Department of Electronics & Communication Engineering

MID QUESTION BANK

Course Title	**EMBEDDED SYSTEMS DESIGN**			
Course Code	**A70440**			
Regulation	**R13**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	0	-	4
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Team of Instructors				

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 MLRITM, 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.

Group-A: Short Answer Questions

S.No.	QUESTION	BLOOMS TAXONAMY	COs	POs
	UNIT-I			
1	Define a System. With examples?	Understand	1,2	a,b,c,l
2	Discuss an embedded system?	Understand	1,2	a,b,c,l
3	Write the advantages of embedded system?	Apply	1,2	a,b,c,l
4	Write the disadvantages of embedded system?	Understand	1,2	a,b,c,l
5	Give the applications of an embedded system?	Understand	1,2	a,b,c,l
6	Describe various classifications of embedded systems?	Remember	1,2	a,b,c,l
7	Give two essential units of a processor on an embedded system?	Apply	1,2	a,b,c,l
8	Analyze the execution unit of a processor in an embedded system do?	Apply	1,2	a,b,c,l
9	Give the classification of embedded system?	Apply	1,2	a,b,c,l
10	Discuss the various embedded system requirements?	Understand	1,2	a,b,c,l
11	Give examples for small scale embedded systems?	Apply	1,2	a,b,c,l
12	Give examples for medium scale embedded systems?	Apply	1,2	a,b,c,l
13	Give examples for large scale embedded systems?	Apply	1,2	a,b,c,l
14	Define is the operational quality attribute?	Understand	1,2	a,b,c,l
15	Define is the non-operational quality attribute?	Understand	1,2	a,b,c,l
16.	What is an embedded system?	Apply	1,2	a,b,c,l
17.	What are the characteristics of embedded system?	Understand	1,2	a,b,c,l

18.	What are the types of embedded system?	Apply	1,2	a,b,c,l
19.	Why we use embedded systems?	Understand	1,2	a,b,c,l
20.	What are the components of embedded system?	Understand	1,2	a,b,c,l
Unit II				
1	Describe the components used as the core of an embedded system?	Understand	3,4	a,b,c,
2	Give the difference between microprocessor and microcontroller?	Understand	3,4	a,b,c,
3	Define is digital signal processing (DSP)?	Understand	3,4	a,b,c,
4	Define is processor architecture?	Understand	3,4	a,b,c,
5	Define programmable logic device?	Understand	3,4	a,b,c,
6	Write the difference between RISC and CISC processors?	Analyze	3,4	a,b,c,
7	Write the difference between PLD and ASIC?	Analyze	3,4	a,b,c,
8	Write the difference between masked ROM and OTP?	Analyze	3,4	a,b,c,
9	Discuss the different types of RAM used for embedded system design?	Apply	3,4	a,b,c
10	Define SRAM cell?	Understand	3,4	a,b,c,
11	Define DRAM cell?	Understand	3,4	a,b,c,
12	Define Relay? What are the different types of relays are available?	Understand	3,4	a,b,c,
13	Define is PPI device?	Understand	3,4	a,b,c,
14	Write is the difference between I2C and SPI communication interface?	Analyze	3,4	a,b,c,
15	Write the merits and limitations of the RS232 interface?	Evaluate	3,4	a,b,c,
16	Write the merits and limitations of the IEEE1394 interface over USB?	Understand	3,4	a,b,c,
17	Explain actuattors	Understand	3,4	a,b,c,
18	Definesensors	Understand	3,4	a,b,c,
19	What are the differences between PLD and ASIC	Understand	3,4	a,b,c,
20	Write difference between Harvard and vonNeumann architecture	Analyze	3,4	a,b,c,
Unit III				
1	Define Assembly Level Language?	Remember	3,4	a,b,c,
2	Discuss about format of the assembly level language?	Remember	3,4	a,b,c,
3	What is absolute object file?	Understand	3,4	a,b,c,
4	Write the difference between compiler and cross compiler?	Understand	3,4	a,b,c,e
5	Define inline assembly?	Analyze	3,4	a,b,c,e
6	Give the limitations of the high level language based development?	Analyze	3,4	a,b,c,e
7	Write short notes on Linker and Locater?	Understand	3,4	a,b,c,e
8	Discuss about the object to hex file converter?	Understand	3,4	a,b,c,e
9	Define embedded firmware?	Understand	3,4	a,b,c,e
10	Define super loop model design in embedded firmware design?	Understand	3,4	a,b,c,e
11	Discuss briefly about approachment of embedded operating system?	Analyze	3,4	a,b,c,e
12	What is mean by mnemonics? Give the example?	Understand	3,4	a,b,c,e
13	Distinguish between the assembly language and machine language?	Analyze	3,4	a,b,c,e
14	What are the assembler directive instructions? Give example?	Understand	3,4	a,b,c,e
15	What are the drawbacks of the assembly language based development?	Analyze	3,4	a,b,c,e
16	What is the process to perform the translation of assembly to machine code?	Understand	3,4	a,b,c,e
17	Define the functionality of cross compiler conversion?	Understand	3,4	a,b,c,e
18	What are the steps are require in firmware execution flow?	Understand	3,4	a,b,c,e
19	Write the examples of RTOS employed in embedded product development?	Understand	3,4	a,b,c,e
20	Define Watch Dog Timer?	Understand	3,4	a,b,c,e
Unit IV				
1	Define is an operating system.	Understand	2,3,4	a,b,c,e
2	Define kernel?	Understand	2,3,4	a,b,c,e
3	Discuss about kernel space and user space?	Understand	2,3,4	a,b,c,e
4	Define monolithic and micro kernel?	Understand	2,3,4	a ,b,c,e
5	Define task control block?	Understand	2,3,4	a,b, c,e
6	Define virtual memory?	Understand	2,3,4	a,b ,c,e
7	Analyze how accurate time management is achieved in real time kernel?	Analyze	2,3,4	a,b,c,e
8	Define process life cycle?	Understand	2,3,4	a,b,c,e

9	Define process control block?	Understand	2,3,4	a,b,c,e
10	Analyze how threads and process are related?	Analyze	2,3,4	a,b,c,e
11	Give the difference between threads and process in detail?	Understand	2,3,4	a,b,c,e
12	Give the comparison between multitasking, multiprogramming, multi processing?	Analyze	2,3,4	a,b,c,e
13	Discuss all activates are involved in the context switching?	Evaluate	2,3,4	a,b,c,e
14	Define task scheduling?	Understad	2,3,4	a,b,c,e
15	Explain the different queues are associated with process scheduling?	Evaluate	2,3,4	a,b,c,e
16	Write brief notes on Library file creation and usage?	Understand	2,3,4	a,b,c,e
17	Define general purpose operating system? Give the example	Understand	2,3,4	a,b,c,e
18	Define RTOS? Give the example?	Understand	2,3,4	a,b,c,e
19	Distinguish between the general purpose operating system and real time operating system?	Analyze	2,3,4	a,b,c,e
20	Compare between the assembly level and high level languages based development?	Analyze	2,3,4	a,b,c,e
Unit V				
1	Define deadlock?	Understand	2,3,4	a,b.l
2	Discuss about Coffman conditions?	Understand	2,3,4	a,b.l
3	Discuss about the different methods of handling deadlocks?	Apply	2,3,4	a,b.l
4	Give the difference between buffer over run and buffer under run?	Analyze	2,3,4	a,b.l
5	Define task synchronization?	Understand	2,3,4	a,b.l
6	Give the difference between mutex and semaphores?	Evaluate	2,3,4	a,b.l
7	Analyze the critical section problem?	Analyze	2,3,4	a,b.l
8	Define device driver?	Understand	2,3,4	a,b.l
9	Discuss about the sleep and wakeup mechanism for mutual exclusion	Apply	2,3,4	a,b.l
10	What is Inter process communication?	Understand	2,3,4	a,b.l
11	What is mean by test and set lock?	Understand	2,3,4	a,b.l
12	Define semaphore?	Understand	2,3,4	a,b.l
13	Define message passing?	Understand	2,3,4	a,b.l
14	Define shared memory?	Understand	2,3,4	a,b.l
15	What is mean by remote procedure call?	Understand	2,3,4	a,b.l
16	Explain the firmware embedding process for Os based ES	Understand	2,3,4	a,b.l
17	Explain the major draw backs of out-of-circuiting programming	Apply	2,3,4	a,b.l
18	Explain multiprocessing ,multi tasking	Analyze	2,3,4	a,b.l
19	What all activities are involved in context switching	Understand	2,3,4	a,b.l
20	Compare process and threads	Apply	2,3,4	a,b.l

Group-B: Long Answer Questions

S.No.	QUESTION	BLOOMS TAXONAMY	COs	POs
Unit I				
1	What is an embedded system? Explain the different applications of embedded systems?	Remember	1,.3	a,b,e.,l
2	Explain the various purposes of embedded systems in detail with illustrative examples?	Understand	1,.3	a,b,e.,l
3	Explain the different classifications of embedded systems. Give an example for each?	Evaluate	1,.3	a,b,e.,l
4	Explain the different characteristics of embedded systems in detail?	Understand	1,.3	a,b,e.,l
5	Explain quality attribute in the embedded system development context?	Remember	1,.3	a,b,e.,l
6	What are the different qualities attributes to be considered in an embedded system design?	Understand	1,.3	a,b,e.,l
7	What is the operational quality attribute? Explain the important operational quality attributes to be considered in any embedded system design?	Understand	1,.3	a,b,e.,l
8	What is the non-operational quality attribute? Explain the important operational quality attributes to be considered in any embedded system?	Understand	1,.3	a,b,e.,l
9	Explain the quality attribute Response in the embedded system design	Evaluate	1,.3	a,b,e.,l

	context?			
10	Explain the quality attribute Throughput in the embedded system design context?	Evaluate	1,.3	a,b,e.,l
11	Explain the quality attribute Reliability in the embedded system design context? Explain the quality attribute maintainability in the embedded system design context?	Evaluate	1,.3	a,b,e.,l
12	Explain the quality attribute information security in the embedded system design context? Explain the quality attribute safety in the embedded system design context?	Evaluate	1,.3	a,b,e.,l
13	Explain the quality attribute portability in the embedded system design context?	Evaluate	1,.3	a,b,e.,l
14	Give examples for general purpose processor?	Remember	1,3	a,b,e.,l
15	Describe embedded cores?	Understand	1,3	a,b,e.,l
16	Explain the real life example on the bonding of embedded technology with human life?	Analyze	1,3	a,b,e.,l
17	Discuss about the product life cycle of an embedded product development?	evaluate	1,3	a,b,e.,l
18	What is an embedded systems? Explain the different applications of embedded systems		1,.3	a,b,e.,l
19	Explain various purpose of embedded systems indetail?		1,.3	a,b,e.,l
20	Explain the different classification of embedded systems.Give an example for each		1,.3	a,b,e.,l
	Unit II			
1	Explain the components of typical embedded systems in detail?	Evaluate	1,.3	a,b,e.,l
2	Which are the components used as the core of an embedded systems? Explain the merits and drawbacks?	Understand	1,.3	a,b,e.,l
3	What is the difference between microprocessor and microcontroller? Explain the role of micro processors and micro controllers in embedded systems?	Understand	1,.3	a,b,e.,l
4	What is digital signal processing (DSP)? Explain the role of DSP in embedded system design?	Evaluate	1,.3	a,b,e.,l
5	What is processor architecture? What is the different processor architectures available processor/controller design? Give an example	Evaluate	1,.3	a,b,e.,l
6	What is programmable logic device? What are different types of PLDs? Explain the role of PLDs in embedded system design?	Understand	1,.3	a,b,e.,l
7	What are the different types of memories used in embedded systems design? Explain the role of each?	Analyze	1,.3	a,b,e.,l
8	What are the different types of memories used for program storage in embedded systems design?	Analyze	1,.3	a,b,e.,l
9	What are the advantages of FLASH over other program storage memory in Embedded system design?	Understand	1,.3	a,b,e.,l
10	What is sensor? Explain its role in embedded system design? Illustrate with an example?	Evaluate	1,.3	a,b,e.,l
11	What is actuator? Explain its role in embedded system design? Illustrate with an example?	Evaluate	1,.3	a,b,e.,l
12	Explain the different factor that needs to be considering in the selection of memory for embedded system?	Apply	1,.3	a,b,e.,l
13	What are differences between general purpose processor and application specific instruction set processors with an example?	Understand	1,.3	a,b,e.,l
14	Explain the on different onboard communication interfacein brief?	Apply	1,.3	a,b,e.,l
15	Explain the sequence of operation for communicating with an I2C slave device?	Apply	1,.3	a,b,e.,l
16	Explain the RS 232 serial interface in detail?	Apply	1,.3	a,b,e.,l
17	Explain the external communication interfacein brief?		1,.3	a,b,e.,l
18	Draw the interfacing diagram for connecting an LED to the port pin of a microcontroller. The LED is turned ON when the microcontroller port pin is at Logic 0.	Apply	1,.3	a,b,e.,l
19	Explain the sequence of operation for communicating with 1 wire slave device.	Evaluate	1,.3	a,b,e.,l
20	Write a C program to interface 7 segment LED display to microcontroller 8051?	Apply	1,.3	a,b,e.,l
21	Write a C program to interfacing matrix keyboard to microcontroller 8051?	Apply	1,.3	a,b,e.,l
	Unit III			
1	What is embedded firmware? What are the different approaches available for embedded firmware development?.	Understand	2,3, 4	a,b,c,e
2	Explain the role of RESET circuit in embedded system	Analyze	2,3, 4	a,b,c,e
3	Explain the role of Real Time Clock in embedded system	Analyze	2,3, 4	a,b,c,e
4	Explain the role of Watch dog Timer in embedded system	Evaluate	2,3, 4	a,b,c,e
5	Explain the role of Brown out protection circuit in embedded system	Evaluate	2,3, 4	a,b,c,e

6	Explain the various steps involved in the assembling of an assembly language program?	Evaluate	2,3, 4	a,b,c,e
7	Explain the advantages of Assembly level language based on embedded firmware development?	Evaluate	2,3, 4	a,b,c,e
8	Explain the high level language based on embedded firmware development technique?	Apply	2,3, 4	a,b,c,e
9	Explain about source file to object file translation in the assembly language based development?	Apply	2,3, 4	a,b,c,e
10	Explain about library file creation and usage in the assembly language based development?	Evaluate	2,3, 4	a,b,c,e
11	Write the advantages and drawbacks of assembly language based development?	Understand	2,3, 4	a,b,c,e
12	Write the advantages and limitations of high language based development?	Understand	2,3, 4	a,b,c,e
13	Explain about mixing assembly with high level language (assembly language with C)?	Apply	2,3, 4	a,b,c,e
14	Explain about mixing high level language with assembly (C with assembly language)?	Apply	2,3, 4	a,b,c,e
15	Give the examples for situations demanding mixing of C with assembly? Explain the techniques for mixing of C with assembly?	Apply	2,3, 4	a,b,c,e
16	Give the examples for situations demanding mixing of assembly with C? Explain the techniques for mixing assembly with C?	Apply	2,3, 4	a,b,c,e
17	Explain the role of Brown out protection circuit in embedded system	Evaluate	2,3, 4	a,b,c,e
18	Explain the various steps involved in the assembling of an assembly language program?	Evaluate	2,3, 4	a,b,c,e
19	Explain the advantages of Assembly level language based on embedded firmware development?	Evaluate	2,3, 4	a,b,c,e
20	Write the advantages and drawbacks of assembly language based development?	Understand	2,3, 4	a,b,c,e
	Unit IV			
1	What is kernel? What are the different functions handled by a general purpose kernel?	Understand	2,3, 4	a,b,c,e
2	What is the difference between a general purpose kernel and real time kernel? Give an example for both?	Analyze	2,3, 4	a,b,c,e
3	Explain the difference between memory management of general purpose kernel and real time kernel?	Understand	2,3, 4	a,b,c,e
4	Explain how accurate time management is achieved in real time kernel?	Apply	2,3, 4	a,b,c,e
5	Explain the TASK and Process in the operating system context?	Apply	2,3, 4	a,b,c,e
6	Explain the memory architecture of a process?	Evaluate	2,3, 4	a,b,c,e
7	Explain various activities involved in the creation of process and threads?	Evaluate	2,3, 4	a,b,c,e
8	What is process control block (PCB)? Explain the structure of the PCB	Understand	2,3, 4	a,b,c,e
9	What is task control block (TCB)? Explain the structure of the TCB	Understand	2,3, 4	a,b,c,e
10	Explain how Threads and process are related? what are the common to process and threads?	Apply	2,3, 4	a,b,c,e
11	Explain how multithreading can improve the performance of an application with an illustrative example?	Apply	2,3, 4	a,b,c,e
12	Explain thread context switch and the various activities performed in thread context switching for user level and kernel level threads	Analyze	2,3, 4	a,b,c,e
13	What all activities are involved in context switching?	Understand	2,3, 4	a,b,c,e
14	Explain the different multitasking models in the operating system context?	Analyze	2,3, 4	a,b,c,e
15	Explain the various factors to be considered for the selection of scheduling criteria?	Apply	2,3, 4	a,b,c,e
16	Explain the different types of non-preemptive scheduling algorithms? State the merits and demerits of each?	Understand	2,3, 4	a,b,c,e
17	Explain the different types of preemptive scheduling algorithms? State the merits and demerits of each?	Understand	2,3, 4	a,b,c,e
18	Explain Round Robin (RR) process scheduling with interrupts?	Apply	2,3, 4	a,b,c,e
19	Explain starvation in the process scheduling context? Explain how it can be effectively	Apply	2,3,	a,b,c,e

	tackled?		4	a,b,c,e
20	What is IDLEPROCESS? What is the significance of it in the process scheduling context?	Apply	2,3,4	a,b,c,e
	Unit V			
1	Explain the various process interaction models in detail?	Analyze	2,3,4	a,b,c,e
2	What is inter process communication (IPC)?	Evaluate	2,3,4	a,b,c,e
3	Explain The message passing technique for IPC. What are the merits and demerits of message based IPC?	Analyze	2,3,4	a,b,c,e
4	Explain the synchronous and asynchronous messaging mechanisms for IPC under windows kernel?	Apply	2,3,4	a,b,c,e
5	What is priority inversion? What are the different techniques adopted for handling priority inversion?	Understand	2,3,4	a,b,c,e
6	Explain the different task communication synchronizationissues encountered in inter processcommunication?	Evaluate	2,3,4	a,b,c,e
7	What is mutual exclusion in the process synchronization context?	Understand	2,3,4	a,b,c,e
8	Explain the interlocked functions for locked based mutual under windows OS	Analyze	2,3,4	a,b,c,e
9	What is semaphore? Explain the different types of semaphores. Where it is used?	Understand	2,3,4	a,b,c,e
10	Explain the semaphore based process synchronization under windows OS	Understand	2,3,4	a,b,c,e
11	What is critical section? What are the different techniques for controlling access to critical section?	Evaluate	2,3,4	a,b,c,e
12	Explain the event and event object based synchronization mechanism for IPC Windows OS	Understand	2,3,4	a,b,c,e
13	Explain the architecture of Device drivers	Evaluate	2,3,4	a,b,c,e
14	Explain the critical section object for process synchronization?	Analyze	2,3,4	a,b,c,e
15	Explain the different functional and non-functional requirements that needs to be evaluated in the selection of RTOS	Apply	2,3,4	a,b,c,e
16	Explain the different mechanisms for mutual exclusion?	Understand	2,3,4	a,b,c,e
17	Why critical section object is based synchronization fast?	Evaluate	2,3,4	a,b,c,e
18	Give an overview of different IPC mechanisms adopted by various operating systems?	Analyze	2,3,4	a,b,c,e
19	Explain the different threadbinding models for user and kernel level threads	Apply	2,3,4	a,b,c,e
20	Compare threads and processers indetail	Understand	2,3,4	a,b,c,e