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DATE: 26-04-2017

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

**B.Sc. ELECTRONICS – VI SEMESTER**

**SEMESTER EXAMINATION – APRIL 2017**

**EL 6212: Microcontroller and Embedded Systems**

**Time: 3 Hrs Maximum Marks: 100**

**(*For supplementary candidates only)***

***Attach this question paper with the answer script***

This question paper has two printed pages and three parts.

**PART A**

**Attempt any five 5X12=60**

1. a. Enumerate the advantages and disadvantages of RISC over CISC architecture.

 b. Draw the architecture of PIC16F877A indicating different sections. 4+8

2. a. Explain memory organization of PIC16F877A.

 b. Mention bits of INTCON register and their significance.

 c. Write a note on stack in PIC16F877A. 6+4+2

3. a. Explain Port D features and how it can be used as a parallel slave port for read operation.

 b. With the help of a block diagram explain the working of timer 2.

 c. Mention a few interrupts of PIC and write the interrupt sequence. 4+4+4

4. a. With the help of necessary circuits/blocks explain the procedure for analog to digital

 conversion.

 b. Write a block diagram to interface PIC with a seven segmental display and write the

 program to count 0-9. 6+6

5. a. Describe matrix keyboard interface with PIC and its basic operation.

 b. With the help of block diagram explain interfacing of LCD module with PIC. Mention the

 initialization process of LCD module. 6+6

6. a. Write a note on bus arbitration.

 b. Discuss any six design constraints (metrics) that a designer should consider while

 designing an embedded system. 6+6

7. a. Write a note on I/O addressing scheme of interfacing.

 b. Discuss types of processor technologies used in Embedded System designs. 6+6

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**PART B**

**Attempt any five 5X6=30**

8. WAP to subtract two 16 bit numbers.

9. a. If delay required is 16ms with an internal clock frequency of 4MHz, assign a valid range

 count in Timer 0.

 b. Calculate the total delay executed by PIC16F877A

 Delay : movlw FFH

 movwf 20H

 loop : decfsz 20,1

 goto loop

 return 4+2

10. WAP to generate a 5 step waveform using DAC interfaced with PIC.

11. WAP to multiply two 8 bit numbers located at A0H, A1H and copy the result in A2H, A3H.

12. a. WAP to clear a block of data from location 21 to 2F using indirect addressing mode.

 b. With the help of a timing diagram distinguish between bit rate and baud rate. Also define

 the two.

13. Explain customization of a single purpose processor using a proper example.

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

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

 approach.

**PART C**

**Attempt any five 5X6=30**

15. BTFSC f,b is a 1/2 cycle operation. Explain with an example.

16. Mention how working register values can be nullified by means of instructions.

17. What is the current sink/source capabilities of PIC16F877A and give its significance.

18. Mention the port which has interrupt on change feature and its significance.

19. Justify why unit cost of a GPP is very low even though manufacturers invest a large amount

 for NRE cost?

20. Write two advantages of using Single purpose processor over General purpose processor?

21. Write two applications of PWM in Embedded system designs.