

DAY - **18**

SEAT NUMBER

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2023

III

16

1100

V - 587

(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 alternative from the following sub-questions and rewrite the complete sentences.

(a) If you take 2's complement twice, you will get _____ Binary number. 1

- (i) 1's complement
- (ii) Original
- (iii) Positive
- (iv) **Negative**

(b) In _____ Gate if A and B are inputs. 1

A = 1 and B = C, then output $Y = \bar{C}$

- (i) NOR
- (ii) AND
- (iii) EX-OR
- (iv) OR

(c) Analog to Digital converter which does not use DAC is _____ type ADC. 1

- (i) Simultaneous
- (ii) Counter
- (iii) Successive approximation
- (iv) **Resistive**

(d) Data bus in digital computer is always _____.

1

- (i) unidirectional
- (ii) bidirectional
- (iii) in opposite direction
- (iv) None of these

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

(a) Using Boolean algebra verify :

3

$$\overline{AB + BC + CA} = \overline{A} \cdot \overline{B} + \overline{B} \cdot \overline{C} + \overline{C} \cdot \overline{A}$$

(b) Which multiplexer will be required to implement the following expression ?

3

$f(A, B, C) = \sum m(1, 2, 5, 7)$. Draw necessary diagram.

(c) Explain T-flip-flop using logic diagram. Write its truth table.

3

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

(a) (i) $(12)_{10} = (?)_2$

(ii) $(17)_{10} = (?)_{BCD}$

(iii) $(A96)_{16} = (?)_{10}$

3

(b) Draw logic diagram of 1 : 4 Demultiplexer, explain its working and write truth table.

3

(c) Explain Databus, Address bus and Control bus in Computer.

3

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

(a) Draw a logic diagram of 3-bit ripple counter. Explain its working, write its truth table and draw output waveforms.

4

(b) List output devices in digital computer, explain any two.

4

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

(a) Explain how to convert Hexa decimal number into Decimal number with suitable example.

3

(b) Explain preset and clear facilities in Flip-flop.

3

(c) Explain the need of A/D and D/A Converter.

3

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

(a) State and prove Demorgan's theorems. Draw logic diagrams and write truth tables. 4

(b) Implement the following equations using suitable decoder : 4

$$(i) Y_1 = ABC\bar{D} + AB\bar{C}D + A\bar{B}C\bar{D} + A\bar{B}\bar{C}D$$

$$(ii) Y_2 = \bar{A}BCD + \bar{A}\bar{B}CD + A\bar{B}\bar{C}D + \bar{A}\bar{B}\bar{C}D \quad 4$$

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

(a) Explain binary subtraction by 1's complement method with suitable examples. 3

(b) Explain full adder with logic diagram using gates. Write equations for carry and sum. Write truth table. 3

(c) Compare Multiplexer with Demultiplexer. 3

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

(a) Draw circuit diagram of CMOS NAND gate and explain its working. 4

(b) Compare Synchronous with Asynchronous counter. (Any four points) 4

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

(a) Explain TSL inverter with the help of circuit diagram. 3

(b) Explain the working of BCD to 7-segment decoder/driver. 3

(c) What is Edge Triggering ? Explain positive and negative edge triggering in Flip-flop. <https://www.maharashtrastudy.com> 3

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

(a) Draw logic diagram of 4-bit binary adder/subtractor and explain its working. 4

(b) Explain with circuit diagram, the working of R-2R ladder type digital to analog converter. 4

OR

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

(a) Draw and explain open-collector TTL NAND gate circuit. 3

(b) Explain the concept of one bit memory cell. 3

(c) For a 4-bit resistive divider ($0 = 0$ volt and $1 = +10$ volt). Find-

(i) Full scale output voltage

(ii) The output voltage due to change in LSB and

(iii) Analog output voltage for digital input 1010. 3

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

(a) What are the various codes used in digital system ? Explain any two. 4

(b) What is Encoder ? Explain the working of Decimal to BCD Encoder with logic diagram and write its truth table. 4

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