

(Time: 2½ hours)

Total Marks: 75

- N. B.: (1) **All** questions are **compulsory**.
 (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
 (3) Answers to the **same question** must be **written together**.
 (4) Numbers to the **right** indicate **marks**.
 (5) Draw **neat labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

15

- Distinguish between general purpose system and embedded systems
- List three applications of embedded systems. Discuss any one in detail.
- Briefly explain function of the following. Also give an example each
 - PLD
 - COTS
- What is use of a stepper motor in an embedded system? Explain different types of stepper motors.
- Discuss characteristics of embedded systems.
- What are operational quality attributes of embedded system?

2. Attempt any three of the following:

15

- Explain the difference between domain specific and application specific embedded system. Give two examples of each.
- What is role of display panel in a washing machine? What inputs can be accepted from user in a washing machine display interface?
- What is memory map? Explain the interrupt map for embedded system
- What are different types of memory? Explain each in brief.
- Explain the function of control and status register. Give example.
- Write a note on watchdog timer.

3. Attempt any three of the following:

15

- With neat block diagram explain the components of 8051 microcontroller.
- Draw the pinout diagram and explain functions of pins of 8051 microcontroller.
- What is the need of interfacing external memory with 8051 microcontroller? How is the interfacing done?
- Write a note on data types in embedded C.
- Explain how time delay is calculated using 8051 microcontroller? Write code segment to support your explanation.
- Demonstrate the use of bitwise operator in embedded C.

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- 4. Attempt any three of the following: 15**
- a. What are the factors to be considered in selecting a microcontroller for embedded system? Discuss any one in detail.
 - b. Explain the steps in designing an embedded system using 8051 microcontroller.
 - c. List and explain in brief the features of 8051 microcontroller.
 - d. With required example explain structure of embedded system program
 - e. Explain what is meant by the super loop based approach.
 - f. What are different types of files created in the process of burning a program onto IC.
- 5. Attempt any three of the following: 15**
- a. Define operating system kernel. What are services provided by kernel?
 - b. Distinguish between Real Time operating system and general purpose operating system.
 - c. List and explain the functional requirements to be considered in order to select the correct RTOS.
 - d. What are the components of IDE of embedded system development environment?
 - e. Explain following terms –
 - Compiler
 - Debugger
 - Disassembler
 - Emulator
 - Simulator
 - f. Write a note on current trends in embedded industry.
