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Register Number:

DATE:

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

B.Sc. – VI SEMESTER

SEMESTER EXAMINATION- APRIL 2020

**EL 6215- PIC MICROCONTROLLER AND EMBEDDED SYSTEMS**

**Time: 2 ½ hrs Maximum marks: 70**

This question paper has **TWO** printed pages and **THREE** parts.

**PART – A**

**ANSWER ANY FIVE OF THE FOLLOWING 5X8=40 Marks**

1. a) What is an Embedded System? Discuss two important Characteristics of Embedded

 systems.

 b) What is a design metric? Discuss any four design metrics used in Embedded System. (4+4)

2. a) Write a note on PWM as a standard single purpose processor.

 b) Draw the general block diagram of a microcontroller. (4+4)

3. a) Draw pinout configuration of PIC16F877A.

 b) Write any four features of PIC16F877A. (4+4)

4. a) With the help of bit pattern explain status register.

 b) With example explain direct and indirect addressing modes. (4+4)

5. a) Discuss timer2 of PIC16F877A with the help of a diagram.

 b) What is an interrupt? Discuss any two interrupts used in PIC16F877A (4+4)

6. a) Write the bits of OTION\_REG register and discuss the significance of the bits

 b) Discuss stepper motor interfacing with a microcontroller. (4+4)

7. a) Explain general steps to interface relays.

 b) Write a note on LCD controller and its initialization process. (4+4)

**PART – B**

**ANSWER ANY FIVE OF THE FOLLOWING 5X4=20 Marks**

8. With an appropriate example design a single-purpose processor using RTL customisation.

9. Given an analog signal whose voltage should range from 0 to 10V, and an 8 bit digital encoding. Calculate the correct encoding for 5.33V using successive approximation method. Show stepwise calculation.

10. Write an ALP to perform subtraction of two 16 bit numbers.

11. Write an ALP to multiply two 8 bit numbers.

12. Write an ALP to add a block of **ten** numbers of 8-bit each.

13. Write an ALP to generate a staircase waveform using DAC.

14. Write an ALP to interface a 7 segmental display with PIC.

**PART – C**

**ANSWER ANY FIVE OF THE FOLLOWING 5X2=10 Marks**

15. Write any four design metric benefits of using General Purpose Processor technology in Embedded systems.

16. Write two differences between timer and counters. Write two applications of a timer.

17. What is the need of a microcontroller? How is a microcontroller different from a microprocessor?

18. Which type of memory architecture is used in PIC16F877A and why?

19. What is brown out reset?

20. Expand MSSP and I2C.

21. Can an LED be directly interfaced with PIC16F877A? Justify.

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