

17534

11920

3 Hours / 100 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any THREE of the following: **12**
- (i) Compare between microprocessor and microcontroller (any four)
 - (ii) State the difference between Harvard and Von-Neumann architecture with suitable diagram.
 - (iii) Draw the format of PSW register of 8051 microcontroller and describe it.
 - (iv) Explain the function of following directives
 - (1) DB
 - (2) EQU
 - (3) ORG
 - (4) END
 - (v) Draw the control word format of 8255 for I/O mode.

P.T.O.

b) **Attempt any ONE of the following:**

6

- (i) Draw the diagram to interface 2kB, external RAM with 8051 microcontroller, mention the pins during interfacing and describe in brief.
- (ii) Write a program to multiply two 8 bit numbers stored in internal memory location. Multiplicand is stored in location 40H and Multiplier is stored in memory location 41H store LSB of result in R₂ and MSB of result in R₃.

2. **Attempt any FOUR of the following:**

16

- a) Which are different types of Buses? State their features.
- b) Draw the format of TCON SFR and explain each bit.
- c) Describe the function of following pins of 8051 microcontroller.
 - (i) $\overline{\text{PSEN}}$
 - (ii) $\overline{\text{EA}}$
 - (iii) ALE
 - (iv) RESET
- d) State four features of 8051 microcontroller
- e) Draw the format of PCON register and explain function of each bit.
- f) Draw internal RAM structure of 8051.

3. **Attempt any FOUR of the following:**

16

- a) Describe the function of following instruction of 8051 microcontroller.
 - (i) MOV A, @Ri
 - (ii) MOVX A, @DPTR
 - (iii) SWAP A
 - (iv) INC@ Ri

- b) List any two instructions of following addressing modes.
 - (i) Immediate addressing
 - (ii) Register addressing.
 - (iii) Direct addressing and
 - (iv) Index addressing mode
- c) Write assembly language program to find sum of 5 numbers stored in internal RAM from memory location 50H. Store result in memory location 70H.
- d) State function of editor, assembler, linker and compiler.
- e) Explain the operating mode 1 of serial port of 8051 microcontroller.

4. a) **Attempt any THREE of the following:** **12**

- (i) Write a programme to add two BCD numbers stored in Register R_2 and R_3 of bank 1. Store result in register R_0 of Bank.
- (ii) Draw the port structure of port O and describe its function.
- (iii) What is baudrate in UART of 8051. What value should be loaded into TH_1 to have 4800 baudrate. Give its decimal and hex value for crystal frequency 11.0592 MHz
- (iv) Write the format of SCON register and explain it.

b) **Attempt any ONE of the following:** **6**

- (i) Draw the interfacing diagram of stepper motor with 8051 and write an ALP to rotate stepper motor continuously in clockwise direction.
- (ii) Write a program to move a block of ten bytes stored in internal memory 50H onwards to External memory location 2000H onwards.

- 5. Attempt any FOUR of the following:** **16**
- a) Draw the format of TMOD register of 8051 and state function of each bit.
 - b) Write a program to generate square wave of 1 KHz at P1.5 pin of 8051. Using mode 1 and timer 0. Assume 12 MHz crystal frequency.
 - c) Draw IE register format and explain it.
 - d) Write an assembly language program to check bit P1.7, if it is high send 55H to P₀ otherwise send AAH to P2.
 - e) Write an assembly language program to send 'Hello' on Serial port of 8051 at 9600 baudrate. Assume fosc = 11.0592 MHz.
- 6. Attempt any FOUR of the following:** **16**
- a) Draw the interfacing diagram of relay with 8051 and write ALP to turn ON and Off relay.
 - b) Describe selection factors of microcontroller
 - c) Draw and describe IP register format of 8051.
 - d) List the interrupts in 8051. Give their priorities and vector addresses.
 - e) Explain mode 3 of timer of 8051 with its internal logic diagram.
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