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Total Number of Pages : 02

B.Tech
Sub_Code: REC7D002

7th Semester Reg/Back Examination: 2025-26

SUBJECT: Embedded Systems

BRANCH(S): AEIE, CSE, CSIT, ECE, EEE, ELECTRICAL, ETC, IT, MECH

Time : 3 Hour

Max Marks : 100

Q. Code : U437

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- a) Define an embedded system and mention its important components.
- b) What is the need of real time clock in embedded system?
- c) What is thread priority in an RTOS?
- d) What are the features of UML?
- e) What is the role of embedded software in a system?
- f) Mention different types of real time tasks with diagram.
- g) What is a CAN bus? Where is it used?
- h) Define rate monotonic and earliest deadline first scheduling.
- i) What are the sources for dynamic power dissipation for a processor?
- j) Differentiate between RISC and CISC.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) Explain the processors and hardware units in an embedded system.
- b) Explain the characteristics of embedded systems with suitable examples.
- c) Write short notes on Bluetooth communication and its applications.
- d) Explain in detail about UML Modeling with suitable diagrams.
- e) Explain data transfer and data processing instructions of ARM with examples.
- f) Explain the RS-232C standard with timing diagram and data format.
- g) Write short notes on any two: (a) Petri Nets (b) SPI (c) State Charts
- h) Draw and explain the hardware/software co-design flow.
- i) Discuss the need and steps involved in writing a device driver.
- j) Explain the various features and interfaces of USB.
- k) Explain software strategies for low power devices.
- l) Explain the K-L partitioning method with example.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** With neat diagrams, explain the ARM architecture and operation of pipeline stages. (16)
- Q4** Explain how to enable intra communications among peripherals using I²C bus and data frame of the SDA bits. (16)
- Q5** Discuss about EDF scheduling algorithm. Construct an EDF Schedule consists of three periodic tasks (Period p_i , Execution time e_i): (3, 1), (5, 2), and (8, 3). (16)
- Q6** Discuss about the sources of dynamic and static power dissipation in embedded microcontrollers. Provide mathematical expressions. (16)