

Registration Number:

Date & Session:

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

**B.Sc. ELECTRONICS – 6th SEMESTER**

**SEMESTER EXAMINATION: APRIL 2024**

**(Examination conducted in May /June 2024)**

**EL6223: INTEL 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS**

**(For current batch students only)**

**Time: 2 Hours Max Marks: 60**

**This paper contains two printed pages and three parts**

**PART-A**

**Answer all the questions by selecting the best option: 10x1=10**

1. Which microprocessor type has separate data and instruction buses?

 a) Princeton b) Harvard c) RISC d) CISC

**2. Which example is a widely used microcontroller for hobbyist projects?**

 a) Raspberry Pi b) PIC c) Arduino d) ATmega

3. What is the primary function of the Program Status Word (PSW) in 8051?

 a) Timer control b) Status flags c) Stack pointer d) Interrupt priority

4. Which port in 8051 is bit-addressable and used for general-purpose I/O?

 a) P0 b) P1 c) P2 d) P3

5. In Register Indirect addressing mode, where is the operand's address stored?

 a) In a register b) In the instruction itself

 c) In memory d) It is not used in this mode

 6. In an assembly language program, what does the RET instruction do?

 a) Transfer data b) Return from a subroutine

 c) Logical operation d) Branch to a specified address

7. What is the primary characteristic of an embedded system?

 a) Large size b) General-purpose computing

 c) Dedicated functionality d) High power consumption

8. What is the primary function of a PWM (Pulse Width Modulation) in embedded systems?

 a) Controlling LCD displays b) Generating variable voltage levels

 c) Handling keypad input d) Controlling stepper motors

9. In which applications are stepper motors often preferred?

 a) High-speed applications b) Continuous rotation tasks

 c) Precision positioning tasks d) Random motion applications

10.What does ARM stand for in the context of microcontrollers?

 a) Advanced Reduced Machine b) Advanced RISC Machine

 c)Application Resistant Microcontroller d) Acquired Ready-made Module

**PART-B**

**Answer any FIVE questions 5×6=30**

11 a) Write the differences between Microprocessor and Microcontroller.

 b) Mention any six important features of 8051 microcontroller. (3+3)

12 a) Describe the interrupt structure of the 8051 microcontroller. Explain the types of

 interrupts supported and their priorities.

 b) Write the bits of SCON register. (4+2)

13 a) Discuss any two addressing modes used in 8051microcontroller.

 b) Explain MOVX and ADD instructions used in 8051 microcontroller. (3+3)

14 a) Draw the internal block diagram of 8259 Peripheral Interrupt Controller and explain.

 b) Write a note on bit addressable memory area in 8051 microcontroller. (3+3)

15 a) With the help of a block diagram and explain the interfacing of relay to 8051

 microcontroller.

 b) Write the characteristics of embedded system. (3+3)

16 a) Write a note on any two design metrics of embedded system.

 b) What are Application Specific processors? Give examples. (3+3)

17 a) Discuss timer modes in 8051 microcontroller.

 b) Discuss the operation of PWM single purpose processor. (4+2)

**PART-C**

**Answer any FIVE questions: 5×4=20**

18. Write an ALP to subtract two 16-bit numbers.

19. Write an ALP to add ten 8-bit numbers.

20. Write an ALP to sort the given array in ascending order.

21. Write an ALP to generate square wave using DAC.

22. Write an ALP to implement a hexa-decimal counter.

23. Write an ALP to implement a traffic light control.

24. Design a custom single-purpose processor to find the GCD of two numbers.

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