Hall Ticket No | | | | | | | | | | |

Question Paper Code: BESB01

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-I

M.Tech I Semester End Examinations, January - 2020

Regulations: IARE-R18

EMBEDDED SYSTEM DESIGN

(Embedded Systems)

Time: 3 hours **Max. Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1	a)	Define an Embedded system? Explain in detail the classifications of an Embedded Systems.	[7M]
	b)	Explain the various purposes of Embedded systems in detail with illustrative examples.	[7M]
2	a)	Explain in detail the different applications and characteristics of an Embedded system.	[7M]
	b)	What are the Quality attributes of an Embedded system. Explain in detail.	[7M]

UNIT – II

3	a)	Explain different factors that are need to be considered in the selection of memory for Embedded systems.	[7M]
	b)	Compare and contrast the differences between I^2C and SPI communication interface.	[7M]
4	a)	Illustrate different communication buses that are used in automotive application.	[7M]
	b)	What are the different sections of a memory segment allocated to an application by the memory manager?	[7M]

UNIT – III

5	a)	Describe in detail the purpose of a Real Time Clock in Embedded system.	[7M]
	b)	Explain briefly the function of Watchdog timer in an Embedded system.	[7M]
6	a)	What is the need of an Embedded firmware? Explain briefly the Embedded firmware development languages.	[7M]
	b)	Explain the functionality and role of Brown out protection circuit in embedded system.	[7M]

UNIT – IV

7	a)	Define kernel? What are the different functions handled by a general purpose kernel?	[7M]
	b)	Discuss in detail about how Threads and process are related? What are the common to process and threads?	[7M]
8	a)	Determine how multithreading can improve the performance of an application with an illustrative example?	[7M]
	b)	What is a process? With a neat representation explain in detail the process states and state transition.	[7M]

UNIT – V

9	a)	Discuss in detail, the different task communication synchronization issues encountered in Inter Process Communication.	[7M]
	b)	Explain with neat sketch the architecture of device driver, and give the various applications of device drivers.	[7M]
10	a)	Describe in detail about the message passing technique for inter process communication.	[7M]
	b)	What is Shared memory? Explain briefly the concept of Shared memory in task communication.	[7M]

INSTITUTE OF AERONAUTICAL ENGINEERING

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COURSE OBJECTIVES:

I	Introduce the difference between embedded systems and general purpose systems.
II	Optimize hardware designs of custom single-purpose processors.
III	Compare different approaches in optimizing general-purpose processors.
IV	Introduce different peripheral interfaces to embedded systems.

COURSE OUTCOMES:

CO 1	Understand the basic concepts of embedded system and various applications and characteristics system design of embedded system design and Quality Attributes of Embedded Systems.
CO 2	Classify the different types of processors and compare them and remember the definitions of ASICs, PLDs, memory, memory interface. Communication Interface.
CO 3	Applying the blocks and different circuits and Embedded Firmware Design Approaches and Development Languages.
CO 4	Understand Operating System Basics, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.
CO 5	Understand Task Communication Synchronization Issues, Task Synchronization Techniques, Device Drivers, analyze RTOS.

COURSE LEARNING OUTCOMES:

BESB01.01	Demonstrate to understand the definition and comparison of embedded system with other systems.
BESB01.02	Explain to understand the history embedded system, Classify the embedded systems.
BESB01.03	List out the application areas of embedded systems Understand the purpose of the embedded systems.
BESB01.04	Understand the concepts of the characteristics and quality attributes.
BESB01.05	Classify the different types of processors and compare them and Remembering the definitions of ASICs, PLDs.
BESB01.06	Concept of COTS and Explain the memory shadowing, memory selection.
BESB01.07	Communication Interface: Onboard and External Communication Interfaces.
BESB01.08	Applying the different blocks and different circuits.
BESB01.09	Applying the embedded firmware design approaches and development languages.
BESB01.10	Remembering the basics of operating system and types of operating systems.
BESB01.11	Understanding the definitions of task, process and threads.
BESB01.12	Analyze the multiprocessing, multi tasking, task scheduling.
BESB01.13	Understanding the Task Communication.
BESB01.14	Analyze the Task Synchronization, issues and techniques.
BESB01.15	Analyze Real Time Operating System and how to choose RTOS.

MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES:

SEE Question No.		CLO Code	Course learning Outcomes	CO code	Blooms Taxonomy Level
1	A	BESB01.01	Demonstrate to understand the definition and comparison of embedded system with other systems	CO 1	Understand
	B	BESB01.02	Explain to understand the history embedded system.	CO 1	Understand
2	A	BESB01.03	List out the application areas of embedded systems Understand the purpose of the embedded systems	CO 1	Understand
	B	BESB01.04	Understand the concepts of the characteristics and quality attributes	CO 1	Understand
3	A	BESB01.06	Concept of COTS and Explain the memory shadowing, memory selection	CO 2	Remember
	B	BESB01.07	Communication Interface: Onboard and External Communication Interfaces.	CO 2	Understand
4	A	BESB01.07	Communication Interface: Onboard and External Communication Interfaces	CO 2	Understand
	B	BESB01.06	Concept of COTS and Explain the memory shadowing, memory selection	CO 2	Understand
5	A	BESB01.08	Applying the different blocks and different circuits	CO 3	Remember
	B	BESB01.08	Applying the different blocks and different circuits	CO 3	Understand
6	A	BESB01.09	Applying the embedded firmware design approaches and development languages	CO 3	Remember
	B	BESB01.08	Applying the blocks and different circuits	CO 3	Understand
7	A	BESB01.10	Remembering the basics of operating system and types of operating systems	CO 4	Understand
	B	BESB01.11	Understanding the definitions of task, process and threads	CO 4	Remember
8	A	BESB01.12	Analyze the multiprocessing, multi tasking, task scheduling	CO 4	Understand
	B	BESB01.11	Understanding the definitions of task, process and threads	CO 4	Remember
9	A	BESB01.13	Understanding Task Communication	CO 5	Understand
	B	BESB01.14	Analyze the Task Synchronization, issues and techniques	CO 5	Understand
10	A	BESB01.13	Understanding Task Communication	CO 5	Understand
	B	BESB01.14	Analyze the Task Synchronization, issues and techniques	CO 5	Understand

Signature of Course Coordinator **HOD, ECE**