

B.C.A. (Part—I) Semester—I Examination
1ST3 : DIGITAL TECHNIQUES—I

Time : Three Hours]

[Maximum Marks : 60

- Note :—**(1) All questions are compulsory.
(2) Draw diagrams wherever necessary.

EITHER

1. (a) Explain with truth table :
(i) NOR gate
(ii) EX-NOR gate. 6
(b) Convert $(3A.B)_{16}$ into binary, octal and decimal numbers. 6

OR

- (p) Perform the following conversions :
(i) $(105.5)_{10} = (x)_2$
(ii) $(AC.7)_{16} = (x)_{10}$
(iii) $(32.5)_8 = (x)_{16}$ 6
(q) Subtract $(11001)_2$ from $(10110)_2$ using 2's complement method. 3
(r) What is 1's complement of a binary number ? Convert $(11001101)_2$ into 1's complement number. 3

EITHER

2. (a) Explain working of TTL NAND gate with neat diagram. 8
(b) Define :
(i) Fan-in, Fan-out
(ii) Noise immunity. 4

OR

- (p) Explain working of CMOS NOR gate. 6
(q) Explain working of DTL logic gate (NAND). 6

EITHER

3. (a) State and prove De-Morgan's theorems. 6
(b) Reduce the following equations using Boolean laws :
(i) $AB + \overline{A}BC + \overline{A}B + ABC$
(ii) $AC + ABC + A\overline{C}$. 6

OR

(p) Draw logic diagram of $Y = ABC + AC + A\overline{B}C$. Reduce the above equation and draw logic diagram. 6

(q) Simplify the following equation using K-map :

$$f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 9, 10, 12). \quad 6$$

EITHER

4. (a) What is full adder ? Explain working of full adder. 6

(b) Explain IC 74181 as ALU. 4

(c) State the difference between half adder and full adder. 2

OR

(p) Explain working of 4 bit parallel adder 6

(q) Explain action of full subtractor. 6

EITHER

5. (a) What is multiplexer ? Explain working of 8 : 1 multiplexer. 8

(b) Explain use of demultiplexer as decoder. 4

OR

(p) What is decoder ? Explain 3 : 8 decoder. 8

(q) State difference between multiplexer and demultiplexer. 4