example	Understanding	4
15	**Define** interface? Write Differences between classes and interfaces?	Remembering	4
16	**What** is final keyword? Explain its importance in java with an example program.	Understand	4
17	**What** is inheritance? Explain the benefits of inheritance with an example	Remembering	4
18	**What** are various Member access rules explain with an example	Remembering	4
19	**Discuss** the various levels of Acceee protection available for packages and their implications.	Creating	4
20	**Compare** and contrast overloading and overriding methods	Remembering	4
	UNIT - III		
1	**Explain** briefly about exception handling mechanisms with example programs.	Understanding	4
2	**What** are try, catch , and finally keywords in with an example	Remembering	4
3	**Define** throw keyword? Write with an example	Remembering	4
4	**Define** throws keyword? Write with an example	Remembering	4
5	**Define** a exception called “NotEqualException” that is thrown when a float value is not equal to 3.14. write a program that uses the above user defined exception.	Remembering	4
6	**Differenciate** between checked and unchecked exceptions?	Remembering	4
7	**Define** a exception ?explain the different type of exception.		4
8	**Develop** a program to implement built in exceptions?	Apply, Create	4
9	**Explain** the various ways of creation of thread with an examples.	Understanding	4
10	**Explain** with an example how java performs thread synchronization?	Understanding	4
11	**Explain** the producer consumer problem with an example	Understanding	4
13	**Explain** briefly about the life cycle of a thread with an example.	Understanding	4
15	**Differenciate** between multiprocessing and multithreading?what is to be done to implement these ian a pogram	Remembering	3
16	**Define** thread.How do we set priorities for threads?	Understanding	3
17	**Explain** Deamon threads with a an example?	Understanding	2
18	**Explain** any five methods of thread class?	Understanding	2
19	**Explain** with an example how thread class methods can be used to control the behavior of a thread?	Understanding	2

UNIT – IV			
1	**Explain** the Java Collection frame work with an example.	Understanding	1
2	**What is** ArrayList? Explain with an example.	Remembering	1
3	**Explain** briefly about Vector class with an example.	Understanding	1
4	**What** is hash table? Explain with an example?	Remembering	1
5	**Explain** about stack class with an example.	Understanding	1
6	**What** is enumeration? Explain about with an example.	Remembering	1
7	**Explain** briefly about iterator with an example.	Understanding	1
8	**What** is StringTokenizer? Explain with an example.	Remembering	1
9	**Explain** in detail about Random class with an example.	Understanding	1
10	**What** is Scanner class? Explain with an example.	Remembering	2
11	**Explain** in detail Calender class with an example.	Understanding	2
12	**What** are text input/output file operations? Explain	Remembering	2
13	**Explain** binary input/output file operations with examples.	Understanding	2
14	**What** are random access file operations?	Remembering	2
15	**Explain** briefly about File management using File class.	Understanding	2
16	**Distinguish** between a)InputStream and Reader classes b)OutputStream and Writer Classes	Understanding	3
17	**Explain** different types of JDBC drivers with diagrams.	Understanding	3
18	**Develop** a JDBC application for querying the database and processing the results.	Applying	3
19	**Develop** a JDBC application for updating data.	Applying	3
UNIT – V			
1	**Explain** in detail about hierarchy for swing?	Understanding	4
2	**Explain** in detail about hierarchy for awt?	Understanding	4
3	**Explain** in detail about Layout management?	Understanding	1,4
4	**Develop** a java program for handling a button clicks?	Applying	3
5	**Develop** a java program for handling mouse Related events?	Applying	3
6	**Explain** in detail about Events, Event sources and Event classes	Understanding	3
7	**Explain** in detail about Event sources and Listeners	Understanding	3

8	**Develop** a java program for simple applet?	Applying	3
9	**Develop** a java program for passing parameters to applet?	Applying	3
10	**Develop** an applet that receives an integer in one text field and computes its factorial value and returns it in another text field, when the button named “compute” is clicked	Applying	3
11	**Explain** briefly about Adapter classes.	Understanding	3
12	**What** is the importance of Delegation Event Model on Event Handling	Remembering	2
13	**Distinguish** various differences between Swing and AWT	Analyzing	2
14	**Explain** the differences between applets and applications	Understanding	2
15	**Explain** various swing components in detail	Understanding	2

PART – C (Problem Solving and Critical Thinking Questions)

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	Student john12 = **new** Student(1001, "John", 12); Student john13 = **new** Student(1002, "John", 13); **System**.out.println("comparing John, 12 and John, 13 with compareTo :" + john12.compareTo(john13)); then **predict** the output of the code?	Understand	1,2,3

2	What is the output of the program?
	class Lifetime
	{
	public static void main(String args[])
	{
	int x;
	for (x=0; x<3; x++)
	{
	int y=-1;
	System.out.pirnltn(“ y is :” + y);
	y=100;
	System.out.println(“ y is now : “ + y);
	}
	}
	}
		Understand	1,2,3

3	What will be the output of the program?
	
	public class If2
	{
	static boolean b1, b2;
	public static void main(String [] args)
	{
	int x = 0;
	if (!b1)
	{
	if (!b2)
	{
	b1 = true;
	x++;
	if (5 > 6)
	{
	x++;
	}
	if (!b1)
	x = x + 10;
	else if (b2 = true)
	x = x + 100;
	else if (b1 | b2)
	x = x + 1000;
	}
	}
	System.out.println(x);
	}
	}
		Understand	1,2,3

4	**Explain** the following code legal in Java? is it example of method overloading or overriding?
	public String getDescription(Object obj){
	return obj.toString;
	}
	public String getDescription(String obj){
	return obj;
	}
	and
	public void getDescription(String obj){
	return obj;
	}
		Understand	1,2,3

5	**Analyze** the following program and find the output of the program?
	public class CounterAtomic {
	private AtomicLong counter = new AtomicLong();
	
	public void increment() {
	counter.incrementAndGet();
	}
	
	public long get() {
	return counter.get();
	}
	}
		Analyze	1,2,3

6	What will be the output of the program?
	
	public class Test
	{
	public int aMethod()
	{
	static int i = 0;
	i++;
	return i;
	}
	public static void main(String args[])
	{
	Test test = new Test();
	test.aMethod();
	int j = test.aMethod();
	System.out.println(j);
	}
	}
		Remembering	1,2,3

7	What will be the output of the program?
	
	public class Test
	{
	public static void main(String args[])
	{
	int i = 1, j = 0;
	switch(i)
	{
	case 2: j += 6;
	case 4: j += 1;
	default: j += 2;
	case 0: j += 4;
	}
	System.out.println("j = " + j);
	}
	}
		Remembering	1,2,3

8	Analyze the following program and find the output of the program?
	
	Class Test
	{
	public static void main(String args[])
	{
	int x, y;
	y=20;
	
	for(x=0; x<10: x++)
	{
	System.out.println("this is x:"
	+x); System.out.println("this is
	y:" +y); y= y-2;
	}
	}
	}
		Analyze	1,2,3

9	What will be the output of the program?
	
	class BitShift
	{
	public static void main(String [] args)
	{
	int x = 0x80000000;
	System.out.print(x + " and ");
	x = x >>> 31;
	System.out.println(x);
	}
	}
		Remembering	1,2,3

10	Analyze and find out What will be the problem in the program?
	
	class Equals
	{
	public static void main(String [] args)
	{
	int x = 100;
	double y = 100.1;
	boolean b = (x = y);
	System.out.println(b);
	}
	}
		Analyze	1,2,3

	UNIT – II		

1	Analyze the program and give output
	public class Foo
	{
	Foo()
	{
	System.out.print("foo");
	}
	
	class Bar
	{
	Bar()
	{
	System.out.print("bar");
		Analyzing	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

	}
	public void go()
	{
	System.out.print("hi");
	}
	} /* class Bar ends */
	
	public static void main (String [] args)
	{
	Foo f = new Foo();
	f.makeBar();
	}
	void makeBar()
	{
	(new Bar() {}).go();
	}
	}/* class Foo ends */		

2	**Explain** the following code legal in Java?
	class OuterClass {
	private int privInt = 10;
	public void createInnerClass() {
	InnerClass inClass = new InnerClass();
	inClass.accessOuter();
	}
	class InnerClass {
	public void accessOuter() {
	System.out.println("The outer class's
	privInt is " + privInt);
	}
	}
	}
	public static void main(String[] args)
	{
	OuterClass outClass = new OuterClass();
	OuterClass.InnerClass inner = outClass.new InnerClass();
	inner.accessOuter();
	}
		Understanding	4

3	**Analyze** the following program and find the output of the program?
	class A {
	//Members and methods declarations.
	}
	
	class B extends A {
	//Members and methods from A are
	inherited.
	//Members and methods declarations of B.
	}
	class A {
	public A() {
		Analyze	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

	System.out.println("New A");
	}
	}
	class B extends A {
	public B() {
	super();
	System.out.println("New B");
	}
	}		

4	**Illustrate** the output of the following program?
	interface MyInterface
	{
	public void method1();
	public void method2();
	}
	class XYZ implements MyInterface
	{
	public void method1()
	{
	System.out.println("implementation of method1");
	}
	public void method2()
	{
	System.out.println("implementation of method2");
	}
	public static void main(String arg[])
	{
	MyInterface obj = new XYZ();
	obj. method1();
	}
	}
		Applying	4

5	What is the output of the program?
	Class A
	{
	final public int GetResult(int a, int b) { return 0; }
	}
	class B extends A
	{
	public int GetResult(int a, int b) {return 1; }
	}
	public class Test
	{
	public static void main(String args[])
	{
	B b = new B();
	System.out.println("x = " + b.GetResult(0, 1));
	}
	}
		Remembering	4

6	What will be the output of the program? class Super {	Remembering	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

	public int i = 0;
	
	public Super(String text)
	{
	i = 1;
	}
	}
	
	class Sub extends Super
	{
	public Sub(String text)
	{
	i = 2;
	}
	public static void main(String args[])
	{
	Sub sub = new Sub("Hello");
	System.out.println(sub.i);
	}
	}		

7	What will be the output of the program?
	
	interface Count
	{
	short counter = 0;
	void countUp();
	}
	public class TestCount implements Count
	{
	public static void main(String [] args)
	{
	TestCount t = new TestCount();
	t.countUp();
	}
	public void countUp()
	{
	for (int x = 6; x>counter; x--, ++counter)
	{
	System.out.print(" " + counter);
	}
	}
	}
		Remembering	4

8	Analyze and find out the output of the program?
	
	public class Test
	{
	public int aMethod()
	{
	static int i = 0;
	i++;
	return i;
	}
		Analyze	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

	public static void main(String args[])
	{
	Test test = new Test();
	test.aMethod();
	int j = test.aMethod();
	System.out.println(j);
	}
	}		

9	Develop a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area().provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.	Applying	4

10	Analyze and find out the output of the program?
	
	package mypack
	class Book
	{
	String bookname;
	String author;
	Book(String b, String c)
	{
	this.bookname = b;
	this.author = c;
	}
	public void show()
	{
	System.out.println(bookname+" "+ author);
	}
	}
	
	class test
	{
	public static void main(String[] args)
	{
	Book bk = new Book("java","Herbert");
	bk.show();
	}}
		Analyze	4

	UNIT - III		

1	What will be the output of the program?
	
	public class X
	{
	public static void main(String [] args)
	{
	try
	{
	badMethod();
	System.out.print("A");
	}
	catch (Exception ex)
		Remembering	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

	{
	System.out.print("B");
	}
	finally
	{
	System.out.print("C");
	}
	System.out.print("D");
	}
	public static void badMethod()
	{
	throw new Error();
	}
	}		

2	Analyze the program and find the output ?
	
	public class Test
	{
	public static void aMethod() throws Exception
	{
	try {
	throw new Exception();
	}
	finally {
	System.out.print("finally ");
	}
	}
	public static void mai (String args[])
	{
	tı y
	{
	aMethod();
	}
	c tch (Exc ption e) {
	System.out.print("exception ");
	}
	System.oı t.print("ı inished");
	}
	}
		Analyze	2

3W	at will be the output of the program?
	
	class s1 implements Runnable
	{
	int x = 0, y = 0;
	int addX() {x++; return
	x;} int addY() {y++;
	return y;} public void
	run() {
	for(int i = 0; i < 10; i++)
	System.out.println(addX() + " " + addY());
	}
	pub lic static void mai (String args[])
	{
		Remembering	1

S. No	Question	Blooms Taxonomy Level	Course Outcome

	s1 run2 = new s1();
	Thread t1 = new Thread(run1); Thread t2 = new Thread(run2); t1.start();
	t2.start();
	}
	}		

4	**Explain** the output of the following program?
	class Exceptions {
	public static void main(String[] args) {
	
	String languages[] = { "C", "C++", "Java", "Perl", "Python" };
	
	try {
	for (int c = 1; c <= 5; c++) {
	System.out.println(languages[c]);
	}
	}
	catch (Exception e) {
	System.out.println(e);
	}
	}
	}
		Evaluated	4

5	**What** is the output of the below program?
	class Allocate {
	public static void main(String[] args) {
	
	try {
	long data[] = new long[1000000000];
	}
	catch (Exception e) {
	System.out.println(e);
	}
	
	finally {
	System.out.println("finally block will execute always.");
	}
	}
	}then **predict** the output?
		Remembering	1

6	What will be the output of the program?
	
	class MyThread extends Thread
	{
	public static void main(String [] args)
	{
	MyThread t = new MyThread(); Thread x = new Thread(t); x.start();
	}
	public void run()
	{
	for(int i = 0; i < 3; ++i)
		Analyzing	2

S. No	Question	Blooms Taxonomy Level	Course Outcome

	{
	System.out.print(i + "..");
	}
	}
	}		

7	What will be the output of the program?
	
	public class RTExcept
	{
	public static void throwit ()
	{
	System.out.print("throwit ");
	throw new RuntimeException();
	}
	public static void main(String [] args)
	{
	try
	{
	System.out.print("hello ");
	throwit();
	}
	catch (Exception re)
	{
	System.out.print("caught ");
	}
	finally
	{
	System.out.print("finally ");
	}
	System.out.println("after ");
	}
	}
		Remembering	2

8	Analyze the program and find the output
	
	public class NFE
	{
	public static void main(String [] args)
	{
	String s = "42";
	try
	{
	s = s.concat(".5");
	double d = Double.parseDouble(s);
	s = Double.toString(d);
	int x = (int) Math.ceil(Double.valueOf(s).doubleValue());
	System.out.println(x);
	}
	catch (NumberFormatException e)
	{
	System.out.println("bad number");
	}
	}}
		Analyzing	1

S. No	Question	Blooms Taxonomy Level	Course Outcome

9	What will be the output of the program?
	
	class MyThread extends Thread
	{
	MyThread()
	{
	System.out.print(" MyThread");
	}
	public void run()
	{
	System.out.print(" bar");
	}
	public void run(String s)
	{
	System.out.println(" baz");
	}
	}
	public class TestThreads
	{
	public static void main (String [] args)
	{
	Thread t = new MyThread()
	{
	public void run()
	{
	System.out.println(" foo");
	}
	}
	t.start();
	}
	}
		Remembering	2

10	What will be the output of the program?
	class implements Runnable
	{
	int x, y;
	public void run()
	{
	for(int i = 0; i < 1000; i++)
	synchronized(this)
	{
	x = 12;
	y = 12;
	}
	System.out.print(x + " " + y + " ");
	}
	public static void main(String args[])
	{
	s run = new s();
	Thread t1 = new Thread(run); Thread t2 = new Thread(run); t1.start();
	t2.start();
	} }
		Remembering	1

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – IV		

1	What will be the output of the program?
	
	package foo;
	import java.util.Vector;
	private class MyVector extends Vector
	{
	int i = 1;
	public MyVector()
	{
	i = 2;
	}
	}
	public class MyNewVector extends MyVector
	{
	public MyNewVector ()
	{
	i = 4;
	}
	public static void main (String args [])
	{
	MyVector v = new MyNewVector();
	}
	}
		Remembering	2

2	**Analyze** the following program and find the output of the program?
	public class Test {
	public static void main(String[] args) {
	System.out.println(Math.min(Double.MIN_VALUE, 0.0d));
	}
	}
		Analyzing	2

3	Find the output of the program.
	import java.util.*;
	class I
	{
	public static void main (String[] args)
	{
	Object i = new ArrayList().iterator();
	System.out.print((i instanceof List)+",");
	System.out.print((i instanceof Iterator)+",");
	System.out.print(i instanceof ListIterator);
	}
	}
		Remembering	1,4

4	**Compare** the output before adding and after adding?
	import java.util.*;
	
	public class ArrayListExample {
	public static void main(String args[]) {
	ArrayList<String> obj = new ArrayList<String>();
	obj.add("Ajeet");
	obj.add("Harry");
	System.out.println("Currently the array list has following
		Remember	2

S. No	Question	Blooms Taxonomy Level	Course Outcome

	elements:"+obj);
	obj.add(0, "Rahul");
	obj.add(1, "Justin");
	obj.remove("Chaitanya");
	obj.remove("Harry");
	System.out.println("Current array list is:"+obj);
	obj.remove(1);
	System.out.println("Current array list is:"+obj);
	}
	}		

5	What is the output of the following program
	import java.util.*;
	
	public class ArrayListExample
	{
	public static void main(String args[])
	{
	ArrayList<String> a1 = new ArrayList<String>();
	a1.add(1);
	a1.add(2);
	a1.add(3);
	a1.add(4);
	System.out.println("Current array list is:"+a1);
	Integer ia[]= new Integer [a1.size()];
	ia= a1.toArray(ia);
	int sum=0;
	for (int i : ia) sum += i;
	System.out.println("Sum is:"+sum)
	}
	}
		Remembering	2

6	Analyze the program and explain the importance of **line 1** and give the output
	import java.util.StringTokenizer;
	class Stdemo
	{
	Static String in= “title= java : the complete reference” +
	“author= schildt” +
	“publisher= Osborne/mcgraw-hill “ +
	“copyright= 2005”;
	public static void main(String args[])
	{
	String key= st.nextToken();------ 1
	String val= st.nextToken();
	System.out.println(key + “\t” + val);
	}
	}
		Analyzing	2

7	What is the output of the below program? import java.io.*; class BRRead { public static void main(String args[]) throws IOException {	Remembering	

S. No	Question	Blooms Taxonomy Level	Course Outcome

	char c;
	{
	BufferedReader br= new BufferedReader(new InputStreamReader (System.in));
	System.out.println("enter characters, „q‟ to quit.");
	Do
	{
	c= (char) br.read();
	System.out.println(c);
	While(c != „q‟);
	}
	}
	}
			4

8	Analyze the program and give the output and also explain the importance of **hasNext() and next() methods.**
	import java.util.*;
	class Findlinedemo
	{
	public static void main(String args[])
	{
	String s="Name: Tom Age: 28 Id: 77";
	Scanner sc= new Scanner(s);
	sc.findInLine ("Age");
	if(sc.hasNext())
	Syste.out.println(sc.next());
	else
	Syste.out.println("error");
	}
	}
		Analyze	1

9	What is the output of the below program?
	import java.io.*;
	class HTdemo
	{
	public static void main(String args[])
	{
	Hashtable< String, Double> balance= Hashtable< String, Double>();
	Enumeration<String> names;
	String str;
	double bal;
	balance.put("abc" 3435.35);
	balance.put("abc" 1254.35);
	names= balance.keys();
	while(names.hasMoreElements())
	{
	Str= names.nextElement();
	System.out.println(str + " : " + balance.get(str);
	}
	System.out.println();
	}
		Remembering	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

10	**Analyze** the below program and give the output of the following program?
	import java.util.Scanner;
	class Division {
	public static void main(String[] args) {
	int a, b, result;
	Scanner input = new
	Scanner(System.in);
	System.out.println("Input two integers");
	a = input.nextInt();
	b = input.nextInt();
	result = a / b;
	System.out.println("Result = " + result);
	}
		Analyze	3

	UNIT - V		

1	**Predict** the output using below code and what happens if below code is not used in GUI programs?
	public void windowClosing(WindowEvent e) {
	dispose();
	System.exit(0);
		Understand	1

2	Explain the below code and mention its important
	Public void actionPerformed(ActionEvent e)
	{
	it(e.getSource()== b1)---Assume b1 is variable of button
	{
	int x= Integer.parseInt(t1.getText())-----Assume t1 is variable of textfield
	int y= Integer.parseInt(t2.getText())-----Assume t2 is variable of textfield
	int sum= X+Y;
	t3.setText(“ ”+sum);-----Assume t3 is variable of textfield
	}
	}
		Understanding	4

3	What is the output the program
	import java.awt.*;
	import java.swing.*;
	/* < applet code= “Jlabeldemo” width= 200 height =200>
	</applet>
	*/
	
	public class JLabeldemo extends JApplet
	{
	ImageIcon i= new ImageIcon(“ india.gif ”);
	JLabel ji=new JLabel(“ INDIA” , I , JLabel.CENTER);
	add(ji);
	}
	}
		Remembering	1

4	**Explain** the output of the following program? import java.applet.*; import java.awt.*; public class Main extends Applet{	Evaluated	2

S. No	Question	Blooms Taxonomy Level	Course Outcome

	public void paint(Graphics g){
	g.drawString("Welcome in Java Applet.",40,20);
	}
	}
	<HTML>
	<HEAD>
	</HEAD>
	<BODY>
	
	<APPLET CODE="Main.class" WIDTH="800" HEIGHT="500">
	</APPLET>
	
	</BODY>
	</HTML>		

5	**Explain** the usage of the following code?
	public void actionPerformed(ActionEvent ae){
	try{
	num = Integer.parseInt(input.getText());
	sum = sum+num;
	input.setText("");
	output.setText(Integer.toString(sum));
	lbl.setForeground(Color.blue);
	lbl.setText("Output of the second Text Box : "
	+ output.getText());
	}
	catch(NumberFormatException e){
	lbl.setForeground(Color.red);
	lbl.setText("Invalid Entry!");
	}
		Understanding	4

6	**Analyze** the program and explain the importance 1 to 4 line and give the output.
	
	import java.awt.*;
	class Frame1 extends Frame
	{
	Frame1()
	{
	setTitle(“demo”); ---------- 1
	setSize(200,200);
	setVisible(true); ---------- 2
	setLayout(new FlowLayout());
	Label l1= new Label(“java”);
	Label l2= new Label(“j2ee”);
	add(l1);----------3
	add(l2);----------4
	}
	}
	Class Labeldemo
	{
	Public static void main(String args();
	{
	Frame1 f= new Frame();
	}
	}
		Analyze	3

S. No	Question	Blooms Taxonomy Level	Course Outcome

7	What is the output the program
	import java.awt.*;
	import java.applet.*;
	/* < applet code= “statusdemo.class” width= 200 height =200>
	</applet>
	*/
	public class satusdemo extends Applet
	{
	Public void init()
	{
	setBackground(Color.red);
	}
	Public void paint(Graphics g)
	{
	g.drawString(“this is in the applet window” 10,20)“
	showStatus(“this is the status window message”);
	}
	}
		Remembering	4

8	Explain the usage of following line of code line by line.
	Public void mouseClicked(MouseEvent me)
	{
	Mousex-=0;
	Mousey=10;
	Msg= “mouse clicked”
	Repaint();
	}
	Public void mouseEntered(MouseEvent me)
	{
	Mousex-=0;
	Mousey=10;
	Msg= “mouse entered”
	Repaint();
	}
		Understanding	1

9	What is the output of the program
	import java.applet.Applet;
	import java.awt.*;
	public class Sms extends Applet {
	public void init() {
	}
	public void paint(Graphics g) {
	g.setColor(Color.blue);
	Font font = new Font("verdana", Font.BOLD, 15);
	g.setFont(font);
	g.drawString("Welcome To Aeronautical Eng College", 50, 50);
	}
	}
		Remembering	3

10	What is the output the program and explain line 1 and 2. import java.awt.*; import java.applet.*; /* < applet code= “GridLayoutDemo” width= 300 height =300> </applet>	Remembering	4

S. No	Question	Blooms Taxonomy Level	Course Outcome

	*/
	public class GridLayoutDemo extends Applet
	{
	static final int n=5;
	public void init()
	{
	setLayout(new GridLayout(n , n));-------1
	setFont (new Font (“SamsSerof”, Font.BOLD, 24)); --- 2
	for (int j=0l j<n; j++)
	{
	int k= I * n + j;
	if(k>00)
	Add(new button (“” + k0;
	}}}}		

Prepared by: **HOD, COMPUTER SCIENCE AND ENGINEERING**

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	**OPERATING SYSTEMS**			
Course Code	CS403PC			
Regulation	**R18 - JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	3	-	-	3
Course Faculty	CH V V N RAJU Asst.Prof			

COURSE OVERVIEW:

This course provides a comprehensive introduction to operating system design concepts, data structures and algorithms. The course is designed to provide in-depth critique on the problems of resource management and scheduling, concurrency and synchronization, memory management, file management, peripheral management, protection and security. This course is intended to discuss the topics in a general setting not tied to any one particular operating system. Throughout the course, the study of practical aspects that pertain to the most popular operating systems such as Unix/Linux and Windows are considered as case studies.

PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	4	4	Data Structures and Algorithms, Computer Architecture

III. MARKS DISTRIBUTION:

Sessional Marks	University End Exam Marks	Total Marks
Midterm Test There shall be two midterm examinations. Each midterm examination consists of essay paper, objective paper and assignment. The essay paper is for 10 marks of 60 minutes duration and shall contain 4 questions. The student has to answer 2 questions, each carrying 5 marks. The objective paper is for 10 marks of 20 minutes duration. It consists of 10 multiple choice and 10 fill-in-the blank questions, the student has to answer all the questions and each carries half mark.	75	100

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	90 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	90 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

V. COURSE OBJECTIVES:

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

I. Be familiar with the fundamental principles of the operating system, its services and functionalities.
II. Master the concepts of processes, inter-process communication, synchronization and scheduling.
III. Be familiar with different types of memory management viz. virtual memory, paging and segmentation.
IV. Be familiar with analyzing the performance of memory management techniques in various real-time scenarios.
V. Master the concepts of data input/output, storage and file management.
VI. Be familiar with deadlocks and distinguish the techniques for deadlock detection, prevention, recovery.
VII. Be familiar with the need for protection in computer systems and the available techniques for protection.

COURSE OUTCOMES:

1. Apply optimization techniques for the improvement of system performance.
2. Ability to understand the synchronous and asynchronous communication mechanisms in their respective OS.
3. Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.
4. Ability to compare the different OS

VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	**Engineering Knowledge** Appl the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization the solution of complex engineering problems.	H	Assignments, Tutorials
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.	H	Assignments
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.	S	Mini Projects
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research Methods design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	S	Projects
PO5	**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.	S	Projects
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.	N	--
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.	N	--
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and	N	--
	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.	N	--
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	N	--

	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.	N	--
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.	S	Lectures, Projects

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

~~***VIII.***~~ *SYLLABUS:*

UNIT – I

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

UNIT – II

Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec

UNIT – III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT – IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT – V

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

Text books:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Principles", 8e, Wiley Student Edition.
2. W. Stallings, "Operating Systems - Internals and Design Principles", 6e, Pearson.

References:

1. S. Godbole, "Operating Systems", 2e, TMH.
2. P. C. P. Bhatt, "An Introduction to Operating Systems", PHI.
3. S. Haldar and A. A. Aravind, "Operating Systems", Pearson Education.
4. T. W. Doeppner, "Operating Systems in Depth", Wiley.

~~IX.~~ *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 - 2	**Operating System Introduction:** Operating Systems Objectives & Functions, Computer System Architecture, OS Structure And Operations	**Understand** the importance of OS and its functions	T2: 2.1 T1: 1.1 - 1.5
3 - 4	Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time systems, Special-Purpose Systems	**Associate** the types of operating systems with real-life applications	T2: 2.2
5 - 6	OS Services, User OS Interface, Systems Calls, Types of Systems Calls, System Programs	**Interpret** the OS services and system calls	T1: 2.1 - 2.5
7 - 8	OS Design & Implementation, OS Structure, Virtual Machines	**Explain** the benefits of building abstract layers in hierarchical fashion and virtualization	T1: 2.6 - 2.8
9 - 10	**Process & CPU scheduling:** Process Concepts, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher	**Compare** and **contrast** the common algorithms used for both preemptive and non-preemptive scheduling of tasks in operating systems	T1: 3.1 - 3.4 T2: 3.1 - 3.4

11 - 13	Scheduling Criteria, Scheduling Algorithms		T1: 5.2 - 5.3
14	Multiple Processor Scheduling, Real-Time Scheduling	**Examine** appropriate scheduling algorithm for real-life applications	T1: 5.5 T2:10.1-10.2
15	Thread Scheduling	**Infer** advantages of threads over processes	T1: 5.4
16	Case Studies - Linux, Windows	**Associate** the process management in real operating systems	T1:5.6, 21.4 T2: 8.3 - 8.5
17 - 19	**Process coordination:** Process Synchronization, The Critical - Section Problem, Peterson‟s Solution, Synchronization Hardware	**Summarize** the range of mechanisms that can be employed at the operating system level to realize concurrent systems and describe the benefits of each.	T1: 6.1 - 6.4
20 - 21	Semaphores & Classical Problems of Synchronization, Monitors	**Understand** classical problems of synchronization	T1: 6.5 - 6.7
22	Case Studies: Linux, Windows	**Discuss** process synchronization in real operating systems	T2: 6.7 - 6.8, 6.10
23 - 24	**Memory Management & Virtual Memory:** Logical & Physical Address Space, Swapping, Contiguous Memory Allocation	**State** basics of memory management	T1: 8.1 - 8.3
25 - 26	Paging, Structure of Page Table	**Demonstrate** the concepts of memory management such as paging and segmentation	T1: 8.4 - 8.5
27	Segmentation, Segmentation with Paging		T1: 8.6
28 - 29	Virtual Memory, Demand Paging,	**Illustrate** the benefits of virtual	T1: 9.1 -

	Performance of Demand Paging	memory and demand paging	9.2
30 - 32	Page Replacement, Page Replacement Algorithms	**Order** the page replacement algorithms according to their performance	T1: 9.4
33	Allocation of Frames, Thrashing		T1: 9.5 - 9.6
34	**File system Interface:** Concept of File, Access Methods, Directory Structures	Summarize the full range of considerations that support file systems. Compare and contrast different approaches to file organization, recognizing the strengths and weaknesses of each.	T1:10.1-10.3
35 - 36	File System Mounting, File Sharing, Protection, File System Structure, Implementation	**Outline** the issues of file system implementation	T1:10.4-10.6 T1:11.1-11.2
37 - 38	File Allocation Methods	**Define** file allocation methods and performance metrics	T1: 11.4
39 - 40	Free-Space Management, Directory Implementation, Efficiency and Performance		T1: 11.3, 11.5 -11.6
41 - 42	**Mass Storage Structure:** Overview, Disk Structure, Disk Attachment	**Distinguish** between various techniques for disk management	T1:12.1-2.4
43 - 44	Disk Scheduling and Management, Swap-Space Management		T1:12.5-12.6
45	**Deadlocks:** System Model, Deadlock Characterization	Explain conditions that lead to deadlock and differentiate between	T1: 7.1 - 7.2

		deadlock, starvation, and race	
		conditions.	
46 - 48	Methods of Handling Deadlocks, Deadlock Prevention and Avoidance	**Understand** the difference between preventing and avoiding deadlocks.	T1: 7.3 - 7.5
49 - 50	Dead Lock Detection, Recovery from Deadlock		T1: 7.6 - 7.7
51 - 52	**Protection:** System Protection, Goals of Protection, Principles of Protection, Domain of Protection	**Quote** the goals and principles of system protection	T1:14.1-14.3
53 - 54	Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights	**Clarify** the different types of access control	T1:14.4-14.7
55 - 56	Capability- Based systems, Language - Based Protection	**Match** appropriate protection system for the needs	T1:14.8-14.9

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

CO	Course outcome	Blooms taxonomy level
C223.1	Infer the issues to be considered in the design and development of operating system	Apply
C223.2	Demonstrate the usage of Unix commands, system call interface for process management, interprocess communication and I/O in Unix	Apply
C223.3	Create control access to a computer and the files that shared	Analyse
C223.4	Resolve user problems with standard operating environments.	Analyse
C223.5	Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.	Create

S - Supportive **H - Highly Related**

MAPPING COURSE OUTCOMES 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
C223.1	3	2	2	2	0	0	0	0	0	0	0	1	3	0	0
C223.2	3	2	2	2	0	0	0	0	0	0	0	1	3	0	3
C223.3	3	2	2	2	0	0	0	0	0	0	0	1	3	0	3
C223.4	3	2	2	2	3	0	0	0	0	0	0	1	3	0	3
C223.5	3	0	0	0	0	0	0	0	0	0	0	1	3	0	3
Average	**3**	**2**	**2**	2	3	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**3**

ASSIGNMENT

Course Name	:	**Operating System**
Course Code	:	CS405PC
Class	:	II B. Tech II Semester
Branch	:	Computer Science and Engineering
Year	:	2019 – 2020
Course Faculty	:	CH V V N RAJU 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 & II

S. No.	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT - I		
1	**Explain** in detail the types of system calls provided by a typical operating system?	Understand	1
2	**Compare** Tightly coupled systems and loosely coupled systems.	Understand	1
3	**Define** Operating System Operations and Structures	Knowledge	1
4	**Compare** and contrast Multiprogramming, Multitasking and Multiprocessing.	Apply	1
5	a. **Define** an operating system? State and explain the basic functions or services of an operating system. b. **List** the differences between multiprogramming and Time-sharing systems.	Understand Knowledge	1
6	Briefly **Explain** various managements of operating systems and their responsibilities in detail?	Understand	1
7	**Explain** about context switching with necessary diagram?	Understand	1
8	**Define** the system structure of Modern Operating System?	Understand	1
9	Briefly **Compare** the different operating system structures?	Apply	1
10	**Compare** Batch operating system and Time Sharing operating system?	Apply	1

S. No.	Questions	Blooms Taxonomy Level	Course Outcome
11	**Explain** how do clustered systems differ from multiprocessor systems? What is required for two machines belonging to a cluster to cooperate to provide a highly available service?	Understand	1
12	**List** and discuss the various services provided by the operating system?	Knowledge	1
13	**Explain** the advantages and disadvantages of using the system calls interface for manipulating both files and devices?	Understand	4
14	**Distinguish** between the client-server and peer-to-peer models of distributed systems?	Understand	1
	UNIT – II		
1	**Define** Monitor? Compare it with semaphore. Explain in detail a monitor with notify and broadcast using an example.	Knowledge	2
2	**Differentiate** I/O bound program and CPU bound program?	Understand	2
3	**Define** semaphore? Explain the application of semaphore.	Knowledge	2
4	**Give** short note about the following : a. Binary Semaphores. b. b. Bounded Waiting.		2
5	**List** out the various process states and briefly explain with a state diagra m.	Knowledge	2
6	a. **Describe** process scheduling? Explain the various levels of scheduling. b. **Compare** and contrast pre-emptive and non-pre-emptive	Understand Analyze	2

	algorithm.		
7	**Explain** how the concurrent processes cooperate by sharing and by communication	Understand	2
8	**Discuss** about the actions taken by the kernel to context switch between the processes?	Understand	2
9	**List** five services provided by an operating system that are designed to make it more convenient for users to use the computer system. In what cases it would be impossible for user-level programs to provide these services? Explain.	Knowledge	2
10	**State** the purpose of short-term, medium-term and long term schedulers. Also discuss the differences among them.	Knowledge	2
11	**Describe** the following a. Virtual Machine b. Process state c. Process Control Block	Knowledge	2
12	**Define** Process? Explain different Process States?	Knowledge	2
13	**Describe** the following a. Race Condition b. Process Interaction	Knowledge	2
	UNIT – III		
1	**Describe** the file system of UNIX?	Knowledge	1
	Compare the main memory organization schemes of contiguous-	Apply	2
	memory allocation, segmentation, and paging with respect to the		

2	following issues: A. external fragmentation B. internal fragmentation C. ability to share code across processes		
3	**Describe** Belady's anomalous behaviour of FIFO.	Understand	2
4	**Define** thrashing? Explain the different methods to avoid thrashing.	Knowledge	2
5	**Explain** about addresses binding for a user program and discuss multi step processing of a user program?	Understand	2
6	**State** and explain about Virtual memory concept with neat diagram.	Knowledge	6
7	**Explain** how double buffering improves the performance than a single buffer for I/O?	Understand	6
8	**Explain** the basic concepts of segmentation with neat diagrams?	Understand	7
9	**Differentiate** between logical I/O and device I/O?	Understand	7
10	**Differentiate** between internal and external fragmentation. Which one occurs in paging scheme?	Understand Understand	6
11	**Discuss** briefly about Swapping concept with necessary Examples.	Understand	7
12	Consider the following page-reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 **Calculate** the number of page faults would occur for the following replacement algorithms, assuming frame size is 4. Remember that frames are initially empty. (i)LRU replacement (ii)FIFO replacement (iii)Optimal replacement	Apply	6
13	**Explain** briefly about Paging with neat diagram.	Understand	6
14	**Discuss** LRU-Approximation page replacement?	Understand	6

UNIT – IV			
1	**Discuss** about a. Disk Management b. Swap -Space Management	Understand	7
2	**Describe** the following Directory Implementation methods: a. Linear List b. Hash Table	Knowledge	7
3	**Discuss** the Criteria for choosing file origination?	Understand	7
4	**Define** buffering, caching and spooling.	Knowledge	7
5	**Describe** indexed file, indexed sequential file organization?	Knowledge	7
6	**Explain** the following File concepts: a. File Attributes. b. File Operations. c. File Types. d. Internal File Structure.	Understand	7
7	a. **Discuss** about N- step- SCAN policy for disk scheduling. b. **Explain** how double buffering improves the performance than a single buffer for I/O.	Understand Understand	7
8	**List** and Explain three Blocking Methods?	Knowledge	7
9	**Explain** shortest Process Next scheduling with an example?	Understand	7
10	**Explain the** relationship between a pathname and a working directory?	Understand	7
11	**Discuss** about N-Step scan policy for disk scheduling?	Understand	7
12	**Discuss** in detail the performances issues of secondary storage management?	Understand	7

13	**Compare** and contrast chained allocation with indexed allocation technique of file allocation	Apply	7
14	**List** the various disk space allocation strategies. Explain clearly the contiguous allocation technique.	Knowledge	8
15	**Describe** briefly a. The methods of file accessing. b. b. Two level directory structure.	Knowledge	7
16	**Explain** about the protection strategies provided for files. a. Types of access b. Access control list (ACL)	Understand	8

	c. Three classifications-owner, group & universe		
	d. Other protection approaches-passwords		
	UNIT – V		
1	**Explain** the working of banker‟s algorithm for deadlock avoidance with	Understand	9
	suitable examples.		
2	a. **Explain** the critical section? Describe the different solution	Understand	9
	available to avoid race conditions?		
	b. **Explain** about Mutual exclusion?		
3	**Explain** the Banker‟s algorithm for deadlock avoidance.	Understand	9
	Deadlock avoidance definition		
	Data structures used		
	Safety algorithm		
	Resource request algorithm		
4	**Describe** the access matrix model used for protection.	Understand	11
5	**Relate** the terms race condition, atomic transaction, critical	Apply	9

	section and mutual exclusion.		
6	**Describe** Resource-Allocation graph? Explain how resource graph can be used for detecting deadlocks.	Understand	9
7	**Discuss** deadlock detection in detail.	Understand	9
8	**Explain** briefly about resource allocation graph with examples.	Understand	9
9	**State** and explain the methods involved in recovery from deadlocks	Knowledge	9
10	**Explain** the conditions for the deadlock to occur? How can a deadlock be prevented?	Understand	9

ASSIGNMENT

Course Name	:	**Operating System**
Course Code	:	CS405PC
Class	:	II B. Tech II Semester
Branch	:	Computer Science and Engineering
Year	:	2019 – 2020
Course Faculty	:	CH V V N RAJU Asst.Prof

OBJECTIVES:

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.ASSIGNMENT – I & II

S. No.	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT - I		
1	**Explain** in detail the types of system calls provided by a typical operating system?	Understand	4
2	**Compare** Tightly coupled systems and loosely coupled systems.	Understand	1
3	**Define** Operating System Operations and Structures	Knowledge	1
4	**Compare** and contrast Multiprogramming, Multitasking and Multiprocessing.	Apply	1
5	a. **Define** an operating system? State and explain the basic functions or services of an operating system. b. **List** the differences between multiprogramming and Time-sharing systems.	Understand Knowledge	1
6	Briefly **Explain** various managements of operating systems and their responsibilities in detail?	Understand	1
7	**Explain** about context switching with necessary diagram?	Understand	1
8	**Define** the system structure of Modern Operating System?	Understand	1
9	Briefly **Compare** the different operating system structures?	Apply	1
10	**Compare** Batch operating system and Time Sharing operating system?	Apply	1

S. No.	Questions	Blooms Taxonomy Level	Course Outcome
11	**Explain** how do clustered systems differ from multiprocessor systems? What is required for two machines belonging to a cluster to cooperate to provide a highly available service?	Understand	1
12	**List** and discuss the various services provided by the operating system?	Knowledge	1
13	**Explain** the advantages and disadvantages of using the system calls interface for manipulating both files and devices?	Understand	4
14	**Distinguish** between the client-server and peer-to-peer models of distributed systems?	Understand	1
	UNIT – II		
1	**Define** Monitor? Compare it with semaphore. Explain in detail a monitor with notify and broadcast using an example.	Knowledge	2
2	**Differentiate** I/O bound program and CPU bound program?	Understand	2
3	**Define** semaphore? Explain the application of semaphore.	Knowledge	2
4	**Give** short note about the following : a. Binary Semaphores. b. b. Bounded Waiting.		2
5	**List** out the various process states and briefly explain with a state diagram	Knowledge	2

6	**a.Describe** process scheduling? Explain the various levels of scheduling. b. **Compare** and contrast pre-emptive and non-pre-emptive algorithm.	Understand Analyze	2
7	**Explain** how the concurrent processes cooperate by sharing and by communication	Understand	2
8	**Discuss** about the actions taken by the kernel to context switch between the processes?	Understand	2
9	**List** five services provided by an operating system that are designed to make it more convenient for users to use the computer system. In what cases it would be impossible for user-level programs to provide these services? Explain.	Knowledge	2
10	**State** the purpose of short-term, medium-term and long term schedulers. Also discuss the differences among them.	Knowledge	2
11	**Describe** the following a. Virtual Machine b. Process state c. Process Control Block	Knowledge	2
12	**Define** Process? Explain different Process States?	Knowledge	2

13	**Describe** the following a. Race Condition b. Process Interaction	Knowledge	2
	UNIT – III		
1	**Describe** the file system of UNIX?	Knowledge	1
2	**Compare** the main memory organization schemes of contiguous-memory allocation, segmentation, and paging with respect to the following issues: A. external fragmentation B. internal fragmentation C. ability to share code across processes	Apply	4
3	**Describe** Belady's anomalous behaviour of FIFO.	Understand	2
4	**Define** thrashing? Explain the different methods to avoid thrashing.	Knowledge	2
5	**Explain** about addresses binding for a user program and discuss multi	Understand	3

	c. Three classifications-owner, group & universe		
	d. Other protection approaches-passwords		
	UNIT – V		
1	**Explain** the working of banker‟s algorithm for deadlock avoidance with	Understand	3
	suitable examples.		3
2	a. **Explain** the critical section? Describe the different solution	Understand	3
	available to avoid race conditions?		3
	b. **Explain** about Mutual exclusion?		3
3	**Explain** the Banker‟s algorithm for deadlock avoidance.	Understand	2
	a. Deadlock avoidance definition		
	b. Data structures used		
	c. Safety algorithm		
	d. Resource request algorithm		
4	**Describe** the access matrix model used for protection.	Understand	1
5	**Relate** the terms race condition, atomic transaction, critical section and mutual exclusion.	Apply	1
6	**Describe** Resource-Allocation graph? Explain how resource graph can be used for detecting deadlocks.	Understand	2
7	**Discuss** deadlock detection in detail.	Understand	1
8	**Explain** briefly about resource allocation graph with examples.	Understand	1
9	**State** and explain the methods involved in recovery from deadlocks	Knowledge	2
10	**Explain** the conditions for the deadlock to occur? How can a deadlock be prevented?	Understand	3

TUTORIAL QUESTION BANK

Course Title	**OPERATING SYSTEMS**			
Course Code	**A50510**			
Regulation	**R13 - JNTUH**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	-	-	4
Course Faculty	CH V V N RAJU Asst.Prof			

OBJECTIVES:

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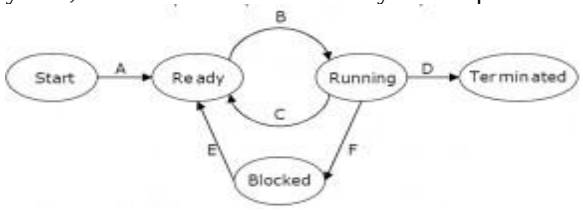
S. No.	Question	Blooms Taxonomy Level	Course Outcomes
	UNIT – I		
	PART - A (Short Answer Questions)		
1	**Define** operating system?	Knowledge	1
2	**Discuss** batch systems?	Understand	1
3	**List** any four functions of operating system?	Knowledge	1
4	**Define** system call?	Knowledge	1
5	**List** any four types of system calls?	Knowledge	1
6	**Distinguish** between user mode and kernel mode operations of the operating system?	Understand	1
7	**List** the advantages of multiprogramming?	Knowledge	1
8	**Distinguish** between multiprogramming and multitasking?	Understand	1
9	**Define** interrupt?	Knowledge	1
10	**Define** distributed systems?	Knowledge	1
11	**Define** real-time operating system?	Knowledge	1
12	**Define** virtual machine?	Knowledge	1
13	**List** the memory hierarchy available in operating system?	Knowledge	1
14	**Define** multiprocessor system?	Knowledge	1
15	**Describe** the different types of multiprocessing?	Knowledge	1
16	**Describe** the different types of multiprocessor systems?	Knowledge	1
17	**Define** kernel?	Knowledge	1

18	**Define** time-sharing systems?	Knowledge	1
19	**Describe** the use of fork () and exec () system calls?	Knowledge	1
20	**Define** privileged instructions?	Knowledge	1
21	**State** the differences between system call and system program?	Knowledge	1
22	**State** the five major activities of an operating system in regard to process management?	Knowledge	1
23	**State** the main advantage of the layered approach to system design? What are the disadvantages of using the layered approach?	Knowledge	1
24	**List** the contemporary operating systems that use the microkernel approach?	Knowledge	1
25	**List** the various OS components?	Knowledge	1
26	**State** the challenges in designing a distributed operating system?	Knowledge	1
	PART-B (Long Answer Questions)		
1	**State** and explain various types of computer systems?	Knowledge	2
2	a) **Define** an operating system? State and explain the basic functions or services of an operating system? b) **Explain** the differences between multiprogramming and time-sharing systems?	Understand	2
3	**Explain** how protection is provided for the hardware resources by the operating system?	Understand	2
4	**Describe** the system components of an operating system and **explain** them briefly?	Understand	2
5	**Describe** the operating system structures?	Knowledge	2
6	**Discuss** the following structures of OS?		2
7	**Explain** briefly system calls with examples?	Understand	2
8	**Define** the essential properties of the following operating systems?		2
9	a) **Explain** the architecture of an operating system? b) **Draw** and explain the architecture of windows 2000 and traditional UNIX?	Understand	2
10	Computer system architecture deals about how the component of a computer system may be organized? **Discuss** in detail about different architectures of a computer system?	Understand	2
11	Does an operating system generally need to keep about running processes in order to execute them? **Explain** in detail.	Understand	2
12	**Discuss** the view of an operating system as a resource manager?	Understand	2
13	**Distinguish** between multiprogramming, multitasking and multiprocessing?	Understand	2
14	**Explain** how operating system services are provided by system calls?	Understand	2
15	**Describe** the functionalities listed below? a) Batch programming b) Virtual Memory c) Time sharing	Knowledge	2
16	**Distinguish** between the client-server and peer-to-peer models of distributed systems?	Understand	2
	PART-C (Problem Solving and Critical Thinking)		
1	How does the distinction between kernel mode and user mode function as a rudimentary form of protection (security) system? **Justify.**	Apply	1
2	**Explain** using a simple system call as an example (e.g. getpid, or uptime), what is generally involved in providing the result, from the point of calling the function in the C library to the point where that function returns?	Understand	1
3	In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems? a) **Explain** two such problems? b) Can we ensure the same degree of security in a time-shared machine as we have in a dedicated machine? **Explain** your answer.	Apply	1

4	**Explain** why must the operating system be more careful when accessing input to a system call (or producing the result) when the data is in memory instead of registers?	Understand	1
5	**Discuss** how a multi-threaded application can be supported by a user- level threads package. It may be helpful to consider (and draw) the components of such a package, and the function theyperform?	Understand	1
6	**Explain** why do you think that idleness in CPU occurs?	Knowledge	1
7	**Explain** If you run the same program twice, what section would be shared in the memory?	Knowledge	1
8	**Explain** the difference between interrupt and exception?	Understand	1
9	**Differentiate** between tightly coupled systems and loosely coupled systems.	Apply	1
10	**Explain** Is OS is a resource manager? If so justify your answer	Knowledge	1
	UNIT – II		
	PART - A (Short Answer Questions)		
1	**Define** process. what is the information maintained in a PCB?	Knowledge	2
2	**Define** process state and mention the various states of a process?	Knowledge	2
3	**Describe** context switching?	Knowledge	2
4	**Explain** the use of job queues, ready queues and device queues?	Understand	2
5	**Distinguish** between thread with process?	Understand	2
6	**Explain** benefits of multithreaded programming?	Understand	2
7	**Explain** different ways in which a thread can be cancelled?	Understand	2
8	**Distinguish** between user threads and kernel threads?	Understand	2
9	**Define** CPU scheduling?	Knowledge	2
10	**List** the various scheduling criteria for CPU scheduling?	Knowledge	2
11	**Distinguish** between preemptive and non-preemptive scheduling techniques?	Understand	2
12	**Define** turnaround time?	Knowledge	3
13	**List** different types of scheduling algorithms?	Knowledge	1
14	**State** critical section problem?	Knowledge	1
15	**State** the requirements that a solution to the critical section problem must satisfy?	Knowledge	1
16	**Define** race condition?	Knowledge	2
17	**Define** semaphores. Mention its importance in operating system?	Knowledge	2
18	**State** two hardware instructions and their definitions which can be used for implementing mutual exclusion?	Knowledge	2
19	**Explain** bounded waiting in critical region?	Understand	2
20	**Distinguish** between semaphore and binary semaphore?	Understand	1
21	**Define** monitor?	Knowledge	1
22	**Describe** entry and exit sections of a critical section?	Knowledge	1
23	**State** the real difficulty with the implementation of the SJF CPU scheduling algorithm?	Knowledge	1
24	**State** the factors on which the performance of the Round Robin CPU scheduling algorithm depends?	Knowledge	2
25	**Name** the algorithms used for foreground and background queue scheduling in a multilevel queue-scheduling algorithm?	Knowledge	2
26	**State** the assumption behind the bounded buffer producer consumer problem?	Knowledge	2
	PART-B (Long Answer Questions)		
1	**Explain** the reasons for process termination?	Understand	1
2	**Discuss** the following process, program, process state, process control	Understand	1
3	**Explain** the process state transition diagram with examples.	Understand	1

4	**Discuss** the attributes of the process. **Describe** the typical elements of process control block?	Understand	1
5	**Explain** the principles of concurrency and the execution of concurrent processes with a simple example?	Understand	2
6	**Describe** dining-philosophers problem? Device an algorithm to solve the problem using semaphores?	Understand	2
7	**Explain** the infinite buffer producer/consumer problem for concurrent processing which uses binary semaphores?	Understand	2
8	Define monitor? Distinguish between monitor and semaphore. **Explain** in detail a monitor with notify and broadcast functions using an example?	Understand	2
9	List out the various process states and briefly **explain** the same with a state diagram?	Understand	1
10	a) Describe process scheduling? **Explain** the various levels of scheduling. b) **Distinguish** pre-emptive and non-pre-emptive schedulingalgorithms?	Understand	1
11	**Discuss** about following? a) Process b) Components of process c) Program versus process d) Process states	Understand	1
12	**Discuss** the following? a) CPU-I/O burst cycle b) CPU schedule c) Pre-emptive and non-preemptive scheduling d) Dispatcher	Understand	2
13	**Explain** the concept of multi-threading? Discuss the following multi-threading models. a) Many-to-one b) One-to-one c) Many-to-many d) Two-level	Understand	1
14	**Explain** the issues that may rise in multi-threading programming. Discuss about each in detail?	Understand	1
15	**Discuss** the following CPU scheduling algorithms a) Round robin b) Multilevel- queue scheduling c) Multi-level feedback queue scheduling	Understand	1
16	A scheduling mechanism should consider various scheduling criteria to realize the scheduling objectives? **List** out all the criteria.	Knowledge	2
17	Define semaphore? **Explain** the method of application of semaphore for process synchronization?	Understand	3
18	**Explain** the Readers and Writers problem and its solution using the concept of semaphores?	Understand	2
19	**Explain** the uses of the following: a. Mutex object b. Semaphore object c. Waitable timer object	Understand	2
20	**Write** short notes about the following: a. Binary Semaphores b. Bounded Waiting	Knowledge	2
PART-C (Problem Solving and Critical Thinking)			

<table>
<tr><td>1</td><td>Suppose we have a single processor system, and jobs arrive at a rate of 10 jobs a Seconds, suppose each job takes an average of 50 milli-seconds to complete. Assure that both distributions are exponential. State the expected number of jobs in the system and the average time in the system?</td><td>Apply</td><td>1</td></tr>
<tr><td>2</td><td>Suppose the following jobs arrive for processing at the times indicated, each job will run the listed amount of time.
<table><tr><th>Jobs</th><th>Arrival Time</th><th>Burst Time (in secs)</th></tr><tr><td>1</td><td>0.0</td><td>8</td></tr><tr><td>2</td><td>0.4</td><td>4</td></tr><tr><td>3</td><td>1.0</td><td>1</td></tr></table>Give Gantt chart illustrating the execution of these jobs using the non-pre-emptive FCFS and SJF scheduling algorithms. Compute the average turnaround time and average waiting time of each job for above algorithms.</td><td>Apply</td><td>1</td></tr>
<tr><td>3</td><td>Consider system with five processor P0 to P4 and 3 resources A, B and C, Resources type A has 10 instances, B has 5 instances and C has 7 instances. The snapshot at time T0 is
<table><tr><th></th><th colspan="3">ALLOTED</th><th colspan="3">MAX</th></tr><tr><th></th><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th></tr><tr><td>P0</td><td>0</td><td>1</td><td>0</td><td>7</td><td>5</td><td>3</td></tr><tr><td>P1</td><td>2</td><td>0</td><td>0</td><td>3</td><td>2</td><td>2</td></tr><tr><td>P2</td><td>3</td><td>0</td><td>2</td><td>9</td><td>0</td><td>2</td></tr><tr><td>P3</td><td>2</td><td>1</td><td>1</td><td>2</td><td>2</td><td>2</td></tr><tr><td>P4</td><td>0</td><td>0</td><td>2</td><td>4</td><td>3</td><td>3</td></tr></table>Now the process P1 request one additional resource type A and two instances of C. Determine whether this new site is safe or not.</td><td>Apply</td><td>1</td></tr>
<tr><td>4</td><td>Explain the advantage of using semaphores over Test And Set () and Swap () functions. Describe the use of wait() and signal() functions on semaphore and how these can provide the solution to the Critical section problem?</td><td>Understand</td><td>1</td></tr>
<tr><td>5</td><td>Consider the following set of processes with the length of the CPU burst time given in milliseconds
<table><tr><th>Process</th><th>BurstTime</th><th>Priority</th></tr><tr><td>P1</td><td>10</td><td>3</td></tr><tr><td>P2</td><td>1</td><td>1</td></tr><tr><td>P3</td><td>2</td><td>3</td></tr><tr><td>P4</td><td>1</td><td>4</td></tr><tr><td>P5</td><td>5</td><td>2</td></tr></table>The processes are assumed to have arrived in the order p1, p2, p3, p4, p5 all at time 0.
a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, anon pre-emptive priority (a smaller priority number implies a higher priority) and RR (quantum=1) scheduling.
b) What is the turnaround time of each process for each of the scheduling algorithms in part?
c) What is the waiting time of each process for each of the scheduling algorithms in part? Which of the schedules in part a results in the minimal average waiting time?</td><td>Apply</td><td>1</td></tr>
<tr><td>6</td><td>Consider three processes (process id 0, 1, 2 respectively) with compute time bursts 2, 4 and 8 time units. All processes arrive at time zero. Consider the longest remaining time first (LRTF) scheduling algorithm. In LRTF ties are broken by giving priority to the process with the lowest process id. The average turnaround time is?</td><td>Apply</td><td>2</td></tr>
</table>

7	**Consider** three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end	Apply	2
8	**Explain** the following process state transition diagram for a uniprocessor system, assume that there are always some processes in the ready state 	Understand	2
9	**Explain** Four jobs to be executed on a single processor system arrive at time 0 in the order A, B, C, D. their burst CPU time requirements are 4, 1, 8, 1 time units respectively. The completion time of A under round robin scheduling with time slice of one time unit is?	Apply	3
10	**Explain** Which scheduling algorithm allocates the CPU first to the process that requests the CPU first?	Understand	3
	UNIT – III		
	PART - A (Short Answer Questions)		
1	**Explain** the main function of the memory-management unit?	Understand	2
2	**Distinguish** between logical address and physical address?	Understand	2
3	**Describe** dynamic loading and dynamic linking?	Knowledge	2
4	**Distinguish** between compile time, load time and execution time address binding?	Understand	2
5	**Define** swapping?	Knowledge	2
6	**List** dynamic storage allocation strategies in contiguous memory allocation scheme?	Knowledge	2
7	**Distinguish** between MFT and MVT?	Understand	2
8	**Distinguish** between internal and external fragmentation?	Understand	3
9	**Define** compaction?	Knowledge	3
10	**List** and define non-contiguous memory allocation schemes?	Knowledge	3
11	**Distinguish** between paging and segmentation?	Understand	3
12	**State** the purpose of TLB?	Knowledge	2
13	**Explain** the basic approach of page replacement?	Understand	2
14	**Distinguish** between page table and inverted page table?	Understand	2
15	**State** the benefits of a virtual memory system?	Knowledge	2
16	**Distinguish** between demand paging and pure demand paging?	Understand	3
17	**Explain** the calculation of effective access time of a demand-paged memory system?	Understand	3
18	**Explain** page fault and its effect on the performance of the demand paged memory system?	Understand	3
19	**Explain** the need for page-replacement.?	Understand	1
20	**List** various page replacement algorithms?	Knowledge	1
21	**Distinguish** between local and global page replacement strategies?	Understand	1
22	**Distinguish** between equal and proportional frame allocation strategies?	Understand	2
23	**Explain** the concept of thrashing and why thrashing should be avoided in a system?	Understand	2
	PART-B (Long Answer Questions)		

1	**Describe** the following? a) Virtual Memory b) Cache Memory c) Auxiliary Memory	Understand	1
2	**Explain** in detail the requirements that memory management technique needs to satisfy?	Understand	1
3	**Explain** a) Paging b) Page table structure c) Translation look-aside buffer d) Segmentation	Understand	2
4	**Explain** why the "principle of locality" is crucial to the use of virtual memory? What is accomplished by page buffering?	Understand	2
5	**Discuss** briefly the swapping concept with necessary examples?	Understand	1
6	**Describe** contiguous memory allocation concept with advantages and disadvantages?	Knowledge	1
7	**Differentiate** the main memory organization schemes of contiguous-memory allocation, segmentation, and paging with respect to the following		2
8	**Differentiate** between internal and external fragmentation and Which one occurs in paging scheme?	Understand	3
9	**Explain** briefly about paging with neat diagram?	Understand	1
10	**Discuss** the following a) Hierarchical paging b) Inverted page Tables	Understand	1
11	Draw and **explain** the working procedure of paging hardware in detail?	Understand	1
12	**Explain** the basic concepts of segmentation with neat diagrams?	Understand	1
13	**Define** page fault? When does a page fault occur? Describe the action taken by OS when page fault occurs?	Knowledge	2
14	**State** and explain about virtual memory concept with neat diagram?	Knowledge	2
15	**Differentiate** between paging and segmentation?	Understand	2
16	**Explain** briefly the performance of demand paging with necessary examples?	Understand	2
17	**Explain** the basic Scheme of page replacement and about the various page replacement strategies with examples?	Understand	3
18	**Explain** the Readers and Writers problem and its solution using the concept of semaphores?	Understand	1
19	**Explain** the uses of the following: a. Mutex object b. Semaphore object c. Waitable timer object	Understand	2
20	**Write** short notes about the following: a. Binary Semaphores b. Bounded Waiting	Knowledge	3
21	**Explain** the Readers and Writers problem and its solution using the concept of semaphores?	Understand	2
PART-C (Problem Solving and Critical Thinking)			
1	Suppose you have 16M bytes of main memory. Using the list method there is an overhead of 8B per memory block. Using the bitmap method, the allocation granularity is of 128B. How many blocks are there when the space overhead of both methods is the same? **Explain** the average block size for this many blocks?	Apply	3

2	**Consider** a computer system supports 32-bit virtual addresses as well as 32-bit physical addresses. Since the virtual address space is of the same size as the physical address space, the operating system designers decide to get rid of the virtual memory entirely.	Apply	4
3	**Consider** a CPU generates 32-bit virtual addresses. The page size is 4 KB. The processor has a translation look-aside buffer (TLB) which can hold a total of 128 page table entries and is 4-way set associative. The minimum size of the TLB tag is:	Apply	2
4	**Consider** there are 3 page frames which are initially empty. If the page reference string is 1, 2, 3, 4, 2, 1, 5, 3, 2, 4, 6, the number of page faults using the optimal replacement policy is	Apply	1
5	**Consider** the following page reference string 7,0,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0 Assuming three frames, how many page faults would occur in each of the following cases? a) LRU b) FIFO c) Optimal algorithms Note that initially all frames are empty.	Apply	1
6	**Analyze** that we have a paging system with page table stored in memory A. If a memory reference takes 200 nanoseconds how long does a paged B. If we add associative registers and 75% of all page table references are memory reference take found in the associative registers, what is the effective memory reference time? Assume that finding a page table entry in the associative registers takes zero time, if the entry is there.	Analyze	2
7	In two level nested loops, the outer index (i) runs from 1 to 5 and the inner index (j) runs from 1 to 10.The page faults seem to occur for every 7^{th} innermost iterations. If it takes 0.02 micro second to load a new page what is the extra time required because of occurrence of page faults?	Apply	2
8	Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? **Explain** Which algorithm makes the most efficient use of memory?	Apply	2
9	Suppose we have a demand paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty frame is available or the replaced page is not modified and 20 milliseconds if the replaced page is modified. Memory access time is 100 nanoseconds. **Consider** that the page to be replaced is modified 70 percent of the time. What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds?	Apply	3
10	**Consider** a logical address space of eight pages of 1024 words each mapped onto a physical memory of 32 frames a) How many bits are in the logical address? b) How many bits are in the physical address?	Apply	3
	UNIT – IV		
	PART - A (Short Answer Questions)		
1	**Define** the terms – file, file path, directory?	Knowledge	2
2	**Explain** any four common file attributes?	Understand	2
3	**Explain** any four file operations?	Understand	2
4	**Distinguish** between shared and exclusive lock?	Understand	2
5	**List** any four common file types and their extensions?	Knowledge	2
6	**Explain** the information associated with an open file?	Understand	3
7	**List** the different file accessing methods?	Knowledge	3

8	**Explain** the operations that can be performed on a directory?	Understand	4
9	**Discuss** the most common schemes for defining the logical structure of a directory?	Understand	4
10	**Describe** UFD and MFD.?	Knowledge	4
11	**Describe** file system mounting?	Knowledge	2
12	**Write** the format of a typical file-control block?	Knowledge	3
13	**List** the different disk-space allocation methods?	Knowledge	2
14	**List** the various layers of a file system?	Knowledge	3
15	**Explain** the functions of virtual file system (VFS)?	Understand	3
16	**Describe** about different types of disk scheduling?	Knowledge	3
17	**Define** the terms with respect to disk I/O - seek time, latency time?	Knowledge	3
18	**Explain** the allocation methods of a disk space?	Understand	3
19	**State** the advantages of linked disk-space allocation strategy?	Knowledge	3
20	**State** the advantages of indexed disk-space allocation strategy?	Knowledge	2
21	**List** the different free disk-space management techniques?	Knowledge	2
22	**Explain** the bit vector method free space management on disk?	Understand	2
23	**Discuss** the advantages of contiguous memory allocation of disk space?	Understand	2
24	**Discuss** the drawbacks of contiguous allocation of disk space?	Understand	1
25	**List** any four secondary storage memory devices?	Knowledge	1
26	**Describe** about logical formatting of the disk?	Knowledge	1
27	**List** various disk-scheduling algorithms?	Knowledge	1
28	**State** the purpose of boot block?	Knowledge	2
PART-B (Long Answer Questions)			
1	a) **Discuss** the criteria for choosing a file organization? b) **Describe** indexed file and indexed sequential file organization?	Understand	3
2	**Describe** the file system of UNIX?	Understand	3
3	**List** the common file types along with their extensions and describe each file type?	Knowledge	3
4	**Differentiate** among the following disk scheduling algorithms? a) FCFS b) SSTF c) SCAN d) C-SCAN e) LOOK f) C-LOOK	Understand	2
5	a) **Explain** magnetic disk structure and its management? b) **Exemplify** swap space management?	Understand	1
6	**Explain** the following in detail with respect to disk? a) Seek time b) Latency c) Access time d) Transfer time	Understand	1
7	a) **Explain** in detail the interrupts and interrupt handling features? b) **Explain** with neat diagram the steps in DMA transfer?	Understand	1
8	a) **Discuss** the N-step SCAN policy for disk scheduling? b) **Explain** how double buffering improves the performance than a single buffer for I/O?	Understand	1

9	a) **Explain** the techniques used for performing I/O? b) Give an example of an application in which data in a file should be accessed in the following order: i. sequential ii. Random	Understand	2
10	**Discuss** in detail the performance issues of secondary storage management?	Understand	2
11	**Explain** how disk caching can improve disk performance?	Understand	2
12	**Explain** low-level formatting or physical formatting?	Understand	2
13	**Define** buffering, caching and spooling?	Knowledge	2
14	**Discuss** the following a) File system mounting b) Thrashing	Understand	2
15	**Explain** the following file concepts: a) File attributes b) File operations c) File types d) Internal file structure	Understand	3
16	**Explain** the concept of file sharing? What are the criteria to be followed in systems which implement file sharing?	Understand	3
17	**Describe** the following Directory Implementation methods? a) Linear List b) Hash Table	Knowledge	3
18	**Explain** the concept and techniques of free space management?	Understand	3
19	**Discuss** about a) Disk space management b) Swap -space management	Understand	3
1	Suppose we have files F1 to F4 in sizes of 7178, 572, 499 and 1195 bytes. Our disks have fixed physical block size of 512 bytes for allocation. **Explain h**ow many physical blocks would be needed to store these four files if we were to use a chained allocation strategy assuming that we need 5 bytes of information to determine the next block in the link? Which file results in the maximum internal fragmentation (measured as a percentage of the file size itself)?	Understand	1
2	**Using** a diagram, show how an indexed allocation of a file may be done for a disked based system with the following characteristics. The disc size is 30blocks each of 1024 bytes (may be modeled as 6 X 5 matrixes). File f1 is 11 logical records of 112 bytes, file f2 is 890 logical records of 13 bytes, file f3 is 510 bytes of binary data stream and file f4 is 4 logical blocks of 95 bytes.	Apply	2
3	A hard disk has 63 sectors per tracks, 10 platters each with 2 recording surfaces and 1000 cylinders. The address of a sector is given as a triple <c, h, and s> where c is the cylinder number, h is the surface number and s is the sector number. Thus 0th sector is addressed as <0, 0, and 0>, the 1st sector is Addressed as <0, 0, and 1> and so on. Calculate the address of 1050th sector.	Understand	2
4	**Explain** the maximum file size supported by a file system with 16 direct blocks, single, double, and triple indirection? The block size is 512 bytes. Disk block numbers can be stored in 4 bytes.	Understand	2
5	**Discuss** the reasons why the operating system might require accurate information on how blocks are stored on disk. how could operating system improves file system performance with this knowledge	Understand	2
6	**Discuss** how OS could maintain a free-space list for a tape-resident file system. Assume that the tape technology is append-only and that it uses EOT marks and locate, space and read position command	Understand	2
7	Is there any way to implement truly stable storage? **Explain** your answer	Understand	2

8	Could a RAID level 1 organization achieve better performance for read requests than RAID level 0 organization(with non redundant striping of data)? If so, how?	Understand	1
9	Compare the performance of write operations achieved by a RAID level 5 organization with that achieved by a RAID level 1 organization.	Understand	2
10	**Consider** that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms? A. FCFS B. SSTF C. SCAN D. C-SCAN E. LOOK F. C-LOOK	Apply	2
UNIT – V			
PART – A (Short Answer Questions)			
1	**Define** deadlock?	Knowledge	1
2	**Define** resource. List some resources that a process might need for its execution?	Knowledge	1
3	**Explain** the sequence in which a process may utilize the resources in normal mode of operation?	Understand	1
4	**Describe** the conditions under which a deadlock situation may arise?	Knowledge	1
5	**Explain** safe state and unsafe state?	Understand	2
6	**Describe** the representation of a resource-allocation graph?	Knowledge	2
7	**Distinguish** between deadlock avoidance and prevention strategies?	Understand	2
8	**Describe** the purpose of banker‟s algorithm?	Knowledge	2
9	**List** the four data structures (matrices) that must be maintained to implement banker‟s algorithm?	Knowledge	2
10	**Describe** the techniques for recovery from deadlock?	Knowledge	3
11	**List** the goals of protection?	Knowledge	3
12	**Define** the terms – object, domain, access right?	Knowledge	3
13	**Write** the format of an access matrix?	Knowledge	3
14	**List** the implementation techniques of access matrix?	Knowledge	3
15	**Describe** role-based access control?	Knowledge	3
16	**List** the schemes that implement revocation of capabilities?	Knowledge	4
17	**List** any two example systems that implement capability-based protection?	Knowledge	4
18	**Describe** any one language-based protection schemes.	Knowledge	1
19	**Write** the main differences between capability lists and access lists?	Knowledge	1
20	**State** the protection problems that may arise if a shared stack is used for parameter passing?	Knowledge	1
21	**State** principle of least privilege?	Knowledge	1
PART-B (Long Answer Questions)			
1	**Define** deadlock? what are the four conditions necessary for a deadlock situation to arise? how it can be prevented?	Knowledge	2
2	**Explain** briefly resource allocation graph with examples?	Understand	2
3	**Differentiate** the deadlock handling methods?	Understand	2
4	**Discuss** in detail the technique of deadlock avoidance?	Understand	2

5	**Explain** Banker‟s algorithm for deadlock avoidance with an example?	Understand	3
6	**Discuss** deadlock detection method in detail?	Understand	3
7	**State** and explain the methods involved in recovery from deadlocks?	Knowledge	3
8	Describe resource-allocation graph? **Explain** how resource graph can be used for detecting deadlocks?	Understand	4
9	**Describe** the terms. a) Race condition b) Atomic transaction c) Critical section d) Mutual exclusion	Knowledge	4
10	**Describe** how the access matrix facility and role-based access control facility are similar? how do they differ?	Knowledge	4
11	**Explain** why a capability based system such as Hydra provides greater flexibility than the ring- protection scheme in enforcing protection policies?	Understand	4
12	**Explain** the following. a) Goals of protection b) Principles of protection	Understand	4
13	**Discuss** about domain of protection?	Understand	4
14	Why do you need to provide protection to the system? **Explain** how access matrix can be used for the purpose?	Understand	4
15	**Discuss** the access matrix implementation techniques?	Understand	3
16	**Compare** the various access matrix implementation techniques?	Understand	3
17	**Discuss** the various issues that need to be considered through the process of revocation of access rights?	Understand	2
18	**Explain** various schemes to implement revocation for capabilities?	Understand	2
19	**Explain** how language-based protection scheme can be used for providing system protection at kernel level?	Understand	1
20	**Explain** relative merits of compiler-based enforcement based solely on a kernel, as opposed to enforcement provided largely by a compiler?	Understand	1
	PART-C (Problem Solving and Critical Thinking)		
1	**Consider** the following snapshot of a system <table><tr><th></th><th colspan="4">Allocation</th><th colspan="4">Max</th><th colspan="4">Available</th></tr><tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th><th>A</th><th>B</th><th>C</th><th>D</th><th>A</th><th>B</th><th>C</th><th>D</th></tr><tr><td>P1</td><td>0</td><td>0</td><td>1</td><td>3</td><td>0</td><td>0</td><td>1</td><td>2</td><td>1</td><td>5</td><td>2</td><td>0</td></tr><tr><td>P2</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>7</td><td>5</td><td>0</td><td></td><td></td><td></td><td></td></tr><tr><td>P3</td><td>1</td><td>3</td><td>5</td><td>4</td><td>2</td><td>3</td><td>5</td><td>6</td><td></td><td></td><td></td><td></td></tr></table>Answer the following questions using the banker‟s algorithm: a) What is the content of matrix “Need”? b) Is the system in a safe state? c) If a request from process P1 arrives for (0, 4, 2, 0) can the request be granted immediately?	Apply	1
2	**Consider** the version of the dining-philosophers problem in which the chopsticks are placed at the center of the table and any two of them can be used by a philosopher. Assume that requests for chopsticks are made one at a time. Describe a simple rule for determining whether a particular request can be satisfied without causing deadlock given the current allocation of chopsticks to philosophers.	Analyze	1
3	**Consider** a system consisting of *m* resources of the same type being shared by *n* processes. A process can request or release only one resource at a time. Show that the system is deadlock free if the following two conditions hold: a) The maximum need of each process is between one resource and *m* resources. *b)* The sum of all maximum needs is less than *m* + *n*.	Analyze	1

4	**Explain** How does the principle of least privilege aid in the creation of protection systems?	Analyze	2
5	**Describe** how the Java protection model would be compromised if a Java program were allowed to directly alter the annotations of its stack frame.	Analyze	2
6	**List** the Coffman's conditions that lead to a deadlock**.**	Understand	2

7	A system has n resources $R_0,...,R_{n-1}$,and k processes $P_0, ... P_{k-1}$.The implementation of the resource request logic of each process P_i is as follows:
	if (i % 2 == 0)
	{
	if (i < n) request Ri
	if (i+2 < n) request Ri+2
		Analyze	2

8	A system contains three programs and each requires three tape units for its operation. **Explain** the minimum number of tape units which the system must have such that deadlocks never arise is?	Analyze	2
9	A system has 6 identical resources and N processes competing for them. Each process can request atmost 2 resources. **Explain** which one of the following values of N could lead to a deadlock?	Analyze	2
10	Two shared resources R and R are used by processes P_1 and P_2. Each process has a certain priority for accessing each resource. Let T_{ij} denote the priority of P_i for accessing R_j. A process $P_i$can snatch a resource R_h from process P_j if T_{ik} is greater than T_{jk}. Given the following : 1. $T_{11} > T_{21}$ 2. $T_{12} > T_{22}$ 3. $T_{11} < T_{21}$ 4. $T_{12} < T_{22}$ **Explain** which of the following conditions ensures that P_1 and P_2 can never deadlock?	Analyze	3