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BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(CSE)-2024/B.Tech.(CSE)-AIR-2024/B.Tech.(ME)-2024
Course Name – Basic Electrical and Electronics Engineering
Course Code - BES00002
(Semester II)

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) Indicate the correct option for the type of electrical device a Transformer is;
a) static b) rotating
c) oscillating d) None of these

(ii) Choose the unit of Resistivity from the following:
a) Ohm-meter b) Ohm
c) Farad d) Henry

(iii) Choose from the following the unit of magnetic field strength-
a) Weber b) Ampere
c) Tesla d) Henry

(iv) Select the principle behind electromagnetic induction-
a) Faraday's Law b) Coulomb's Law
c) Ohm's Law d) Kirchhoff's Law

(v) Choose the unilateral element from below mentioned option
a) Resistor b) Diode
c) Inductor d) Capacitor

(vi) Identify the value of efficiency of a circuit under maximum power transfer condition
a) 0.25 b) 0.5
c) 0.75 d) 0.8

(vii) Indicate, Which of the following expressions doesn't represent the correct formula for Drift current density.
a) $J = \sigma E$ b) $J = qn\mu E$

c) $J = \mu E$ d) None

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

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

(ix) Indicate the band gaps of silicon and germanium are

a) 0.67 eV and 1.1 eV b) 0.87 eV and 6.78 eV
c) 5.89 eV and 4.6 eV d) 0.54 eV and 0.7861 eV

(x) State the electric field between acceptor and donor ions in a PN junction with no external voltage.

a) Peak b) Barrier
c) Threshold d) Path

(xi) Enumerate the biasing conditions for the PN junction diode.

a) One b) Two
c) Three d) Four

(xii) State the ripple factor for a half-wave rectifier.

a) 2 b) 1.21
c) 0.482 d) 0.877

(xiii) State the transformer utilization factor of a bridge full-wave rectifier.

a) 0.623 b) 0.812
c) 0.692 d) 0.825

(xiv) State what the Peak Inverse Voltage (PIV) of a half-wave or full-wave rectifier always is.

a) Greater than the input voltage b) Smaller than the input voltage
c) Equal to the input voltage d) Greater than the input voltage for full wave rectifier and smaller for the half wave rectifier

(xv) Indicate the function of a zener diode.

a) half wave regulator b) half wave rectifier
c) voltage regulator d) amplifier

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain three terminals of a PNP and NPN transistor. (3)

3. Describe the active and passive elements in a circuit. (3)
4. Compute peak factor and form factor of a AC wave. state their values for a sinusoidal AC wave. (3)
5. Establish the relationship between mobility and current density for a semiconductor. (3)

6. Differentiate among Active region, Cut-off region and Saturation region at CB mode. (3)

OR

Deduce the relation between β and α. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Illustrate the Input and Output characteristics of CE configuration. (5)

8. Explain the working principle of JFET. (5)

9. Estimate the DC output power is maximum in a half-wave rectifier when the load resistance is equal to the forward resistance. (5)

10. Explain the effects of temperature on diode current. (5)

11. State Thevenin's theorem and Norton's theorem. (5)
12. For a semiconductor, the total current density is measured to be 1 A/cm^2. If the drift current density is found to be 0.6 A/cm^2, calculate the diffusion current density. (5)

OR

Explain that the drift current in a semiconductor depends on charge carrier mobility. (5)

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