

Instructions:

15162

3 Hours / 100 Marks	Seat No.				

(4) Figures to the **right** indicate **full** marks.

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

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

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

(6) Mobile Phone, Pager and any other Electronic Communication

(1) All questions are compulsory.

permissible.

devices are **not** permissible in Examination Hall. Marks 1. a) Attempt any six of the following: **12** i) List the applications of digital systems. 2 ii) Define the following terms. 2 1) Noise Immunity 2) Propogation Delay iii) Draw logical symbol and truth table of X-NOR gate. 2 iv) Which are the universal gates? Why they called it? 2 v) Convert $(268.75)_{10} = (?)_2$. 2 vi) Give the examples of associative and distributive law of boolean algebra. 2 vii) Name the IC for digital comparator and ALU. 2 2 viii) Define any two specifications of DAC. b) Attempt any two of the following: 8 i) Compare CMOS and TTL logic families on following parameters. 1) Propagation Delay 2) Fan-out 3) Speed-power Product 4) Noise Immunity ii) Implement X-NOR gate by using 1) NAND gate only 2) NOR gate only iii) Convert the following: 4 2) $(237)_8 = (?)_{10}$ 1) $(327.89)_{10} = (?)_{BCD}$ 3) $(1011001)_2 = (?)_8$ 4) $(249)_{10} = (?)_2$



		Marks
2.	2. Attempt any four of the following:	16
	a) State and prove De-Morgan's Theorems.	4
	b) For the logic expression given below	4
	$F = \overline{X} \cdot Y + X \cdot \overline{Y}$	
	1) Obtain the truth table.	
	2) Name the operation performed from truth table.	
	3) Realize this operation using AND, OR, NOT gates.	
	4) Realize this operation using only NAND gates.	
	c) Perform the following substraction using 2's complement method. 1) $(01000)_2 - (01001)_2$ 2) $(01100)_2 - (00011)_2$	4
	d) Minimize the following expression using K-map.	4
	F(A, B, C, D) = π M (1, 4, 6, 9, 10, 11, 14, 15)	•
	e) Design a full adder using half adder.	4
	f) Draw the block diagram of ALU IC 74181 and explain the function of all pins.	4
	1) Draw the block diagram of ALO IC 74181 and explain the function of an pins.	7
3.	3. Attempt any four of the following:	16
	a) Prove the following using the algebraic theorems	4
	$1) A + \overline{A}B + A\overline{B} = A + B$	
	2) $AB + \overline{A}B + \overline{A}\overline{B} = \overline{A} + B$	
	b) Obtain an 1:8 demultiplexer using 1:4 demultiplexer.	4
	c) Minimize the following function using K-map.	4
	$F = \sum m(0, 1, 2, 3, 11, 12, 14, 15)$	
	d) Convert $F(A, B, C) = \sum m(1, 4, 5, 6, 7)$ in standard POS form.	4
	e) Explain the functions of 'preset' and 'clear' inputs in flip-flops.	4
	f) Explain 3-bit synchronous counter with truth table and timing diagram.	4
4.	4. Attempt any four of the following:	16
	a) Distinguish between synchronous and asynchronous counter.	4
	b) Compare weighted resistor DAC and R-2R DAC.	4
	c) Draw neat circuit diagram of clocked JK flip-flop using NAND gates. Give its trut explain race around condition.	h table and 4



Marks

4

4

4

16

4

4

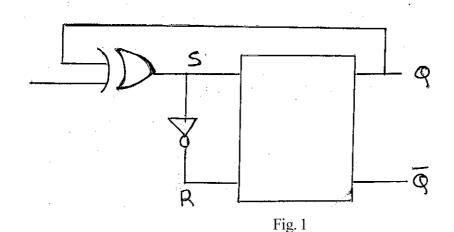
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4

d) prepare the truth table for following circuit and from the truth table identify the flip flop.



- e) Classify memories. Give the function of each type.
- f) Draw neat block diagram of Ramp ADC and explain its working.
- 5. Attempt any four of the following:
 - a) Perform the following using 9's complement.
 - 1) $(52)_{10} (89)_{10}$

- $2) (83)_{10} (21)_{10}$
- b) State different applications of flip flops.
- c) Find the Boolean expression for logic circuit given below and reduce it using Boolean algebra.

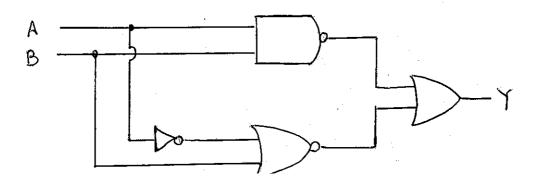


Fig. 2

- d) Draw and explain SISO with truth table and timing diagram.
- e) Draw the block diagram of BCD to seven segment decoder/driver using IC 7447 with its truth table.
- f) What is modulus of counter? Design a mod-3 ripple counter using a 2-bit ripple counter.

6. Attempt any two of the following: a) i) Define and draw the logical symbol of a demultiplexer. ii) Realize the logic function of the truth table given below using a multiplexer. 6

A	В	С	Y
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

b) i) Draw the symbol and truth table of T flip flop for Negative Edge Triggered.	2
ii) List different types of shift registers.	2
iii) Compare counters and shift registers.	4
c) i) With suitable diagram describe successive approximation ADC.	4
ii) List any four specifications of ADC.	4