[This question paper contains 4 printed pages.]

1899 *Your Roll No. .....*

B.Sc. (Gen.) Part II / II Year **E**

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 any **five** *questions in all.*
Question **1** *is compulsory.*
All *questions carry equal marks.*

1. Attempt any **five** questions :

   (a) Design XNOR gate using NAND gates.

   (b) What are basic properties of Boolean algebra ?

   (c) Do the following conversions :

      (i) $(3021.2)_5$ to decimal

      (ii) $(A65F)_{16}$ to decimal

      (iii) $(637)_8$ to binary

   (d) Draw full subtracter using XOR and other logic gates.

P.T.O.

(e) State duality theorem.

(f) Differentiate between volatile and non-volatile memories. (4×5)

2. (a) Simplify the Boolean function

$F(w,x,y,z) = \Sigma(0,1,2,4,5,6,8,9,12,13,14)$ (6)

(b) Design a full adder in SOP showing K maps for Sum and Carry. (8)

(c) Express $(23)_{10}$ and $(-23)_{10}$ in binary notation. (6)

3. (a) Design astable multivibrator of 20 KHz frequency. (7)

(b) Explain the operation of JK master-slave flip flop. (7)

(c) What is a synchronous counter and why is it named so ? (6)

4. (a) Design a decade counter. (8)

(b) A truth table has output 1s for each of the following inputs

ABCD = 0011

ABCD = 1100

ABCD = 1000

ABCD = 0111

What are the fundamental products ? Also write the output as SOP. (12)

5. (a) Explain all the flags present in 8085 microprocessor. (8)

(b) Specify the addressing modes of the following instructions in 8085

(i) MVI H, 23H

(ii) LDA 3000H

(iii) LDAX D (4×3)

6. (a) Design a 3 bit R-2R ladder DAC circuit. Also explain its working. (10)

(b) Reduce the given expression using basic theorems and properties of Boolean algebra

$$ABC + \bar{A}BC + \bar{A}\bar{B}C + AB\bar{C} + \bar{A}\bar{B}\bar{C}$$ (10)

7. Write short notes on any **two** :

(a) Assembly language

(b) Memories

(c) Shift register (10×2)