

17320

21718

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) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) 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**
- (i) Convert (AC)H into binary and octal.
 - (ii) Draw symbol, Truth table and logical equation of Ex-OR gate.
 - (iii) Draw logic diagram of half adder and write its logical equation.
 - (iv) Draw symbol of positive edge triggered and negative.
 - (v) Specify the function of –
 - 1) IC 74245
 - 2) IC 74151
 - (vi) What is Flash memory?
 - (vii) Write applications of DAC and ADC.
 - (viii) List advantages of TTL logic family.

P.T.O.

b) Attempt any TWO of the following:

8

(i) Perform binary subtraction using 2's complement method.

$$(12)_{10} - (08)_{10}$$

(ii) Convert following expression into canonical SOP form

$$Y = A + BC + ABC$$

(iii) Draw excitation table for RS Flip-flop and JK flip-flop.

2. Attempt any FOUR of the following:

16

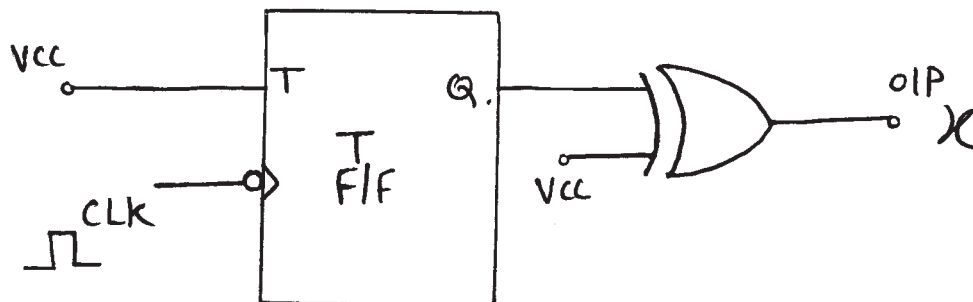
a) Compare TTL, ECL and CMOS logic family on following points:

- (i) Basic gates
- (ii) Component used
- (iii) Propagation delay
- (iv) Power dissipation

b) Design half subtractor using truth table and k-map.

c) Draw 4 bit left shift SISO register, truth table and waveforms for data 1011.

d) Study the following circuit and draw waveforms for Q and x. consider last value of Q = 1.



last value of Q = 1.

Fig. No. 1

- e) Differentiate between weighted resistor method DAC and R-2R ladder DAC. (any four points)
- f) Find out Gray code and excess-3 code of given numbers.
- (i) $(28)_{10}$
- (ii) $(64)_{10}$

3. Attempt any FOUR of the following: 16

- a) Minimize the following expression using k-map and realize it using basic logic gates.

$$Y = \sum m (1, 3, 4, 5, 6, 7)$$

- b) What is race around condition? How it can be avoided?
- c) Draw and explain the operation of 2 input totem pole TTL NAND gate with circuit diagram.
- d) (i) Perform BCD addition.
- $$(983)_{10} + (274)_{10}$$
- (ii) State the rules of BCD additions
- e) Draw and explain working of single slope ADC.
- f) Differentiate between
- (i) Static RAM and dynamic RAM
- (ii) Volatile and Non-Volatile memory

4. Attempt any FOUR of the following: 16

- a) (i) Add binary numbers.
- $$(10110 \cdot 110)_2 + (1001 \cdot 1)_2$$
- (ii) Multiply
- $$(1110)_2 \times (101)_2$$
- b) Realize the following expression using only NOR gate.

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

- c) Draw and explain working of single digit BCD adder using IC 7483.
- d) Design a 3 bit synchronous up counter and draw it.
- e) Draw single digit memory cell using NAND gates and explain working with truth table.
- f) Identify function of IC 7481 and 2716 and draw its pin diagram.

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

16

- a) Compare single slope ADC and dual slope ADC (any four points).
- b) How are memories classified ? Explain any two types of memories.
- c) Why NAND and NOR gates are called as universal gates. Derive basic gates using NOR gates only.
- d) Write a truth table for given circuit if A B changes from 00 to 11.

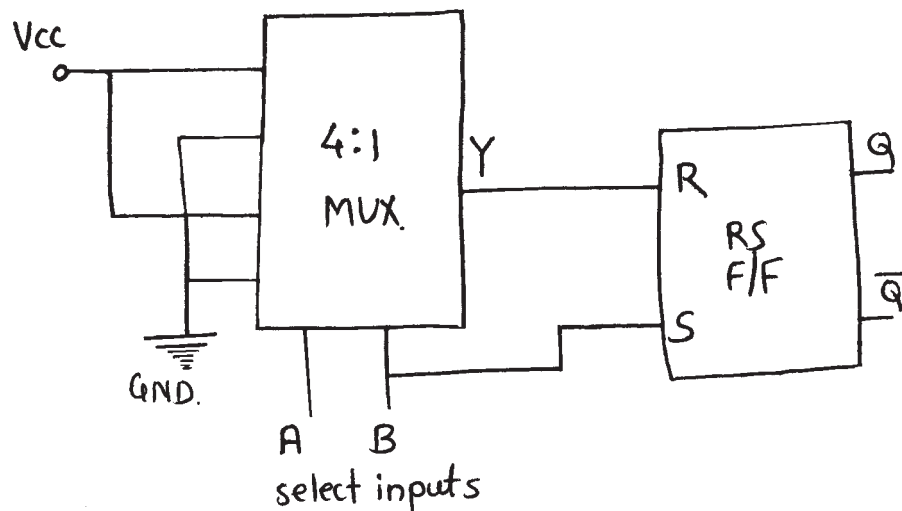


Fig. No. 2

- e) Draw binary to gray code converter and write its truth table.
- f) Draw 4 - bit twisted ring counter and explain working with truth table and waveforms.

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

- a) Draw the pinout configuration for
 - (i) IC 7402
 - (ii) IC 7404
 - b) Implement 1:16 Demux using 1:4 Demux write a truth table.
 - c) Draw pin diagram of IC PCF 8591 and list four features.
 - d) Design and draw MOD-6 counter using IC 7490.
 - e) Draw block diagram of ALU 74181 and explain.
 - f) Calculate output voltage for 4 bit binary weighted resistor DAC for binary inputs and $V_{\text{ref}} = 5\text{V}$.
 - (i) 1010
 - (ii) 1100
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