

# 17320

16172

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) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (7) Use of Steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

1. Attempt any TEN of the following: 20
- a) Convert the following hexadecimal number to decimal number
    - (i)  $(EF)_{16}$
    - (ii)  $(DAD)_{16}$
  - b) Convert the following decimal number to octal.
    - (i)  $(28)_{10}$
    - (ii)  $(62)_{10}$

P.T.O.

- c) Draw the symbol of EX-OR and EX-NOR gate along with its logical equation
- d) Draw symbol of AND gate and write its truth table.
- e) Draw the symbol of D-FlipFlop and T-FlipFlop.
- f) Define Bidirectional Shift Register and Universal Shift Register.
- g) State different triggering methods in digital circuits.
- h) State DeMorgan's theorems.
- i) Convert the following:
  - (i)  $(111011)_2 = ( ? )$  gray code
  - (ii)  $(46)_{10} = ( ? )$  excess-3 code
- j) What is Modulus of counter? How many FlipFlops are required for MOD-11 counter.
- k) What is Flash Memory?
- l) Define Resduction and Linearity of DAC.
- m) Implement given logical equation using gates  $Y = AB + C$
- n) Define Accuracy and settling time w.r.t. to DAC.

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

**16**

- a) Perform the following:  
 $(11011)_2 \times (11011)_2$
- b) State the rules for BCD Addition explain with example.
- c) Draw and explain the working CMOS inverter with circuit diagram.
- d) Design Half adder using K-map and implement using gates.

e) Realize

$$F_1 = \Sigma m (0, 2, 4, 6)$$

$$F_2 = \Sigma m (1, 3, 5)$$

using Demultiplexer.

f) Draw and explain S.R. and FlipFlop using NAND gate along with truth table.

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

**16**

a) Draw and explain working of R-2R DAC.

b) State different types of ROM and explain any one.

c) Draw circuit diagram of TTL NAND gate and explain its working.

d) Subtract using 2's complement method

(i)  $(1110)_2 - (1001)_2$

(ii)  $(1000)_2 - (1001)_2$

e) Draw Master Slave JF FlipFlop and write its truth table.

f) Design MOD-6 Counter using IC 7490 and write its truth table.

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

**16**

a) Describe working of SISO shift Register with proper circuit diagram.

b) Compare combinational and sequential circuit. (Four points)

c) Compare :

(i) Volatile with Non-Volatile memory.

(ii) SRAM with DRAM memory.

d) Explain working of single slope ADC with diagram.

- e) Identify the given circuit and explain its working.  
(Refer Figure No.1)

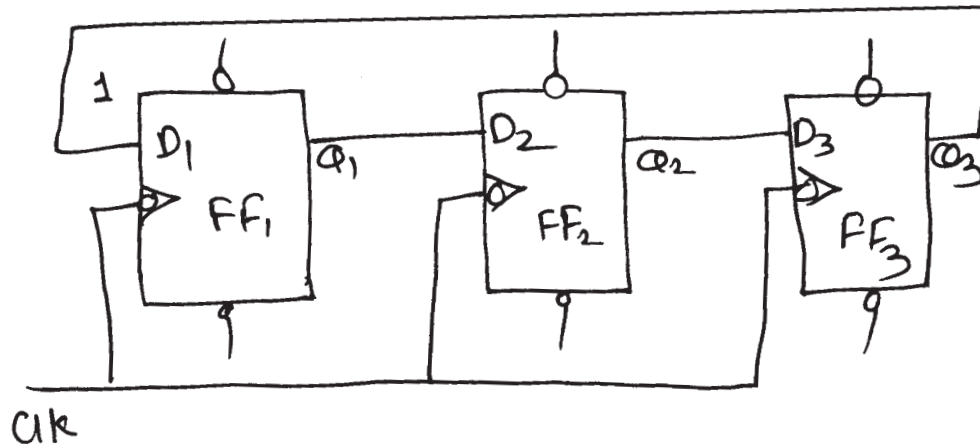


Fig. No. 1

- f) Draw and explain working of 4-bit Weighted Register DAC.  
circuit.

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

16

- a) Compare TTL logic family with CMOS w.r.t. to
- (i) Propagation delay
  - (ii) Power dissipation
  - (iii) Fan-out
  - (iv) Basic gate
- b) Prove :
- (i)  $A + AB = A$
  - (ii)  $\overline{\overline{A} + \overline{B} + \overline{C}} = ABC$
- c) Classify memories and Identify the IC
- (i) IC 2716
  - (ii) IC 7481
- d) Design and draw 16:1 MUX using 8:1 MUX (Multiplex).

- e) What is priority encoder? How is Demultiplex used as Decoder?  
 f) Draw block diagram of successive approximation type ADC and write its advantages.

6. Attempt any FOUR of the following:

16

- a) Compare weighted resistor and R-2R methods of ADC.  
 b) Write std SOP equation of given logical equation  
 (i)  $y = AB + BC$   
 (ii)  $y = \overline{A}BC + B$   
 c) Minimize  $y = \Sigma m(0, 5, 2, 8, 7, 10, 15, 13)$  using k-map.  
 d) Write Advantages of MUX and DEMUX state their applications.  
 e) Identify the given circuit and write its truth table -  
 Diagram below (Refer Figure No.2)

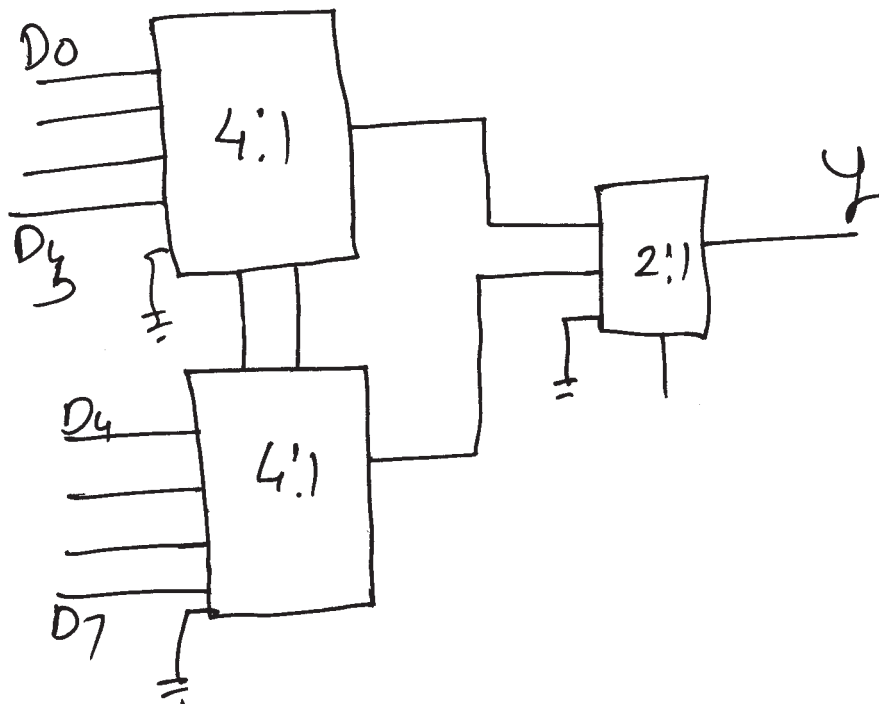


Fig. No. 2

- f) (i) Draw circuit diagram of MOD-10 counter using T-FF.  
 (ii) Identify the function of  
 1) IC - 0800  
 2) IC - 0809