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| **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**  **B.Sc. ELECTRONICS - VI SEMESTER**  **SEMESTER EXAMINATION: APRIL 2018**  **EL 6215 – PIC MICROCONTROLLER AND EMBEDDED SYSTEMS**  **Time- 2 1/2 hrs Max Marks-70**  This paper contains two printed pages and three parts |

**PART A**

**Attempt any five 5X8=40**

1. a. Discuss the different types of processor technologies in Embedded Systems.

b. Write a note on Pulse Width Modulation as Single Purpose Processor technology. 4+4

2. a. Draw the RT level design for controller and datapath of a microcontroller bridge that will help a transmitter, which can send four bits at a time and a receiver which can receive 8 bits at a time to communicate with each other.

b. Write the advantages and disadvantages of RISC over CISC architecture. 4+4

3. Draw the internal architecture of PIC16F877A indicating different sections.

4. a. Write a note on PIC reset actions.

b. Write a note on memory organization of PIC16F877A. 4+4

5. Discuss the Master Synchronous Serial Port (MSSP) module in detail.

6. a. Draw the interrupt logic of PIC16F877A and explain how interrupts are enabled.

b. With the help of a proper diagram explain the interfacing of a stepper motor with

PIC16F877A. 4+4

7. Write the instructions needed to: 8X1=08

(i)set bit 3 of PORTA;

(ii)clear bit 1 of PORTB;

(iii)clear the file register called testfile;

(iv)move the binary number 11011 into the working register;

(v)move the contents of the working register into a file register called cost;

(vi)move the contents of the file register called cost into the working register;

(vii)branch unconditionally to a point in the program identified by the label repeat;

(viii)test bit 2 of the file register called input, and skip the next instruction if the bit is set.

**PART B**

**Attempt any five 5X4=20**

8. Given an analog output signal whose voltage should range from 0 V to 10 V, and an 8 bit digital encoding. Calculate the correct encoding of 5.75V using successive approximation method. Show the step wise calculation.

9. Write a program to add two sixteen bit numbers.

10. Write a program to find whether a given number is palindrome or not?

11. Write an assembly language program to initialize Timer 0 to increase on every low to high transition on TOCKI pin and cause interrupt on overflow.

12. Draw a block diagram to show the interfacing of a DAC with PIC and write a program to generate ramp wave output.

13. Write a program for interfacing LCD controller with PIC16F877A.

14. If delay required is 16ms with an internal clock frequency of 4MHz, assign a valid range count in Timer 0.

**PART C**

**Attempt any five 5X2=10**

15. If the NRE cost is high, will the unit cost also be high? Justify your answer.

16. Name the steps involved in customization of a single purpose processor. What is the purpose of datapath?

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

18. Name the flags which are affected by the execution of *INCF f,d* instruction.

19. Which are the interrupts enabled if [INTCON] = 98’h.

20. Can a relay be directly connected to a port pin of PIC16F877A for interfacing? Justify.

21. What are the events that can wake the device from sleeping mode?