M.Sc. First Year (Electronics) New CBCS Pattern Semester-II

PSCELET05 - Paper-I : Embedded Systems and Applications

P. Pages : 2 **GUG/W/23/11199**

Time : Three Hours * 6 2 2 6 * Max. Marks : 80

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw well labeled diagrams wherever necessary.
3. Use of log table/calculator is allowed.

1. **Either**

a) Draw and explain architecture of 8051 Microcontroller. **8**

b) Write a program to transfer block of data from internal memory locations to external memory locations for 8051 controller. **8**

OR

c) Explain different Addressing Modes of 8051 Microcontroller with examples. **8**

d) Answer the following questions. **8**

1) What is the purpose of EA pin in 8051 Microcontroller.
2) What is the function of ALE signal?
3) Describe DPTR.
4) Write instruction to select register bank 2.

Either

2. a) Draw and explain interfacing diagram of DAC with 8051 microcontroller. Write program to generate sine wave at the output of DAC. **8**

b) Explain interfacing of stepper motor with microcontroller. Write program to rotate stepper motor in clockwise direction continuously in full step mode. **8**

OR

c) Explain different mode for serial communication for 8051 Microcontroller. **8**

d) Explain in brief: **8**
i) SPI, and
ii) USB

Either

3. a) Draw a general architecture of ARM processor and explain. **8**

b) Describe the following ARM instruction sets: **8**
i) Data transfer instructions.
ii) Bit transfer instructions.

OR

c) Draw the general architecture of ATMEGA microcontroller. List the special features of AT mega microcontroller. **8**

d) Explain the utility of a Watch dog timer in a microcontroller. **8**

Either

4. a) State the advantages of PLC timer. List different timer functions. **8**

b) What is ladder diagram? Draw a ladder diagram to operate an alarm when the temperature of furnace in above the maximum set temperature or falls below the minimum set temperature. The process should start heating when minimum temperature in reached and stop when the temperature is above the maximum. **8**

OR

c) Explain the role of timer functions and counter functions in PLC. **8**

d) What is Direct Digital Control (DDC). Explain with block diagram a process control loop using DDC. **8**

5. a) Explain the role of interrupts in the operation of the 8051 μc . **4**

b) Explain serial communication with PC using RS 232. **4**

c) What is real time clock and timers? **4**

d) How a programmable logic controller work? **4**

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