INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER- I

M.Tech I- Semester End Examinations, January - 2020
Regulation: IARE-R18
PRINCIPLES OF DISTRIBUTED EMBEDDED SYSTEMS
(Electronics and Communication Engineering)

Time: 3 Hours   **Max Marks: 70**

Answer any ONE question from each Unit
All questions carry equal marks
All parts of the question must be answered in one place only

UNIT – I

| I. | a) | List the properties that must be part of an architectural model of a real-time system and the properties that can be disregarded in such a model? | [7M] |
| | b) | Describe the elements of an interface. What is the difference between functional intent and function? | [7M] |

| II. | a) | Discuss & Explain clock synchronization with examples. | [7M] |
| | b) | What is the difference between internal synchronization and external synchronization? | [7M] |

UNIT – II

| III. | a) | Why is it not recommended using standard workstation operating systems for hard real-time applications? | [7M] |
| | b) | Discuss & Explain Real time operating system agreement protocols and error detection | [7M] |

| IV. | a) | What are the difficulties in implementing back-pressure flow control at the Communication network interface? | [7M] |
| | b) | Discuss and explain simplest application program interface (API) is the API of a time-triggered S-task. | [7M] |

UNIT – III

| V. | a) | Discuss The time-triggered architecture is based on the vision that a node can be built on an inexpensive single chip. | [7M] |
| | b) | Explain real-time database contains a temporally valid "snapshot" of the current state of the cluster and the cluster environment | [7M] |

| VI. | a) | Discuss & Explain scheduling problem and dynamic scheduling | [7M] |
| | b) | Explain time triggered architecture | [7M] |

UNIT – IV

| VII. | a) | Discuss & Explain Controller Area Network with CAN and without CAN. | [7M] |
| | b) | Identify which one is Synchronous and Asynchronous ISO-11898-1 and ISO-11898-2. | [7M] |

VIII. a) Discuss about the CAN open and CAN open standard with relevant examples. [7M]

b) Explain object directory and Electronic data sheets and devices [7M]

UNIT – V

IX. a) Discuss & Explain Controller Area Network with CAN and without CAN. [7M]

b) Lists the Standard Data Types, their descriptions and the Object Dictionary locations where they are defined, with examples. [7M]

X. a) Discuss & Explain Configuration files and service data objectives [7M]

b) Explain Network management CAN open messages and device profile encoder [7M]

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COURSE OBJECTIVES :

	The course should enable the students to:
I	Understand the design principles of distributed embedded systems.
II	Design CAN network based systems.
III	Understand RTOS to design embedded system.

COURSE OUTCOMES (COs):

CO 1	Understand Real Time Computer Systems requirements Real Time Systems and Real Time Communication.
CO 2	Understand and remember Operating System, Real Time Operating Systems Inter component communication
CO 3	Understand and remember state and dynamic scheduling, system design and validation time – triggered architecture.
CO 4	Understand and remember Can open CAN open standard object directory.
CO 5	Analyze to understand CAN and Design CAN network based systems with examples.

COURSE LEARNING OUTCOMES

Students who complete the course will have demonstrated the ability to do the following.

BESB06.01	Understand Real Time Computer Systems requirements, Real Time Systems and Real Time Communication.
BESB06.02	Understand global time, Internal , external clock synchronization and Real Time Model.
BESB06.03	Understand Real Time Communication, temporal relations and dependability.
BESB06.04	Understand Power energy awareness, event triggered, rate constrained and time triggered.
BESB06.05	Understand and remember Operating System, Real Time Operating Systems Inter component communication .
BESB06.06	Understand and remember task management, dual role of time, inter task interactions process input/output and agreement protocols.
BESB06.07	Understand and remember error detection and importance of RTOS.
BESB06.08	Understand and remember state and dynamic scheduling, system design and validation time - triggered architecture.
BESB06.09	Understand and remember Can open CAN open standard object directory.
BESB06.10	Understand and remember Electronic data sheets ,devices ,analyze CAN Standards.
BESB06.11	Understand and remember CAN Standards and configuration files ,service data objectives and network management CAN open messages.
BESB06.12	Understand and remember CAN Standards and device profile encoder, real time environment RTOS with examples of Real Time Communication.

BESB06.13	Analyze to understand real time system design with CAN Standards.
BESB06.14	Analyze to understand RTOS to design Embedded Systems with examples.
BESB06.15	Analyze to understand CAN and Design CAN network based systems with examples.

MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES:

SEE Question No.		CLO Code	Course learning Outcomes	CO code	Blooms Taxonomy Level
1	a	BESB06.01	Understand Real Time Computer Systems requirements, Real Time Systems and Real Time Communication.	CO 1	Understand
1	b	BESB06.02	Understand global time, Internal , external clock synchronization and Real Time Model	CO 1	Understand
2	a	BESB06.03	Understand Real Time Communication, temporal relations and dependability	CO 1	Understand
2	b	BESB06.03	Understand Real Time Communication, temporal relations and dependability	CO 1	Understand
3	a	BESB06.05	Understand and remember Operating System, Real Time Operating Systems Inter component communication.	CO 2	Remember
3	b	BESB06.06	Understand and remember task management, dual role of time, inter task interactions process input/output and agreement protocols.	CO 2	Understand
4	a	BESB06.06	Understand and remember task management, dual role of time, inter task interactions process input/output and agreement protocols.	CO 2	Understand
4	b	BESB06.07	Understand and remember error detection and importance of RTOS.	CO 2	Understand
5	a	BESB06.08	Understand and remember state and dynamic scheduling, system design and validation time -triggered architecture	CO 3	Remember
5	b	BESB06.08	Understand and remember state and dynamic scheduling, system design and validation time -triggered architecture	CO 3	Understand
6	a	BESB06.08	Understand and remember state and dynamic scheduling, system design and validation time -triggered architecture	CO 3	Remember
6	b	BESB06.08	Understand and remember state and dynamic scheduling, system design and validation time -triggered architecture	CO 3	Understand
7	a	BESB06.09	Understand and remember Can open CAN open standard object directory	CO 4	Understand
7	b	BESB06.10	Understand and remember Electronic data sheets, devices ,analyze CAN Standards	CO 4	Remember
8	a	BESB06.11	Understand and remember CAN Standards and configuration files ,service data objectives and network management CAN open messages.	CO 4	Understand
8	b	BESB06.12	Understand and remember CAN Standards and device profile encoder, real time environment RTOS with examples of Real Time Communication.	CO 4	Remember
9	a	BESB06.13	Analyze to understand real time system design with CAN Standards	CO 5	Understand
9	b	BESB06.13	Analyze to understand real time system design with CAN Standards	CO 5	Understand

10	a	BESB06.14	Analyze to understand RTOS to design Embedded Systems with example	CO 5	Understand
	b	BESB06.15	Analyze to understand CAN and Design CAN network based systems with examples	CO 5	Understand

Prepared by:
Dr.S.Vinoth, Associate Professor   **HOD, ECE**