17534

15162

3 Hours / 100 Marks Seat No. | | | | | | | | |

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****.*

Marks

1. A) Attempt **any three** : **12**

i) Define the term 'BUS'. List out types of buses and state their features.

ii) State any four merits of microcontroller over microprocessor.

iii) Compare power down mode and ideal mode of 8051. Which SFR is used to set these modes ?

iv) State significance of assembler directives. Explain the use of following assembler directives DATA, ORG, CODE, DB.

v) With control word register explain Bit Set Reset (BSR) mode of 8255.

B) Attempt **any one** : **6**

i) Write an assembly language program, for 8051 microcontroller to perform addition of three 8 bit numbers. These numbers are stored at internal memory locations 60 H, 61 H and 62H. Store carry and sum at 63 H and 64 H location. (Assume suitable data)

ii) Sketch 8051 microcontroller interfacing diagram to interface 4 LEDs and 4 switches. Interface LEDs to Port 0 upper nibble and switch to Port 1.

Write an ALP for 8051 to read status of switches and operate LEDs as per switch status.

2. Attempt **any four** : **16**

a) Which pins of 8051 microcontrollers are used for external memory interfacing with 8051 ? State their functions.

b) State two features of 8031, 8952 and 8751 microcontrollers.

c) Sketch memory organisation of 8051 and label it showing register banks, bit addressable locations, SFR area, external data and code memory.

d) State significance of each bit of PSW register of 8051 microcontroller.

e) Explain reset operation for 8051 with reset circuit and reset signal.

f) Sketch block diagram of micro computer. Label each block and state function of each block.

3. Attempt **any four** : **16**

a) List out any two instructions of following addressing modes :

Immediate addressing , Register addressing, Direct addressing and Index addressing mode.

P.T.O.

Marks

b) State difference between SJMP, LJMP and AJMP instructions of 8051 microcontroller.

c) Write single instruction to perform following operation :
   i) Logical instruction to make accumulator content FF H
   ii) To set carry flag bit
   iii) To change content of accumulator from 85 H to 58 H .
   iv) Jump if bit R 0.5 is '0'.

d) Write assembly language program for 8051 to perform addition, if bit P 2.0 is set and substraction if that bit is clear i.e. '0'. Data 1 is at accumulator and Data 2 is at 40 H address.

e) State functions of each bit of SCON register. Draw format of SCON register.

4. A) Attempt **any three** : **12**
   i) State role of assembler, editor, linker and loader in software development.
   ii) Draw circuit diagram of Port 0 and state its alternate functions.
   iii) Draw the formats of SCON register and explain it.
   iv) What is the role of SMOD bit in serial communication ? Write instruction to set SMOD bit.

B) Attempt **any one** : **6**
   i) Write assembly language program to perform AND, OR and XOR operation on two Data. Data 1 is at internal RAM location 40 H and Data 2 is at external memory location 2000 H. Store result at three successive memory location in internal RAM i.e. 50 H, 51 H and 52 H respectively.
   ii) Sketch interfacing diagram showing interfacing of two, 4K×8 RAM chips with 8051 microcontroller. Draw memory map.

5. Attempt **any four** : **16**

a) Draw format of IE register of 8051 microcontroller and describe function of each Bit.

b) List out timer modes and describe in short.

c) What is interrupt ? List out 8051 interrupt sources. Write instruction to disable any one interrupt.

d) Write assembly language program to read data from Port 3. Rotate that data by 4 times to left and output it to Port 1.

e) Write assembly language program to transmit data 75 H serially. At the end of transmission make accumulator content as FF H.

6. Attempt **any four** : **16**

a) Write assembly language program to generate pulse train. Assume suitable value for T_{OFF}. $T_{ON} = 3T_{OFF}$. Assume crystal frequency as 12 MHz.

b) State the meaning of interrupt priority. How it can be change ? Explain with one example.

c) Write 8051 instructions to operate Port A, Port B and Port C of 8255 in simple I/O mode.

d) Explain autoload timer mode. How it can be set ?

e) List out any four selection factors for microcontroller and their importance in applications.