17320

14115

3 Hours/100 Marks

Seat No. | | | | | | | | |

Instructions *: (1)* ***All*** *questions are* ***compulsory****.*
(2) Illustrate your answers with ***neat*** *sketches* ***wherever*** *necessary.*
(3) Figures to the ***right*** *indicate* ***full*** *marks.*
(4) Assume suitable data, if ***necessary****.*

MARKS

1. A) Attempt **any six**. **12**

a) Convert the following binary number to gray code

i) 1101001 ii) 11111.

b) Write any two advantages of MUX.

c) What is meant by modulus of a counter ?

d) Define bi-directional shift register.

e) Write any two applications of analog to digital converter.

f) Write the types of RAM memory with its definitions.

g) Draw symbol of IC 7400 and also write the truth table and boolean expression.

h) Draw the given boolean expression use one AND gate and one OR gate.

$y = AB + BC$.

B) Attempt **any two** : **8**

a) Add the binary number

i) 1011.11 and 1100.01

ii) 0101.1 and 1111.01

b) Convert the following expression into their standard SOP form

$y = A + BC + ABC$

c) Draw the general block diagram of MUX and write its operation.

P.T.O.

MARKS

2. Attempt **any four** : **16**

   a) Convert following numbers into binary and add them $(173)_8 + (741)_8$.

   b) Why NAND gate is called universal gate ? Implement basic gates using NAND gate only.

   c) Draw the block diagram of ALU IC 74181 and also write its operation.

   d) Write the difference between combinational and sequential logic circuit. (any four points).

   e) Design 4 bit asynchronous up-counter also write the truth table and draw the waveform.

   f) Compare between R-2R ladder DAC and weighted resistor DAC (4 points).

3. Attempt **any four** : **16**

   a) Convert the following decimal number into excess-3 code,

      i) $(6)_{10}$ ii) $(35)_{10}$ iii) $(46)_{10}$ iv) $(142.2)_{10}$.

   b) Compare totem pole and open collector outputs. (any four points)

   c) Implement the following using 16 : 1 multiplexer,

      $y = \sum m (1, 2, 5, 6, 8, 12)$.

   d) Write the use of preset and clear terminal in a flip-flop.

   e) Draw the block diagram of successive approximation type ADC and write the function of each block.

   f) Compare EPROM and EEPROM with any four points.

4. Attempt **any four** : **16**

   a) What is priority encoder ? Draw the block diagram of priority encoder.

   b) Realize the following function using De-multiplexer.

      i) $F_1 = \sum m (0, 1, 3, 7, 11, 13, 15)$

      ii) $F_2 = \sum m (2, 4, 8, 10, 11)$.

MARKS

c) What is the Race-around condition ? How it will be eliminated in J-K flip-flop ?

d) Draw the diagram of 3-bit twisted ring counter using J-K F/F. Also write its truth table.

e) Write any three advantages and one disadvantage of dual slope Analog to Digital Converter (ADC).

f) Compare SRAM and DRAM with any four points.

5. Attempt **any four** : **16**

a) Write the four specifications of TTL logic family.

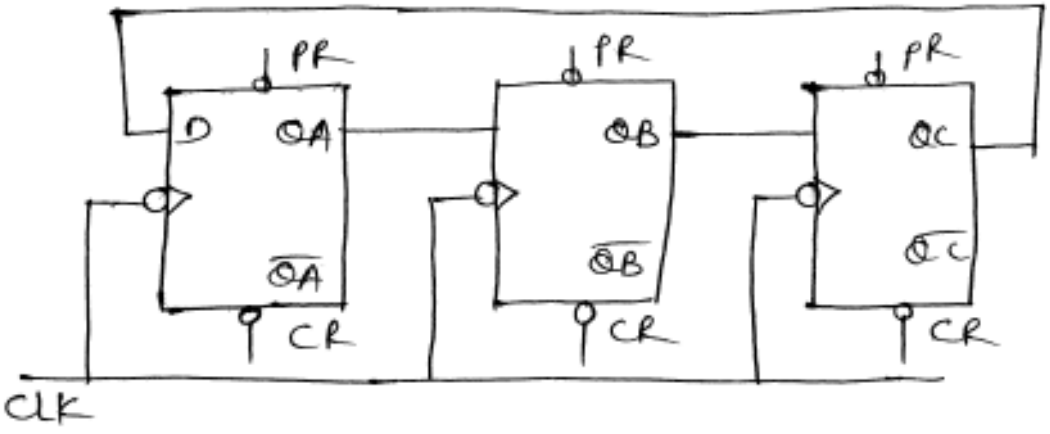
b) Draw the logic diagram of bi-directional buffer IC 74245.

c) With neat diagram write the working of serial in serial out shift register.

d) Write any four features of IC PCF 8591.

e) Compare between EPROM and Flash Memory.

f) Study the given circuit as shown in figure initial output condition is $Q_A Q_B Q_C$ = o/o. Write truth table of output $Q_A Q_B Q_C$.



MARKS

6. Attempt **any four** : **16**

a) Convert the number into its decimal equivalent

$(1011.01)_2$

b) Draw the logical diagram of

i) OR gate

ii) NAND gate

using only NOR gate.

c) Write the De-Morgan's theorem and prove it.

d) Design 16 : 1 MUX using 8 : 1 MUX.

e) Draw S-R latch using NAND gates only, also write about the received output for each condition using truth table of S-R flip-flop.

f) Draw the circuit diagram of 3-bit binary weighted Digital to Analog Converter (DAC) also write its mathematical derivation.
