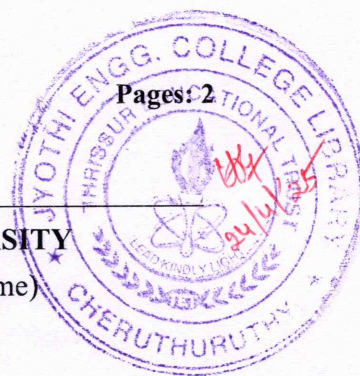


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)



Course Code: CST464

Course Name: EMBEDDED SYSTEMS

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions, each carries 3 marks.*

Marks

- | | | |
|----|---|-----|
| 1 | What are the main difference between embedded system and general purpose system? | (3) |
| 2 | What is real time clock (RTC)? | (3) |
| 3 | How do Data flow graph (DFG) and Control data flow graph (CDFG) differ from each other. | (3) |
| 4 | Explain finite state machine model for automatic seat belt warning system. | (3) |
| 5 | List any three non-functional requirements for selection of RTOS. | (3) |
| 6 | Differentiate hard and soft real time operating system. | (3) |
| 7 | Explain super loop based approach and mention any two of its advantages? | (3) |
| 8 | Describe advantages of assembly language based embedded firmware development. | (3) |
| 9 | Write about time wheels. | (3) |
| 10 | Draw a functional block diagram of a fully automatic washing machine. | (3) |

PART B*Answer any one full question from each module, each carries 14 marks.***Module I**

- | | | |
|----|---|-----|
| 11 | a) What are the role of a watch dog timer and brown-out protection circuit in embedded system. | (8) |
| | b) Differentiate between Programmable logic devices (PLD) and Application specific integrated circuit (ASIC). | (6) |

OR

- | | | |
|----|--|------|
| 12 | a) Explain any 5 external communication interface used in embedded system. | (10) |
| | b) Explain about characteristics of embedded system. | (4) |

Module II

- | | | |
|----|---|------|
| 13 | a) Explain finite state model (FSM) for coil operated telephone system. | (10) |
| | b) Explain hardware-software trade-offs in embedded system design. | (4) |

OR

- 14 a) What is hardware software co-design? Explain traditional embedded development cycle in detail. (10)
- b) Draw the state machine diagram of an automatic dawn-dusk solar street light with a motion sensor. (4)

Module III

- 15 a) Three processes with process IDs P1, P2, P3 with estimated completion time 10, 5, 7 milliseconds respectively enters the ready queue together in the order P1, P2, P3. Calculate the waiting time and Turn Around Time (TAT) for each process and the average waiting time and Turn Around Time (Assuming there is no I/O waiting for the processes) in SJF algorithm. (8)
- b) What is the need of task synchronization? Explain in detail. (6)

OR

- 16 a) Discuss about shared memory and remote procedure call task communication techniques. (10)
- b) Explain about priority inversion and solution for the priority inversion (4)

Module IV

- 17 a) Describe the various Conversion steps involved in the high level based firmware into Corresponding Machine language. (8)
- b) Briefly explain different approaches used for embedding firmware into the hardware of embedded devices. (6)

OR

- 18 Explain the need for EDLC. Illustrate with a neat diagram explain different phases of an EDLC life cycle (14)

Module V

- 19 a) List any three wireless standards used for building IoT networks and compare their characteristics (9)
- b) What are the different firmware embedding techniques? Explain any one in detail. (5)

OR

- 20 a) Explain any two communication buses used in automotive application (8)
- b) Illustrate and explain embedded system application in a battery operated smart card reader. (6)
