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BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – Dip.CE-2024/Dip.CSE-2024/Dip.EE-2024/Dip.ME-2024/Dip.RA-
2024/Dip.CSE-2025/Dip.EE-2025/Dip.ME-2025

Course Name – Fundamentals of Electrical and Electronics Engineering

Course Code - DES00002

(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) Select the unit of magneto-motive force.

- a) Ampere Turn
- c) volt

- b) colomb
- d) ohm

(ii) Predict whose unit is kilowatt-hour (kWh).

- a) Current
- c) Energy

- b) Power
- d) Resistance

(iii) Indicate the charge carriers that contribute to diffusion current in an N-type semiconductor.

- a) Only electrons
- c) Both electrons and holes

- b) Only holes
- d) No diffusion occurs

(iv) Predict why the electrical conductivity of intrinsic semiconductors increases with temperature.

- a) The number of charge carriers increases
- c) The material undergoes a phase change

- b) The bandgap increases
- d) The atoms move closer together

(v) Indicate the conductivity of an intrinsic semiconductor when cooled to 0K.

- a) It will become zero
- c) It will remain the same

- b) It will increase
- d) It will become infinite

(vi) Indicate the factor that is directly proportional to the drift velocity of charge carriers in a semiconductor.

- a) Electric field
- c) Charge carrier concentration

- b) Temperature
- d) Lattice vibration

(vii) Identify what happens to the Fermi level in a semiconductor when heavily doped with donors.

- a) Moves toward the valence band
- c) Stays in the middle of the bandgap

- b) Moves toward the conduction band
- d) Moves outside the bandgap

- (viii) Select which of the following is the unit of magnetic flux density.
- a) Weber
b) Tesla
c) ohm
d) ampere
- (ix) Choose from the following that is not an expression power.
- a) $P=VI$
b) $P=I.I.R$
c) $P=V.V/R$
d) $P=I/R$
- (x) Determine, 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 collector current is less than the emitter current
d) the holes are the minority charge carriers
- (xi) Determine, which of the following is true.
- a) CC amplifier has a large current gain
b) CE amplifier has a large current gain
c) CB amplifier has low voltage gain
d) CC amplifier has low current gain
- (xii) Select the correct option.
- a) BJT is bipolar device
b) BJT is unipolar device
c) BJT is voltage controlled device
d) None of these
- (xiii) The applied input a.c. power to a half-wave rectifier is 100 watts. The d.c. output power obtained is 40 watts. Estimate the rectification efficiency.
- a) 20%
b) 40%
c) 60%
d) 100%
- (xiv) Indicate what causes the depletion region.
- a) doping
b) diffusion
c) barrier potential
d) ions
- (xv) Select, the cut-in voltage of a Ge diode is about
- a) 0.3V
b) 0.6V
c) 0.2mV
d) 0.6mV

Group-B

(Short Answer Type Questions)

$$3 \times 5 = 15$$

2. Compare avalanche breakdown and Zener breakdown. (3)
3. Illustrate the operation of transistor as an amplifier. (3)
4. Describe the effect of temperature on semiconductors. (3)
5. Explain the emf equation of a dc machine. (3)
6. Explain briefly about Eddy current loss. (3)

OR

Explain self and mutual induction. (3)

Group-C

(Long Answer Type Questions)

 $5 \times 6 = 30$

7. Describe Electric Power. (5)
8. Illustrate with a diagram, the no-load phasor diagram of the single phase transformer. (5)
9. Explain the working principle of center-tap Full wave rectifier with a neat diagram. (5)

10. Illustrate the working of NPN transistor. (5)
11. Calculate the peak current if the RMS value of current in an ac circuit is 25 A. (5)
12. A center tap full wave rectifier supplies a load of 1 K Ω . The A.C voltage across the secondary is 220 (R.M.S). If diode resistance is neglected, estimate the D.C voltage across the load and D.C load current. (5)

OR

Evaluate the base current of BJT in common base connection, current amplification factor is 0.9. If the emitter current is 1mA. (5)

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