



BRAINWARE UNIVERSITY

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

Library
Brainware University
308, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

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) Identify the power rating of a resistor from the following?
- a) The ability to handle a specific amount of current
b) The ability to handle a specific amount of voltage
c) The ability to dissipate heat without damage
d) The ability to change resistance values
- (ii) Choose the correct alternative of zener diode in case of voltage regulation
- a) Operational Amplifier
b) MOSFET
c) Integrated Circuits
d) None of these
- (iii) Identify the primary function of a resistor in an electronic circuit?
- a) To amplify signals
b) To store electrical energy
c) To provide resistance to the flow of current
d) To regulate voltage levels
- (iv) Write the left hand section of a junction transistor called?
- a) base
b) Collector
c) depletion region
d) Emitter
- (v) Name the relationship between resistance (R), voltage (V), and current (I) in a resistor according to Ohm's Law?
- a) $R = IV$
b) $V = IR$
c) $I = RV$
d) $V = RI$
- (vi) Identify, which of the following is true in construction of a transistor?
- a) the collector dissipates less power
b) The emitter supplies minority carriers
c) the collector is made physically larger than the emitter region
d) The collector collects minority charge carriers
- (vii) Identify, which of the following are true for a PNP transistor?
- a) the emitter current is less than the collector current
b) The collector current is less than the emitter current
c) the electrons are majority charge carriers
d) The holes are the minority charge carriers

- (viii) Identify, when does the transistor act like an open switch?
 a) cut off region
 b) Active region
 c) saturated region
 d) None of these
- (ix) Select, the emitter current consists of _____.
 a) carriers passing from collector to emitter
 b) Carriers passing from base to collector
 c) carriers passing from emitter to base
 d) None of these
- (x) Identify, when used in circuit, the Zener diode is always
 a) Forward-biased
 b) Connected in series
 c) Troubled by overheating
 d) Reverse-biased
- (xi) The voltage gain of an ideal voltage follower is
 a) <1
 b) infinity
 c) 1
 d) 0
- (xii) In a PNP transistor operating in active region, the main stream of current is _____.
 a) drift of holes
 b) Drift of electrons
 c) diffusion of holes
 d) Diffusion of electrons
- (xiii) Examine the problem: Convert $(0.345)_{10}$ into an octal number
 a) $(0.16050)_8$
 b) $(0.26050)_8$
 c) $(0.19450)_8$
 d) $(0.24040)_8$
- (xiv) Predict 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
- (xv) Write the basic function of a capacitor in an electrical circuit?
 a) To store and release electrical energy
 b) To amplify electrical signals
 c) To regulate voltage
 d) To generate electrical current

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Write the applications of BJT? (3)
3. Describe NAND gate with its Boolean expression, truth table and logical symbol. Show how it can be realized by using basic gates. (3)
4. Construct Ex-OR gate using NAND gates only (3)
5. Describe AND, OR and NOT gates with its Boolean expression, truth table and logical symbol. (3)
6. Write the purpose of a semiconductor diode? (3)

OR

- Write the purpose of a diode in an electrical circuit? (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain SOP and POS. (5)

8. Illustrate D flip-flop with its truth table, circuit diagram and working principle (5)
9. Explain the construction of transistor with diagram. (5)
10. Comparison between FET and BJT (5)
11. Deduce the relation between β and α . (5)
12. Write a short note about Intrinsic Semiconductor with proper diagram (5)
- OR**
12. Write a short note about Extrinsic Semiconductor with proper diagram (5)

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