# ODD- 2024-25 IT23501

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Information Technology (Sandwich Pattern)**
**Course Title** : **Microcontroller & Embedded System**

2:30 Hours / 60 marks Enrolment No. F 0 2 4 I F 0 0 1

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. State the memory capacity of internal RAM and internal ROM of 8051? **[CO-1, L-R]**
b. Give function of $\overline{EA}$ and ALE pins of 8051. **[CO-1, L-A]**
c. Differentiate between serial and parallel communication in 8051. **[CO-3, L-R]**
d. List and explain any two instructions of branching in 8051. **[CO-2, L-U]**
e. Draw interfacing of external program memory with 8051. **[CO-4, L-R]**
f. Draw block diagram of embedded system. **[CO-5, L-R]**
g. Draw functional block diagram of Arduino. **[CO-5, L-R]**
h. List applications of Arduino. **[CO-5, L-A]**
i. State function of pin 13 in Arduino. **[CO-5, L-U]**

**Q.2 Attempt any THREE** **12 Marks**

a. Describe alternate functions of pins of port 3 in 8051. **[CO-1, L-A]**
b. Write ALP for multiplication of 21H and 37H using 8051. Content of accumulator is 21H and content of B register is 37H. **[CO-2, L-A]**
c. Define interrupt and polling method of service in microcontroller. Also define ISR. **[CO-3, L-U]**
d. Write ALP to generate triangular waveform using 8051. **[CO-4, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Compare microprocessor and microcontroller (any four points). **[CO-1, L-R]**
b. List machine control instructions and Boolean instructions of 8051. **[CO-2, L-A]**
c. Give bit format of IE register and explain function of each bit. **[CO-3, L-U]**
d. Draw interfacing diagram of temperature controller with 8051 using ADC. **[CO-4, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Explain with example i) Direct addressing mode ii) Register addressing mode iii) Immediate addressing mode. **[CO-2, L-A]**
b. Explain idle and power down mode of 8051. **[CO-1, L-U]**
c. Draw interfacing diagram of LED with 8051 and write a code to blank even and odd LED. **[CO-4, L-A]**
d. Describe characteristics of embedded system. **[CO-5, L-R]**

c. Write Arduino programming to display 0 on 7-segment display. Assume necessary data if needed. **[CO-5, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. A switch is connected to pin P 1.7 of 8051. Write program to check status of switch & perform following i) If SW = 0, send N to $P_2$ ii) If SW = 1, send Y to $P_2$. **[CO-2, L-A]**

b. Draw interfacing diagram of 8051 with keyboard and write the steps to identify key pressed. **[CO-4, L-A]**

c. List looping techniques and decision making techniques in Arduino and explain them. **[CO-5, L-U]**

****End****