[This question paper contains 2 printed pages]

Sr. No. of Question Paper : 8084 D Roll No.....

Name of the Course : B.Sc. (Gen.) Part II

Name of the Paper : QUALIFYING: Digital Electronics (Paper IV)

Year : II year

Duration : 3 hours

Maximum Marks : 100

Instructions for Candidates:

- 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.

Q1 Attempt any five questions.

(a) Design half adder using NAND gates.

(b) Name two universal gates. Why are they called so?

(c) Do the following conversions:
(i) $(1420.1)_5$ to decimal
(ii) $(F685)_{16}$ to decimal
(iii) $(673)_8$ to binary.

(d) Draw a full subtractor using half subtractors.

(e) State duality theorem.

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

Q2 (a) Simplify the Boolean function

$$F = \bar{A}\,\bar{B}\,\bar{C} + \bar{B}C\,\bar{D} + \overline{ABC}\,\bar{D} + A\,\bar{B}\,\bar{C}$$

(6)

(b) Design a full subtractor in SOP showing K maps for Borrow and Difference. (8)

(c) Express $(25)_{10}$ and $(-25)_{10}$ in binary notation. (6)

Q3 (a) Design astable multivibrator of 5 KHz frequency. (7)

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

(c) What is an asynchronous counter and why is it named so? (6)

Q4 (a) Design a decade counter. (8)

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

ABCD = 1010
ABCD = 1001
ABCD = 0110
ABCD = 0101

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

Q5 (a) Explain different bus systems present in 8085 microprocessor. (8)

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

(i) MVI B, 23H
(ii) STA 2000H
(iii) STAX B (4 x 3)

Q6 (a) Draw a block diagram of 4-bit controlled shift right register. Explain its working. (10)

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

$$BC + AB + A\,\bar{C} + BCD$$ (10)

Q7 Write short note on any two
(a) 8085 microprocessor
(b) Racing condition
(c) 3 bit R-2R ladder DAC circuit. (10 x 2)