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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE) PT (Sem.–7)

MICROCONTROLLER AND PLC

Subject Code : BTEE-604

M.Code : 74092

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1 Answer briefly :

a) Differentiate between a microcontroller and a microprocessor.

b) What is an embedded system?

c) What is criterion for choosing a microcontroller for a particular application?

d) If bank 1 registers are being used, the default value of the stack pointer cannot be used. Why?

e) What is the difference between a machine cycle and a clock cycle?

f) Differentiate between the packed and unpacked BCD numbers.

g) What is checksum byte?

h) Define a programmable logic controller.

i) Lists are the factors affecting the memory size needed for a particular PLC.

j) List all the programming languages of a PLC.

SECTION-B

Q2 Contrast and compare the different addressing modes of 8051 microcontroller with suitable examples.

Q3 Create a square wave with an ON time 2ms and an OFF time of 10ms on all pins of port 0. Assume an XTAL of 22MHz.

Q4 List and explain the registers of 8051 having the bit-addressability. What are the advantages of bit-addressability?

Q5 Outline and explain the sequence of events involved in a single PLC program scan. "*The scan time puts a limit on the speed of events*". Comment.

Q6 Draw the schematic diagram of a discrete input and output module and explain each section.

SECTION-C

Q.7 a) Devise ladder programs for systems that will carry out the following tasks :

a. Switch on a pump when the water level in a tank rises to above 1.2 m and switch it off when it falls below 1.0 m.

b. Switch on a pump; then 100 later, switch on a heater; then a further 30 s later, switch on the circulating motor.

c. Switch on a heater when the temperature is less than the set temperature.

d. Turn on a lamp when a data source is not giving 100.

b) Explain the architecture of the PLC in detail. Define the function of each section. How the analog devices are interfaced?

Q8 a) What are the advantages of using programmable logic over discrete logic? How does a structured ASIC differ from the traditional ASIC and the PLD?

b) Two switches are connected to the pins P0.1 and P0.2. These are also vectored to interrupt locations 0003H. Write a program to test which key is pressed, or to verify if both the keys are pressed.

Q9 a) Write a program to implement an on-off temperature control. Assume a temperature sensor is connected to an input port to read the temperature and a heater to the output port through a relay to control the temperature.

b) Explain the features of the 8255 chip and its mode selection.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.