

17475

21415

3 Hours / 100 Marks

Seat No.

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

(2) Answer each next main Question on a new page.

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

(4) Use of Non-Programmable Electronic Pocket Calculator is permissible.

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

Marks

1. [A] Attempt any SIX :

12

(a) State two advantages and disadvantages of digital system.

(b) Explain positive logic with respect to digital system.

(c) State any four Boolean laws.

(d) Draw the block diagram of half adder.

(e) Enlist any four applications of flip-flop.

(f) Name the following ICs.

(i) IC 74147

(ii) IC 74148

(g) Compare half adder and full adder. (Two points)

(h) Define the following respect to DAC.

(i) Resolution

(ii) Setting Time

P.T.O.

[B] Attempt any TWO :**8**

- (a) Construct EX-OR and OR gate using NAND gates.
- (b) Draw the symbol of 3 input exclusive OR gate. Give its Truth table & write its Boolean equation.
- (c) Draw the symbol and Truth table for
 - (i) D flip-flop
 - (ii) R-S flip-flop

2. Attempt any FOUR :**16**

- (a) Perform the following Binary Arithmetic :
 - (i) $(11011 \cdot 11)_2 + (11011 \cdot 01)_2$
 - (ii) $(11101 \cdot 1101)_2 - (101 \cdot 001)_2$
- (b) State and prove De Morgan's Theorem.
- (c) Using Boolean laws, simplify

$$Y = A \cdot (\bar{A} \cdot C) \cdot (\bar{A} \cdot B + \bar{C})$$
- (d) Compare shift register and counter by four points.
- (e) Convert J-K flip flop to T flip flop. Give its Truth table.
- (f) Give two advantages and applications of A-D converter.

3. Attempt any FOUR :**16**

- (a) Convert the following :
 - (i) $(962)_{10} = (?)_2 = (?)_8$
 - (ii) $(624)_8 = (?)_2 = (?)_{16}$
- (b) State and explain positive and negative logic.
- (c) Minimize the Boolean Expression with K-map.

$$Y = \Sigma m(0, 1, 3, 4, 5, 6, 7, 13, 15)$$

Draw the logical circuit.

(d) Standardize the following Boolean equations :

(i) $Y = A \cdot B + \bar{B} \cdot C + A \cdot \bar{C}$

(ii) $Y = (A + C) \cdot (B + \bar{C}) \cdot (\bar{A} + B)$

(e) Compare synchronous and asynchronous counter by four points.

(f) Describe the working of dual slope ADC using its block diagram.

4. Attempt any FOUR :

16

(a) Give Boolean equation and Truth table for the logical circuit as shown in figure-4 (a).

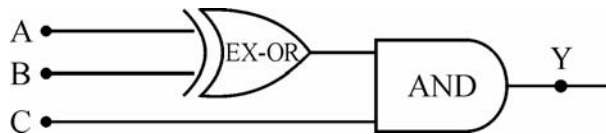


figure-4 (a)

(b) For a given K-map as shown in figure-4(b). Give the minimized logical expression and draw the logical circuit.

	$\bar{C}\bar{D}$	$\bar{C} \cdot D$	$C \cdot D$	$C\bar{D}$
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	1	1	1
AB	0	1	0	0
$A\bar{B}$	0	0	0	1

figure-4 (b)

(c) Draw the Block diagram of ALU IC 74181. Explain function of each pin.

(d) Describe the working of SIPO shift register with the help of diagram.

(e) Draw mod-11 asynchronous counter using T flip flop.

(f) Draw circuit diagram of weighted register method D-A converter and explain in brief.

5. Attempt any FOUR :**16**

- (a) Enlist the names & IC nos. for (i) Basic Gates and (ii) Universal Gates.
- (b) Simplify following equation using K-map.

$$F = B \cdot C + \bar{A} \cdot \bar{B} \cdot C + A \cdot B \cdot \bar{C}$$

and draw simplified circuit diagram. Using NAND gates.

- (c) Design 4 : 1 MUX using logic gates. Write its Truth Table.
- (d) Draw the logical diagram of IC 7495. Universal shift register. State its applications.
- (e) List and describe any four specifications of D-A converter.
- (f) Draw the neat sketch of master Slave J-K flip flop. Write its Truth Table.

6. Attempt any TWO :**16**

- (a) (i) Compare TTL and CMOS families (four points).
 - (ii) Perform following operations using 2's complement method.
 - (1) $(83)_{10} - (67)_{10}$
 - (2) $(53)_{10} - (97)_{10}$
 - (b) (i) State applications of MUX.
 - (ii) Design 1 : 16 De-multiplexer using 1 : 4 DMUX.
 - (c) (i) Define modulus of counter. Determine number of flip-flops required for MOD-6 & MOD-24 counters.
 - (ii) Describe 'Race around' condition. How it can be overcome ?
Give the techniques to eliminate Race around condition.
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