

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Embedded Computing Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Define Embedded System. What are the characteristic and constraints of an Embedded System? (06 Marks)
- b. What are the challenges faced in design an Embedded System? (06 Marks)
- c. Explain the major steps in the embedded System Design Process. (08 Marks)
- 2 a. List and explain the Data Operations in ARM Processor. (08 Marks)
- b. Explain the implementations of direct-mapped cache and set associative cache with a neat diagram. (08 Marks)
- c. Assume that a system has a two level cache. The Level 1 cache has a hit rate of 90% and the Level 2 cache has a hit rate of 97%. The Level 1 cache access time is 4 ns, the level 2 cache access time is 15 ns, and the main memory access time is 80 ns. What is the average memory access time? (04 Marks)
- 3 a. Define Bus. Explain the structure of a Typical Bus that supports read and write. Discuss the timing diagram for Bus. (07 Marks)
- b. Explain the different types of Memories used in Embedded System with their functions. (05 Marks)
- c. List the Hardware and Software tools used for Debugging Embedded Systems. Explain the internal architecture of a logic analyzer with a neat diagram. (08 Marks)
- 4 a. Briefly discuss three components that are commonly used in Embedded Software. (10 Marks)
- b. What are Loops? List and explain three important techniques in optimizing loops. (10 Marks)

PART – B

- 5 a. What is RTOS? Explain the different services provided by RTOS. (06 Marks)
- b. Explain the different Message Passing techniques used for IPC. (07 Marks)
- c. Three processes with process IDs P1, P2, P3 with estimated completion time 12, 10, 6 milliseconds respectively enters the ready queue together. Process P4 with estimated execution completion time 2 milliseconds enters the ready queue after 3 milliseconds. Calculate the waiting time and Turn Around Time (TAT) for each process and the Average Waiting and Turn Around Time in the SRT scheduling. (07 Marks)
- 6 a. Explain the Functional and Nonfunctional requirements in the selection of an RTOS for an Embedded System Design. (10 Marks)
- b. Explain the following briefly: (i) Shared Memory Communication (ii) Advanced Configuration and Power Interface (ACPI) (10 Marks)
- 7 a. Briefly discuss the different types of Interconnection networks. (05 Marks)
- b. Describe the features of: (i) I²C Bus (ii) CAN Bus (10 Marks)
- c. Explain the Ethernet Packet format. (05 Marks)
- 8 a. Explain the following: (i) Magnifying glass (ii) Multimeter (iii) Digital CRO (iv) Function Generator (08 Marks)
- b. What is a Simulator? Explain the advantages and limitations of Simulator based Debugging. (07 Marks)
- c. Write a short note on Disassembler/Decompiler. (05 Marks)

