

Reg. No. :

Question Paper Code : 40498

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth/ Seventh and Eighth Semester

Electrical and Electronics Engineering

EE 8691 — EMBEDDED SYSTEMS

(Common for Electronics and Instrumentation Engineering/
Instrumentation and Control Engineering)

(Regulation 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define branch penalty in a multistage pipeline processor.
2. Draw the structure of SRAM cell implementation.
3. What are the control signals and bit formats used for I^2C communication?
4. State the need for device drivers.
5. List the steps involved in assembly language to machine language conversion process.
6. Compare sequential and concurrent program models.
7. Consider the task list shown in the table. Determine the average wait time using priority scheduling.

Task No.	Execution time	Priority
T1	300	5
T2	125	3
T3	400	2
T4	150	12
T5	100	15

8. What is meant by priority inversion?
9. Distinguish between CAN and LIN automotive communication buses.
10. Draw the building blocks of a digital camera.

PART B — (5 × 13 = 65 marks)

11. (a) Describe the factors to be considered while selecting a controller for a particular application.

Or

- (b) Draw the structure of an SRAM chip and explain the corresponding asynchronous read and write timing diagrams.

12. (a) Elaborate on the ways by which a master and slave device can be synchronized.

Or

- (b) Compare the features of RS232, RS422 and RS485 serial data communication standards.

13. (a) Describe the evolutionary model embedded development life cycle.

Or

- (b) Draw and explain the flowchart for seat belt warning system using sequential program model.

14. (a) Draw the scheduling diagram corresponding to Round robin scheduling for the task set in the table. The time slice is defined to be 50 time units.

Task no.	Ts (time units)
T1	150
T2	100
T3	200
T4	50

Or

- (b) Distinguish between priority inheritance and priority inversion.

15. (a) Consider a domestic washing machine and Design the control system by identifying the required sensors and actuators.

Or

- (b) Design an embedded system for smart card with the following specifications
- (i) Enabling authentication and verification of card and card holder by a host
 - (ii) Enabling GUI at host machine to interact with the card holder/user for the required transactions.

PART C — (1 × 15 = 15 marks)

16. (a) Design an Alarm clock to display time in 24-hour format. Six push buttons act as inputs. The inputs are set time, set alarm, hour, minute, alarm on and alarm off. The outputs include a four digit clock style digital display, PM indicator light, alarm ready light and a buzzer. Develop a state machine model to indicate the sequence operations performed.

Or

- (b) Develop an embedded system for an automatic chocolate vending machine. The machine has an alphanumeric keyboard to interact with the user. Inputs to the system are coins in different denominations and the user commands. The outputs are chocolate, amount collected, date and time. The system communicates with the user by displaying appropriate messages. Develop a state machine model for the design