BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(CSE)-AIML-2022/B.Tech.(CSE)-AIML-2023
Course Name – Basic Electrical and Electronics Engineering
Course Code - ESCM101
(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) Identify the particular DC motor used for having high starting torque.
a) DC shunt motor b) Seperately excitd DC motor
c) DC series motor d) All of the above

(ii) Identify that, in an NPN transistor, the arrow is pointed towards
a) the collector b) the base
c) depends on the configuration d) the emitter

(iii) In the operation of an NPN transistor, indicate the region that electrons can cross:
a) emitter region b) the region where there is high depletion
c) the region where there is low depletion d) P type base region

(iv) Identify the type of amplifiers exhibit the current gain approximately equal to unity without any current amplification.
a) CE b) CC
c) CB d) None of the above

(v) Identify the junction that is forward biased when transistor is used as an amplifier
a) Emitter-Base b) Emitter-Collector
c) Collector-Base d) No junction is forward biased

(vi) Identify energy storing elements from the following
a) Resistor b) Inductor
c) Capacitor d) Both 2 and 3

(vii) Identify energy dissipating element from the following
a) Resistor b) Inductor
c) Capacitor d) Both 2 and 3

(viii) Identify the nonlinear circuit element
a) Resistor b) Diode
c) Capacitor d) Both 1 and 3

(ix) Select the value of transformation ratio of step up transformer

a) zero
b) less than one
c) greater than one
d) equal to one

(x) Interpret, the product of mobility of the charge carriers and applied Electric field intensity is known as:

a) Drain velocity
b) Drift velocity
c) Push velocity
d) Pull velocity

(xi) Select, the cut-in voltage of a Ge diode is about

a) 0.3V
b) 0.6V
c) 0.2mV
d) 0.6mV

(xii) Select the band gap of a semiconductor lies in the range

a) 5 to 10 eV
b) 0.2 to 2.5 eV
c) 0.01 to 0.1eV
d) None of these

(xiii) Indicate the Fermi level of an n-type semiconductor lies

a) near the conduction band-edge
b) near the valence band edge
c) at the middle of the forbidden gap
d) near the valence band-edge

(xiv) Choose that at 0 K an intrinsic semiconductor behaves as a/an

a) Conductor
b) Insulator
c) Semiconductor
d) Any of the above

(xv) Identify the correct option that the Transformer is a _____electrical device

a) Static
b) Rotating
c) Oscillating
d) None of the above

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the working principle of three phase induction motor (3)
3. Define independent and dependent sources (3)
4. Establish the relationship between conductivity and current density for a semiconductor. (3)
5. Distinguish between conductors, semiconductors and insulators using energy band diagrams (3)
6. Indicate the limitations in the operation conditions of a p-n junction. (3)

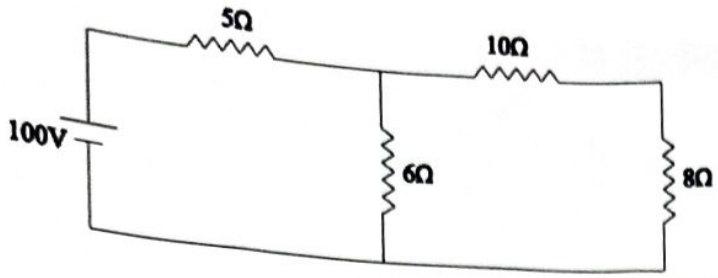
OR

Explain Avalanche Breakdown and Zener Breakdown (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Calculate the current through 8 ohm resistance using thevenin's theorem. (5)



8. Explain the working Principle of Solar Cell (5)

9. An n-p-n transistor with alpha=0.98 is operated in the CB configuration. If the emitter current is 3 mA and the reverse saturation current is Ico=10 microA, what are the base current and the collector current? (5)

10. Comparison between CB, CE and CC configuration of Transistor. (5)

11. Explain intrinsic and extrinsic semiconductors and describe the crystal structure for both the cases. (5)

12. Explain the Ferromagnetism, Paramagnetism & Diamagnetism of materials. (5)

OR

Explain Core type & Shell type transformer (5)

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