

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

**B.Sc. ELECTRONICS – VI SEMESTER**

**SEMESTER EXAMINATION: MAY/JUNE 2023**

**EL6218: Intel 8051 Microcontroller and Embedded Systems**

**Time: 2 ½ hrs Max Marks:70**

**This paper contains TWO printed pages and THREE parts**

**PART-A**

**Answer any five questions. 5X8=40**

1. a) Differentiate between Harvard and Von-Neumann Architecture.

 b) Describe Port 3 features/functions (4+4)

2. a) Write the Architecture of 8051 microcontroller.

 b) Mention what happens when 8051 microcontroller is reset. (6+2)

3. a) Discuss the addressing modes used in 8051 microcontroller with suitable examples.

 b) Define an interrupt. Mention the steps involved in the execution of an interrupt. (4+4)

4. a) Explain the following instructions with an example each.

 i) JNZ rel ii) ANL C, /BIT iii) CJNE A, direct, rel iv) XCHD A, @Ri

 b) Discuss the timer mode 2 operation of 8051 microcontroller. (4+4)

5. a) Write the bits of TCON register and explain the function of each bit. (4+4)

 b) Draw the internal block diagram of Intel 8255A Programmable peripheral interface IC.

6. a) With the help of necessary circuits explain the interfacing of a stepper motor with 8051

 microcontroller and its functioning logic.

 b) Explain the characteristics of an embedded system. (4+4)

7. a) Briefly explain design metrics in embedded systems.

 b) Differentiate between GPP and ASIP. Mention an application each. (4+4)

**PART-B**

**Answer any five questions. 5X4=20**

8. Write a program to add ten 8 bit numbers.

9. Write a program to check the number of ones and zeros in a byte of data.

10.Write a program to a generate a triangular waveform when a DAC is interfaced with 8051 microcontroller.

11.Write a program to interchange a block of ten numbers between starting address locations of registers 30h and 40h

12.Write a program to arrange16 numbers in descending order having the first number at register location 40h.

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

14.Given an analog input signal whose voltage should vary from 0V to 15V, and an 8-bit

 digital encoding. Workout the correct encoding for 7V using the successive approximation

 approach.

**PART-C**

**Answer any five questions. 5X2=10**

15. Name two popular microcontrollers other than Intel 8051.

16. What is the time delay generated in the program? Given: Xtal frequency = 40MHz.

 MOV R1, #55H

LOOP: MOV R2, #80H

 BACK: DJNZ R2, BACK

 DJNZ R1, LOOP

 RET

17.Mention the significance of PD bit of PCON register.

18.If TI and INT1 interrupts are operated together which is executed first and why?

19.8051 Microcontroller cannot drive a relay directly-Substantiate.

20.Timer is different from a counter - Explain.

21.List out the importance of DMA in embedded systems.

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