

[This question paper contains 4 printed pages.]

1931

Your Roll No.

B.Sc. (Prog.) / II

E

COMPUTER SCIENCE

Paper – CS-202 – Computer System Architecture

(Admissions of 2005 and onwards)

Time : 3 Hours

Maximum Marks : 75

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Question 1 is compulsory.

*Attempt any **five** questions from*

Question Nos. 2 to 8.

1. (a) Verify using Boolean algebra :

$$(X + Y)(X + Z) = X + YZ \quad (3)$$

(b) Explain the working of a RS flip-flop. (3)

(c) What is a Hit ratio ? (3)

(d) Explain LDA memory-reference instruction. (3)

(e) Give the truth table of the following expression

$$F = xy'z + x'y'z + xyz \quad (3)$$

P.T.O.

(f) Using ten's complement, perform the following :

$$(-625)_{10} + (731)_{10} \quad (3)$$

(g) Differentiate between direct and indirect addressing modes. (3)

(h) Represent the number 1101.1101 in normalized floating point representation with 16 bits. The normalized fraction mantissa has 9 bits and the exponent has 7 bits. (2)

(i) Represent $(321)_{10}$ in BCD form. (2)

2. (a) Simplify the Boolean function F using K-map in sum-of-products form and draw the logic diagram of simplified F.

$$F(a, b, c, d) = \sum(0, 1, 2, 4, 5, 6, 8, 12) \quad (5)$$

(b) Draw the flowchart for the interrupt cycle of the basic computer. (5)

3. (a) Briefly explain the working of an I/O interface unit with its block diagram. (6)

(b) The content of a 4 bit register is initially 1101. The register is shifted 4 times to the right with the serial input being 10110. Show the contents of register after each shift. (4)

4. Give the function table and the logic circuit of
- (a) 4-to-1 multiplexer. (5)
 - (b) 4-bit full adder circuit. (5)
5. (a) What is an Interrupt ? Briefly explain the three different types of interrupts giving example of each. (6)
- (b) The following memory units are specified by the number of words times the number of bits per word. Specify the number of address and data lines :
- (i) $32M \times 16$
 - (ii) $2G \times 32$ (4)
6. (a) Briefly explain 'Virtual Memory' and 'Primary Memory'. How many 128×8 RAM chips are needed to provide a memory capacity of 2048 bytes ? (6)
- (b) Write any four characteristics of each RISC and CISC architecture based processors. (4)
7. Convert the following numbers to the indicated base :
- (a) $(1101011)_2$ to $(\dots)_8$

(b) $(1101011)_2$ to $(...)_{10}$

(c) $(635)_8$ to $(...)_{16}$

(d) $(\Lambda 9)_{16}$ to $(...)_{2}$

(c) $(182)_{10}$ to $(...)_{2}$ (10)

8. Write short notes on the following (any **four**) :

(a) Indexed addressing mode

(b) Edge-triggered flip-flops

(c) Zero-address instructions

(d) Interrupt initiated I/O

(e) Selective set and selective compliment logic microoperations (2.5×4)