

Register Number:

DATE:

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

 B.Sc. ELECTRONICS- VI SEMESTER

SEMESTER EXAMINATION: APRIL 2022

(Examination conducted in July 2022)

**EL 6215: PIC 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) Explain the important characteristics of embedded systems.

 b) Briefly explain any four design metrics of embedded systems. (4+4)

2. a) Explain the timers used in embedded systems.

 b) With an application, explain PWM processor application. (4+4)

3. a) Discuss RISC architecture.

 b) Describe data RAM of PIC16F877A. (4+4)

4. a) Mention the port D features and enumerate how this can be used as a parallel slave

 port.

 b) What is an interrupt? Discuss the steps involved in executing an interrupt. (4+4)

5. a) Write the architecture of PIC16F877A.

 b) Draw status register mentioning all the bits. (6+2)

6. a) Write a note on timers and their functioning in PIC16F877A.

 b) With the help of a neat diagram explain ON/OFF action of an LED. (4+4)

7. a) Describe the stepper motor interface with PIC16F877A and explain its working.

 b) Describe with necessary circuits, the interface between a HEX keyboard and

 PIC16F877A microcontroller. (4+4)

**PART-B**

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

8. Write a program to add two 16-bit numbers.

9. Write a program to add a block of 10 numbers.

10. Write a program to multiply two 8-bit numbers.

11. Write a program to generate a triangular waveform.

12. Calculate the time delay generated in the following program (f = 20MHz).

**DELAY**
     MOVLW 50                    : 1T

    MOVWF 30                   : 1T
 LOOP2: MOVLW FF                   : 1T

    MOVWF 31                 : 1T

 LOOP1: DECFSZ 31,1                 : 1T or 2 T
         GOTO LOOP1                : 2T

    DECFSZ 30,1                 : 1T or 2T
         GOTO LOOP2                ; 2T
     Return : 2T

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

14.Given an analog output signal whose voltage should range from 0V to 10V, and 8-bit digital encoding. Calculate the correct encoding of 3.75V using Successive approximation method. Show the stepwise calculation.

**PART-C**

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

15. Mention any two instructions by which accumulator register can be initialized.

16. What is the need for tristate buffers in port circuits?

17. Mention the significance of TRIS registers.

18. Identify the circuit and name the function of PR2 register.



19.The ADFM bit of the ADCON0 register controls the output format. Write the result

 pattern when ADFM=1

20. Explain the significance of WDT in embedded systems.

21. Mention the advantages of ASIP.

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