2012
COMPUTER ARCHITECTURE AND SYSTEM SOFTWARE

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) Gray code for decimal 12 is

a) 1100 b) 1011

c) 1010 d) 0100.

ii) 9's complement of 46 is

a) 54 b) 64

c) 63 d) 53 .

iii) BCD numbers express each decimal digit as

a) Byte b) Nibble

c) Bit d) ASCII .

iv) A microprocessor has memory locations from 0000 to 7FFF. Each location stores 1 byte. The memory capacity is

a) 8 k byte
b) 16 k byte
c) 24 k byte
d) 32 k byte.

v) The transfer operation P : $R_2 \leftarrow R_1$ will be executed only when

a) P = 0
b) P = 1
c) P > 0
d) P < 1 .

vi) The number of multiplexers required to construct a common bus for 8 registers with 4 bits each is

a) 16
b) 8
c) 4
d) 2 .

vii) A logical shift is one that transfers ..... through the serial input.

a) 0
b) 1
c) either 0 or 1
d) both (a) and (b).

viii) A computer instruction is a ..... code.

a) Hexadecimal
b) Decimal
c) Binary
d) Octal .

ix) DMA stands for

a) Digital Memory Address
b) Direct Memory Access
c) Digital Memory Array
d) Dual Memory Arithmetic.

x) The basic computer consists of ..... types of registers.

a) 6 b) 8

c) 9 d) 18 .

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Describe the working principle of binary incrementer.
3. What is meant by random access and sequential access of memory devices ? Explain.
4. Briefly describe an instruction execution cycle with proper timing diagram.
5. What is locality of reference ? What is biased exponent ?

2 + 3

6. What are the uses of a System Bus and Data Bus ? How do they differ from an Address Bus ? 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. What is virtual memory ? What could be the maximum size of virtual memory ? Justify. Briefly describe an instruction execution cycle with proper timing diagram. Explain the Booth's algorithm. Illustrate with example. Briefly discuss different types of ROM. Differentiate between Static RAM and Dynamic RAM. 3 + 3 + 3 + 3 + 3

8. What are the differences between RISC and CISC processors ? Explain the concepts of sequential processing pipelining and parallel processing with example. What are the elements of a machine instruction ? What is meant by memory access time ? 4 + 6 + 3 + 2

9. What are 16-bit registers available in 8085 microprocessor ? Write about them. What is 'bootstrap loader' program stored in ROM and not in RAM ? What are the elements of machine instruction ? 2 + 3 + 5 + 5

10. What is interrupt ? What is the difference between primary and secondary storage devices ? What is stack ? What is flag ? What is the disadvantage of microprocessor ? What is the difference between microprocessor and the microcontroller ? 2 + 4 + 2 + 2 + 2 + 3

11. Write short notes on any *three* of the following : 3 × 5

    a) Vector Processing

    b) Paging

    c) DMA controller

    d) Cache memory

    e) 4 in 1 multiplexer.