POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year : 2024
Programme: BE | Full Marks:100
Course: Embedded Systems | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is an Embedded System? Define the three common but salient characteristics of embedded systems. 7
   b) Design the black box, state diagram, truth table and circuit diagram for the water bottle (cost 300) vending machine that accepts a coin of 100 only. 8
2. a) Define control unit of general-purpose processor. Explain sub-operations of the instruction cycle. 8
   b) Explain the direct mapping technique used in cache memory. Discuss its advantages and disadvantages. Provide an example to illustrate how direct mapping works, including how memory addresses are mapped to cache lines. 7
3. a) What are the technical and non-technical aspects while selecting a microprocessor? How do you evaluate a processor speed? 7
   b) Define arbitration. Explain in brief about daisy chain and network-oriented arbitration. 8
4. a) Explain the differences between memory-mapped I/O and I/O-mapped I/O. Discuss their advantages and disadvantages. Provide examples to illustrate how each method works in a computer system. 7
   b) Why RTOS are preferred in embedded system? Explain three methods by which RTOS handle interrupt. 8
5. a) Define monolithic, micro and exo kernel. 7
   b) Draw the diagram and write an assembly level code for interfacing a 7-segment display to 8051 and display the numbers from 0 to 9 with a delay of 1 second. 8
6. a) Write a VHDL program for 4 bit subtractor. 8
   b) What is VHDL testbench? Explain different modelling styles in VHDL design. 7
7. Write short notes on: (Any two) 2×5
   a) Design 3Kx24ROM using 1Kx8 ROM
   b) VHDL Realization of JK Latch
   c) Cross compilers and cross assembler