16452

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – B.Sc.(ANCS)-Hons-2023/B.Sc.(ANCS)-Hons-2024/B.Sc.(ANCS)-Hons-2025
Course Name – Fundamentals of Electronics
Course Code - BNC10001
(Semester I)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select the color code typically used to indicate the resistance value of a resistor?

a) Binary code
b) Alphabet code
c) Color bands
d) QR code

(ii) In an AC circuit, how does the reactance of a capacitor change with frequency?

a) It increases with frequency.
b) It decreases with frequency
c) It remains constant regardless of frequency.
d) It depends on the voltage across the capacitor.

(iii) Choose, Which of the following is a polarized capacitor, meaning it has a positive and negative terminal?

a) Ceramic capacitor
b) Film capacitor
c) Electrolytic capacitor
d) Variable capacitor

(iv) Identify from the following, What happens when you connect capacitors in series in an electrical circuit?

a) The total capacitance increases.
b) The total capacitance decreases.
c) The total capacitance remains the same.
d) The capacitors become short-circuited.

(v) Identify the application of a CC configured transistor is_______________.

a) voltage multiplier
b) Level shifter
c) rectification
d) Impedance matching

(vi) In a combinational circuit, the output at any time depends only on the _______ at that time.

a) Voltage
b) Intermediate values
c) Input values
d) Clock pulses

(vii) Choose, which of the following is method to model a diode's forward characteristics?

a) Iteration method
b) Graphical method
c) Constant-voltage drop model
d) All of these

(viii) Describe the inputs of a NAND gate are connected together. The resulting circuit is

a) OR gate b) AND gate
c) NOT gate d) None of these

(ix) NAND gates are preferred over others because thee

a) Have lower fabrication area b) Can be used to make any gate
c) Consume least electronic power d) Provide maximum density in cheak

(x) Let the input of a subtractor is A and B; then calculate the output if A = B.

a) 0 b) 1
c) A d) B

(xi) Master slave configuration is selected for using in flip-flops to

a) increase its clocking rate b) reduce power dissipation
c) eliminate race-round condition d) improve its reliability

(xii) Flip-flops can be used to design

a) latches b) bounce –elimination switches
c) registers d) all of the above

(xiii) To design the 4:1 MUX how many minimum basic gates are required

a) 1 NOT gates, 3 AND gates b) 2 NOT gates, 3 AND gates
c) 1 NOT gates, 4 AND gates d) 2 NOT gates, 4 AND gates

(xiv) When an inventer is placed between the inputs of an S-R flip-flop for creating a new flip-flop which is known as

a) J-K flip-flop b) master-slave flip-flop
c) T flip-flop d) D flip-flop

(xv) Convert a 16:1 MUX using 4:1 MUX only. How many 4:1 MUX is required

a) 3 b) 4
c) 5 d) 6

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Describe AND, OR and NOT gates with its Boolean expression, truth table and logical symbol. (3)

3. Construct EXOR gate using basic gates only. (3)

4. Apply Boolean algebra to simplify the expression: $A \cdot \left(\overline{A} + B\right)$ (3)

5. Distinguish between p-type and n-type semiconductors. (3)

6. Discriminates between combinational circuit and sequential circuit. (3)

OR

Discriminate between latch & flip flop. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe 1'S complement and 2'S complement with an example. (5)

8. Explain three terminals of a transistor. (5)

9. Describe NOR gate and demonstrate the action of NOR gate as Universal gate. (5)

10. Differentiate between Sequential and Combinational circuits. (5)

11. Compare Zener breakdown and Avalanche breakdown. (5)

12. Explain half subtractor with its block diagram, truth table and circuit diagram by using logic gates. (5)

OR

Illustrate D flip-flop with its truth table, circuit diagram and working principle. (5)

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