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Question Paper Code : 51098

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fourth/Sixth Semester

Computer and Communication Engineering

ET 3491 — EMBEDDED SYSTEMS AND IOT DESIGN

(Common to: Electronics and Communication Engineering/Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Compare CISC and RISC.

2.   List the various timers used in 8051 microcontroller.

3.   Mention the features of ARM instruction set that make it suitable for embedded applications.

4.   What are assembler directives? List the examples.

5.   Define multitasking.

6.   What happens when dead lock occurs?

7.   Identify the challenges and issues of an IoT.

8.   Compare Things of IoT and Machines in M2M.

9.   What are the GPIO pins used in Raspberry Pi board?

10. List the impact of IoT in agriculture.

PART B — (5 × 13 = 65 marks)

11. (a) Draw the architecture of 8051 microcontroller and explain how the various units interact in executing an instruction.

Or

(b) Illustrate serial communication interface supported by 8051 microcontroller.

12. (a) Explain the features and classifications of ARM instruction set.

Or

(b) Outline the significances of operating modes in ARM processor. Explain the various operating modes.

13. (a) Suppose that processes P1, P2, P3 and P4 arrive at the system at times 0, 0, 3, 4 with CPU processing times of 6, 2, 1 and 4 respectively. Apply the following scheduling policies to draw the Gantt chart and calculate the average waiting time and average turnaround time:

   (i) First come first serve (6)

   (ii) Round robin with a quantum size of 2 (arriving jobs join the end of queue) (7)

   Justify the best of the above two algorithms for the mentioned scenario.

Or

(b) Explain the three different states of tasks in real time operating system with a state transition diagram. List the conditions under which a running task can go to the ready to run state and the conditions under which a running task can go to the waiting state.

14. (a) Illustrate with an example of IoT service in detail that follows request response model and publish-subscribe communication model.

Or

(b) With the help of neat diagrams, explain the different levels of IoT with an example.

15. (a) Develop an automatic refrigerator light system with LED, switch using raspberry pi hardware module and also develop a python program to support the working of that design.

Or

(b) Develop a python program for sending an email, when a switch is pressed on Raspberry pi module.

PART C — (1 × 15 = 15 marks)

16. (a) Analyze and explain an IoT strategy for smart city and design the layered architecture for implementing smart cities.

Or

(b) Develop the single master-single slave and single master multiple slave configuration of serial peripheral interconnect interface in Raspberry pi.

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