B.Sc. Third Year (CBCS Pattern) Semester-VI

USDSEPHT 15 Physics Paper IV: Embedded System: Introduction To Microcontrollers

P. Pages : 2 **GUG/S/25/13367**

* 1 7 3 2 *

Time : Three Hours Max. Marks : 50

Notes : 1. All questions are compulsory.
2. Draw neat and well labelled diagrams wherever necessary.

1. Either

a) i) Discuss the various classifications of embedded systems; giving an example for each category you mention. **4**

ii) Discuss the pin diagram and internal architecture of the 8085 microprocessor in detail. How do the data bus and address bus function in this system? **6**

OR

b) a) An 8085 system has an 8-bit data bus. What is the highest decimal number it can represent? **2½**

b) Give any three purposes of embedded systems. **2½**

c) What are delay subroutines? Explain their purpose briefly. **2½**

d) Classify embedded systems based on their application domains; provide two examples. **2½**

2. Either

a) i) Provide a detailed discussion of the 8051's architecture by explaining its block diagram and the function of each block. **6**

ii) Describe in detail how jump, loop, and call instructions control the program execution flow. **4**

OR

b) a) Explain the role of the Program Counter in 8051 microcontroller. **2½**

b) What are flag bits, and why are they important in the PSW register? **2½**

c) Differentiate briefly between jump and loop instructions. **2½**

d) Explain in a brief the purpose of the 8051 family in embedded applications. **2½**

3. Either

a) i) Draw the pinout diagram of the 8051 microcontroller and briefly describe the function of the I/O port pins. **4**

ii) Explain the various addressing modes of the 8051 microcontroller with clear examples and discuss the advantages and disadvantages of each. **5**

iii) If Port 2 = 0x55 and instruction CPL P2.0 is executed, what will be the new value of Port 2? **1**

OR

b) a) Write an example of indirect addressing in 8051 and explain its usage. **2½**

b) Write a short 8051 assembly program to toggle (change state) bit S of Porto continuously. **2½**

c) Explain the concept of individually controlling bits of an I/0 port. **2½**

d) Explain the difference between direct addressing and register addressing modes in the 8051. **2½**

4. **Either**

a) i) Describe .the embedded system design and development environment with a neat diagram. **4**

ii) Explain all phases of embedded product life cycle with an example project. **6**

OR

b) a) Describe the function of each phase in compiling, linking, and locating. **2½**

b) Explain the difference between simulator and emulator with an example . **2½**

c) Explain any one real world application trend in embedded systems. **2½**

d) Differentiate between debugging and de compiling. **2½**

5. Attempt **any ten** questions from the following. (Each Carry 1 Mark)

a) What does "µp" mean in the context of the 8085 µp? **1**

b) List one common application of embedded systems. **1**

c) Name one example of a general purpose computer system. **1**

d) What is the main function of the Program Counter in the 8051? **1**

e) What is the full form of PSW in 8051? **1**

f) Define the 8051 microcontroller. **1**

g) How many I/O ports does the standard 8051 microcontroller have? **1**

h) What is the purpose of the MOV instruction in 8051 assembly? **1**

i) What is .the default state of all I/0 port pins after a reset in the 8051? **1**

j) What does disassembler do? **1**

k) What is cross-compilation? **1**

l) What is a simulator? **1**

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