

DAY - 18

SEAT NUMBER

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2022

III

25

1030

V - 167

(E)

ELECTRONICS
PAPER - II (C-2)

Time : 3 Hours

4 Pages

Max. Marks : 50

- Instructions :**
- (1) All questions are compulsory.
 - (2) Draw neat labelled diagrams wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Use of log tables is allowed.

1. (A) Select correct alternatives from the following sub-questions and rewrite the complete sentences.
- (a) The 2's complement of binary number 1000 is _____
- (i) 0111
 - (ii) 1010
 - (iii) 1001
 - (iv) 1000
- (b) _____ select inputs are required for construction of 1 : 32 Demultiplexer
- (i) 3
 - (ii) 4
 - (iii) 5
 - (iv) 6
- (c) In JK-Flip-flop, if $J=K=1$, then output state is _____.
- (i) race
 - (ii) toggles
 - (iii) set
 - (iv) reset

- (d) For the construction of 4-bit simultaneous A/D converter _____ comparators are required.

1

(i) 3

(ii) 7

(iii) 15

(iv) 31

(B) Attempt **any two** of the following :

(a) Compare between Inclusive OR and Exclusive OR Gates. 3

(b) Define Multiplexer. Explain the working of 4 : 1 MUX using rotary switch. 3

(c) Explain the working of 3-bit asynchronous counter using logic diagram. Write its truth table. 3

2. (A) Attempt **any two** of the following :

(a) Define following binary terms 3

(i) Bit

(ii) Nibble

(iii) Byte

(b) Explain half adder using logic diagram and truth table. 3

(c) Explain J-K Flip-flop with the help of logic diagram. 3

(B) Attempt **any one** of the following

(a) Implement the following multioutput combinational logic circuit using 4-line to 16-line decoder 4

$$F_1 = \sum m(3, 5, 6, 11)$$

$$F_2 = \sum m(2, 6, 10, 13)$$

(b) Write a note on the following output devices

- (i) COM
- (ii) Impact Printers
- (iii) Non-impact Printers
- (iv) Plotters

3. (A) Attempt **any two** of the following

- (a) Explain 8-bit controlled inverter using EX-OR gate 3
- (b) Write the classification of logic families. 3
- (c) Explain T-flip-flop with logic diagram and truth table. Draw Waveforms. <https://www.maharashtrastudy.com> 3

(B) Attempt **any one** of the following

- (a) Explain double-dabble method using suitable examples. 4
- (b) Draw block diagram of Counter Type A/D Converter. Explain its working. Write its advantages and disadvantages. 4

4. (A) Attempt **any two** of the following

- (a) Prove the following Boolean equation using Boolean algebra 3

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

- (b) Explain the circuit of TTL NAND gate. Write its truth table. 3
- (c) Write the concept of 1-bit memory cell using NAND gates. 3

(B) Attempt **any one** of the following

- (a) Implement the following logic equation using Demultiplex and gates. 4

$$Y_1 = A \overline{B} C \overline{D} + \overline{A} \overline{B} C D + \overline{A} B \overline{C} D$$

$$Y_2 = \overline{A} B \overline{C} D + A \overline{B} \overline{C} D + A \overline{B} \overline{C} \overline{D}$$

- (b) Draw block diagram of Digital Computer. Explain the function of each block. 4

5. (A) Attempt **any two** of the following .
- (a) Draw the circuit diagram of TTL Inverter Explain its working with truth table. 3
 - (b) Explain priority encoder using IC 74147 and write its truth table. 3
 - (c) How many Flip-flops are required to construct each of the following counters 3
 - (i) Mod - 10
 - (ii) Mod - 22
 - (iii) Mod - 37
- (B) Attempt **any one** of the following 4
- (a) Convert the following
 - (i) $(110\ 11\ 01)_2 = (?)_{10} = (?)_{16}$
 - (ii) $(25\ 7)_{10} = (?)_2 = (?)_{16}$
 - (b) Explain 4-bit weighted register type D/A converter using circuit diagram Give any two disadvantages. 4

OR

5. (A) Attempt **any two** of the following
- (a) Write the rules of binary addition and subtraction. Solve addition and subtraction. Solve the following using binary rules : 3
 - (i)
$$\begin{array}{r} 1011 \\ + 0111 \\ \hline \end{array}$$
 - (ii)
$$\begin{array}{r} 1100 \\ - 0011 \\ \hline \end{array}$$
 - (b) Draw logic diagram of EX-OR gate using NAND gates. Write truth table of EX-OR gate 3
 - (c) Explain R-2R ladder type D/A converter using circuit diagram. Write the formula to get output voltage. 3
- (B) Attempt **any one** of the following
- (a) Draw BCD to Decimal decoder using basic gates. Explain the working with truth table. 4
 - (b) Explain Decade counter using logic diagram and timing diagram. Also write its truth table. 4