Reg. No. :

Question Paper Code : X10405

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020 AND APRIL/MAY 2021
Sixth/Seventh Semester
Electronics and Instrumentation Engineering
EE 8691 – EMBEDDED SYSTEMS
(Common to Electrical and Electronics Engineering)
(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Define different categories and requirements of embedded systems.
2. Name some of the hardware parts of embedded systems.
3. Differentiate synchronous communication and Iso-synchronous communication.
4. Draw the data frame format of CAN.
5. Classify the difference between state machine model and sequential model.
6. Draw the classic embedded product development life cycle model.
7. Distinguish non preemptive and preemptive scheduling in RTOS.
8. Justify the advantages of mail boxes in RTOS.
9. Mention the importance of input interface and output interface in Washing machine.
10. Sate the role of interfacing I/O circuit in smart card.

PART – B **(5×13=65 Marks)**

11. a) With neat diagram, explain the working of Direct Memory Access (DMA) and mention the memory management methods.

(OR)

b) i) Explain how suitable processor and memory devices are selected for an embedded system design. **(6)**

ii) Explain the function of timing and counting devices in embedded systems. **(7)**

12. a) Write a detailed technical short note on the characteristics of the I2C and explain the process of arbitration.

(OR)

b) Describe about the single master single slave implementation of SPI and single master multiple slave implementation.

13. a) i) Justify the merits of hardware software co-design. **(5)**

ii) Explain the fundamental issues in hardware software co-design. **(8)**

(OR)

b) Explain the following :

i) Data Flow Graph (DFG) model. **(5)**

ii) Controlled Data Flow Graph (CDFG) model. **(8)**

14. a) Illustrate with suitable example about the use of semaphore in multitasking. What are the various semaphore operations ?

(OR)

b) Write the fifteen point strategy for synchronization between the processes, ISRs, OS functions and tasks for resource management.

15. a) Describe the various types of electronic control units employed in automotive applications.

(OR)

b) Describe the various tasks of reading ports in smart card application and explain the concept of synchronization with the port device driver.

PART – C **(1×15=15 Marks)**

16. a) Assume that bit P2.3 is an input and represents the condition of an oven. If it goes high, it means that the oven is hot. Write a program to monitor the bit continuously, whenever it goes high, send a high-to-low pulse to port P1.5 to turn on a buzzer.

(OR)

b) Draw a FSM model for a simple home-made object counter to count the number of products manufactured in a conveyor belt.

———————