Reg. No. :

Question Paper Code : X 85083

M.E./M.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
First Semester
Applied Electronics
AP 5191 – EMBEDDED SYSTEM DESIGN
(Common to M.E. Digital Signal Processing/M.E. Software Engineering / M.E. VLSI Design)
(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Give an example on how UML diagrams may be used to capture real time requirements.
2. Mention the functional and non-functional requirements of an embedded system design.
3. What is meant by ASIP ?
4. Mention the need for a watchdog timer in a system.
5. What is meant by the term 'bus arbitration' ?
6. Mention two features of the Bluetooth protocol.
7. How the system behavior is described using a state machine model ?
8. How does 'hierarchy extension' change the state machine model ?
9. For an embedded system ,what is the advantage of having an onboard debugger ?
10. What is meant by the term 'emulation' ?

PART – B **(5×13=65 Marks)**

11. a) Explain the technology and application areas for the following :
    i) General purpose processor **(4)**
    ii) Digital signal processor **(4)**
    iii) ASIC **(5)**

(OR)

b) Why is embedded systems design very challenging ? Discuss by taking specific factors and relevant examples. **(13)**

12. a) With neat sketches, explain the working of a LCD controller and how it gets interfaced with the processor. **(13)**

(OR)

b) Discuss the necessity of pipelining using in processor architecture. Explain the problems associated with pipelining and their solutions. **(13)**

13. a) Draw the CAN data frame format and explain how CAN bus is used for internetworking of the various processing elements ? **(13)**

(OR)

b) Briefly discuss about the various protocols required for wireless communication. **(13)**

14. a) For a typical system design, discuss (with relevant explanations) why a state machine model fares better than a sequential program model. **(13)**

(OR)

b) With neat sketches, briefly discuss about the interprocess communication mechanism. **(13)**

15. a) Describe the process of porting a Kernel to an embedded processor. All aspects of the process must be included in the description. **(13)**

(OR)

b) Discuss in detail about the various debugging tools used for debugging a system. **(13)**

PART – C **(1×15=15 Marks)**

16. a) Using the concept of state machines, describe the design of an ATM machine. Identify the states and actions and how they are used in the design.

(OR)

b) Take any standard microcontroller and design a robotic vehicle that can run (using DC motors). The vehicle must have the capacity to avoid obstacles and must keep a safe distance from the vehicle in front of it . Start with a block diagram, specify all the components used and their role in the design connection diagrams are also necessary.

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