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Your Roll No. ....

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B.Sc. (Gen.)/II

QUALIFYING : DIGITAL ELECTRONICS—Paper IV

Time : 3 *Hours*   *Maximum Marks* : 100

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

Attempt *five* questions in all,

Question No. 1 is compulsory.

All questions carry equal marks.

1.   Attempt any *five* questions :   5×4=20

    (*a*)   Do the following conversions :

        (*i*) $(634)_8$ to binary

        (*ii*)   (0.640625) to its octal equivalent.

        (*iii*)   Graycode (101011) to its binary equivalent.

P.T.O.

(b)   Design XNOR gate using NOR gate.

(c)   Simplify the following using De Morgan's theorem

$[((AB)' C)'' D]'$.

(d)   Design full substractor using half substractor.

(e)   Define :

   (i)   Power dissipation

   (ii)   Propagation delay

   (iii) Noise margin.

(f)   Define race around condition.

2.   (a)   Reduce the expression : $6\frac{2}{3}$

$$f = A\left[B + \overline{C}\left(\overline{AB + A\overline{C}}\right)\right].$$

(b)   Design a half substractor in SOP showing K-map for

difference and borrow. $6\frac{2}{3}$

(c)   Find the complement of : $6\frac{2}{3}$

$$AB + \overline{AC} + A\overline{B}C.$$

3. (a) Design an OR gate (two input) using diodes and resistance. Explain the working using truth table. $6\frac{2}{3}$

   (b) Write advantages of I^2L families over other families. $6\frac{2}{3}$

   (c) Design NAND gate using NMOS logic family. $6\frac{2}{3}$

4. (a) Design a monostable multivibrator with T_{HIGH} = 1.1 ms. $6\frac{2}{3}$

   (b) Draw the circuit of RS flip-flop and explain its working using truth table. $6\frac{2}{3}$

   (c) Design a MOD-8 counter. $6\frac{2}{3}$

5. (a) Design a 3-bit weighted DAC circuit. (Digital to analog coverter circuit). Also explain its working. 11

   (b) What are the output voltages caused by each bit in a 5-bit ladder if the input levels are 0 = 0V and 1 = 10 V. 9

6. Write short notes on any *two* : 10×2=20

   (a) Up-Down counter

   (b) ROM

   (c) D' Morgan's theorem.

7.   (*a*)   Write a program in assembly language to add two hex

        numbers by direct addressing mode.   10

    (*b*)   Specify the addressing modes of the following

        instructions :   3.3×3

            (*i*)   STA   2050

            (*ii*)   ADI   50H

            (*iii*) STAX   D.