17333

11920

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each Section on same / separate answer sheet.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX of the following : **12**

(a) Compare analog system with digital system. (any 4 points)

(b) Perform the following multiplication in binary number system :

$(15)_{10} \times (8)_{10}$

(c) Define following characteristics of IC's

(i) Propogation delay

(ii) Noise immunity

(d) Draw logic symbol and truth table of two i/p Ex-NOR gate.

(e) Draw block diagram of 4 : 1 Mux and give it's truth table.

(f) How many flip-flop are required to construct following modulus counter

(i) 56 (ii) 83 (iii) 99 (iv) 10

(g) List any four applications of A/D converter.

(h) Write any four Boolean laws used to reduce Boolean Expression.

(B) Attempt any TWO of the following : **8**

(a) Define the following terms with reference to logic families :

(i) Threshold voltage

(ii) Power dissipation

(iii) Operating speed

(iv) Logic Voltage level

(b) State and prove De Morgan's theorems

(c) Add $(83)_{10}$ and $(34)_{10}$ in BCD.

2. Attempt any FOUR of the following : **16**

(a) Convert (2003.31)10 to hex equivalent.

(b) Implement the following expression by minimizing the variable using Universal gate

$Y = A\overline{B} + AB + \overline{A}BC + ABC$

(c) Simplify using K map and Realize reduced expression using basic gates

$f(A, B, C, D) = \Sigma m(1, 3, 4, 5,7, 9, 11, 13, 15)$

(d) Draw master slave – JK flip-flop using NAND gates and explain its working.

(e) Draw symbol of D flip-flop and write down it's truth table

(f) Convert following equation to standard SOP form

$Y = (A + B\overline{C})\ (B + AC)$

3. Attempt any FOUR of the following : **16**

(a) Design half adder circuit using NOR gates only.

(b) Describe edge triggered flip-flop with waveforms.

(c) State any four applications of DAC.

(d) Draw logic diagram of 1 : 8 demultiplexer. Write its truth table.

(e) What is race around condition and how it can be avoided ? Explain.

(f) Design 1 bit comparator using K-map & draw it's logic diagram.

4. Attempt any FOUR of the following : **16**

(a) Draw the logical diagram of MOD 11 counter and describe it's operation with truth table.

(b) Compare R-2R and Weighted Register DAC.

(c) Differentiate between Asynchronous and Synchronous counter.

(d) Classify memories. Give function of each type.

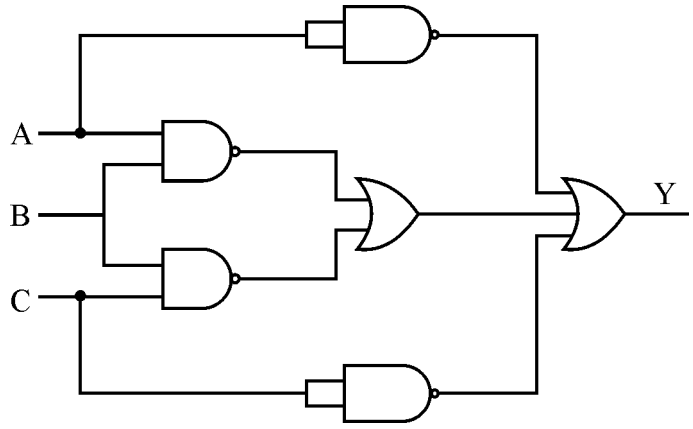
(e) Compare combinational logic system and sequential logic system.

(f) Simplify following equation using boolean algebra and draw its circuit diagram :

$$Z = \overline{(X.\overline{W} + \overline{Y.Z})(X.W + \overline{Y}Z)}$$

5. Attempt any FOUR of the following : **16**

(a) For the logic circuit shown in figure below, what will be the expression for output Y ? Indentify the basic gates & universal gates used in ckt.



(b) Draw and explain SISO with truth table and timing diagram.

(c) Reduce the following expression using K-map & Implement it using NAND gates

$Y = \pi M\ (1, 3, 5, 7, 8, 10, 14)$

P.T.O.

(d) Draw & explain block diagram of BCD to seven segment decoder / driver using IC 7447 with it's truth table.

(e) Draw D flip-flop using

(i) SR flip-flop

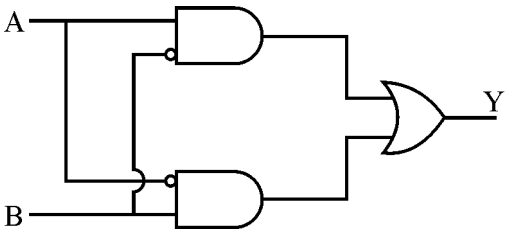
(ii) Jk flip-flop

(f) Convert $(6AC)_{16} = (?)_{10} = (?)_2$

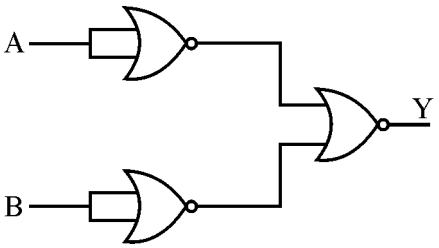
6. Attempt any TWO of the following : **16**

(a) Find the boolean expression for logic circuit given below.

(i)



(ii)



(b) Convert following expression into standard SOP form.

(i) $\overline{A} + B\overline{C}\overline{D}$

(ii) $A\overline{B}C + B\overline{D}$

(c) Draw the circuit diagram of 3 bit R-2R ladder DAC. Obtain it's output voltage expression.
