B.E. Instrumentation Engineering (MODEL CURRICULUM) Sem-V

IN504M : Microcontroller & Interfacing

P. Pages : 2 **GUG/W/22/14024**

Time : Three Hours * 3 2 5 3 * Max. Marks : 80

Notes : 1. Same Answer book must be used for each section.
2. All questions carry marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.

1. a) Draw and explain the architecture of 8051 Microcontroller and also explain the PSW, RAM memory organisation. **12**

b) Write the comparison between Microprocessor and Microcontroller. **4**

OR

2. a) Write and explain the addressing modes of 8051 microcontroller with suitable example. **10**

b) Explain the following instructions **6**
i) MOVC A, @ A+ DPTR
ii) DAA
iii) RRC A

3. a) Write an explain an assembly language program to divide the data in RAM location in 38H by data in 15H and store the quotient in 70H and remainder in 71H. **8**

b) Write and explain an assembly language program to transfer five 8-bit of data from starting memory location 30H to other memory starting at 40H. **8**

OR

4. a) Enlist the assembler directives associated with 8051 Microcontroller and explain any four in detail. **8**

b) Write a short note on following embedded software development tools: **8**
i) Editor ii) Debugger
iii) Linker iv) Locator

5. a) Explain TMOD and TCON register. **8**

b) Write and explain a C program and assembly program to generate a square wave of frequency 10KHz on pin 1.4. Use Timer 0 in Mode 2 with a crystal frequency of 22MHz. **8**

OR

6. a) Write and explain an assembly language program to toggle $P_{1.5}$ every 1 sec Use Timer 1 in Mode 1. Assume Crystal oscillator frequency is 11.0592 MHz. **8**

b) What are the advantages of social communication over parallel communication? **4**

c) Explain the bit pattern of IE register and how to enable the serial interrupt, timer r_0 interrupt and external hardware interrupt in 8051. **4**

7. a) Write and explain a C program and assembly program to interface an ADC 0804 to 8051 microcontroller and display on P_2. **8**

b) Write a program to monitor the status of a switch SW connected to pin 2.7 and perform the following: **8**

i) If SW=0 the stepper motor rotates clockwise
ii) If SW=1, the stepper motor rotates anti-clockwise
Use the wave drive 4-step response.

OR

8. a) Name the 14 pins present in LCD and show how it can be interfaced to microcontroller 8051 with P1 connected to data lines. **8**

b) Write and explain an ALP to do the following: **8**

i) Reads data from port P_1 and writes it to P_2
ii) Also the data at P_1 is transferred serially.
iii) The data received serially is displayed at P_0.

Assume 11.0592 MHz crystal frequency 9600 baud rate.

9. a) Draw the block diagram of Arduino and explain its features. **8**

b) Write a short note on interfacing Arduino with seven segment LEDs. **8**

OR

10. a) Write a short note on I/O ports and Timers used in Arduino. **8**

b) Discuss about the Arduino interfacing with different types of sensors and communication modules. **8**

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