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Register Number:

DATE:

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

**SEMESTER EXAMINATION- APRIL 2020**

**B.SC. ELECTRONICS- VI SEMESTER**

**EL6215: PIC MICROCONTROLLER AND EMBEDDED SYSTEMS**

**Time: 21/2 Hours Max. Marks: 70**

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

**PART-A**

**Answer any FIVE of the following: 5X8=40**

1. **a)** What is an Embedded System? Define two main characteristics of embedded

 systems.

 **b)** Write a note on Design Metrics in embedded systems. **(4+4)**

1. **a)** Write a note on PWM as single purpose processor.

**b)** Explain program counter and its significance in PIC16F877A. **(4+4)**

1. Sketch the architecture of PIC16F877A.
2. **a)** Enumerate Port B features in PIC16F877A.

 **b)** What is an interrupt? Write and explain interrupt sequence in PIC16F877A. **(4+4)**

1. **a)** Explain the following instructions with an example each.

 **i)** SUBLW K **ii)** XORWF f, d **iii)** SWAPF f, d **iv)** RRF f, d

**b)** Describe analog to digital conversion module. **(4+4)**

1. **a)** Draw TIMER2 block and explain its working.

**b)** Discuss the working of I2C mode under MSSP module. **(4+4)**

1. **a)** With the help of a necessary circuit explain the steps involved in interfacing a

 relay with PIC16F877A and give a brief program to ‘ON’ the relay.

**b)** Explain the basic principle involved while interfacing a matrix keyboard with

 PIC16F877A. **(4+4)**

**PART-B**

 **Answer any FIVE questions: 5X4=20**

1. Explain customization of a Single purpose processor with an appropriate example.
2. Given an analog input signal whose voltage should range from 0 to 10V and an

8-bit digital encoding, workout the digital encodings for the following desired

voltages. **a)** 0V **b)** 1V **c) 5.33**V **d) 10**V

1. Write a program to subtract two 16-bit numbers.
2. Write a program to add a block of 16 numbers.
3. Sketch the block diagram of PIC interface with DAC and write the program to generate sawtooth waveform.
4. Write a program interface a stepper motor and to run it continuously with a certain

speed.

1. Determine the time delay created in the program given below.

 MOVLW FF

 MOVWF CHigh

 loop2: MOVLW FF

 MOVWF Clow

 loop1: DECFSZ Clow

 GOTO loop1

 DECFSZ CHigh

 GOTO loop2

 RETURN

**PART-C**

 **Answer any FIVE questions: 5X2=10**

1. Most of the single purpose processors could be implemented as software

on general purpose processor, but such implementation can be burdensome.

Justify.

1. Write any two examples which explain the usage of timer in an embedded

system.

1. Discuss the significance of ADFM bit of ADCON1 register.
2. Name how a device can wake up from sleep mode.
3. Write a program to configure Port A as a digital output port.
4. Enumerate the significance of CD4511 in a seven segment LED interface with

PIC16F877A.

1. DB7 bit of LCD controller need to be checked constantly. Give reasons.

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