17605

BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.CE-2024/Dip.CSE-2024/Dip.EE-2024/Dip.ME-2024/Dip.RA-2024
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 b) colomb
c) volt d) ohm

(ii) Select the maximum capacitance of a capacitor
a) 1 F b) 1 pf
c) >1F d) 1uf

(iii) Identify the unit of resistance is,
a) Mho b) Ohm
c) Farad d) Henry

(iv) Select: An electron moves from the valence band to the conduction band.
a) Proton b) Hole
c) Neutron d) Phonon

(v) Indicate the charge carriers that contribute to diffusion current in an N-type semiconductor.
a) Only electrons b) Only holes
c) Both electrons and holes d) No diffusion occurs

(vi) Indicate the conductivity of an intrinsic semiconductor when cooled to 0K.
a) It will become zero b) It will increase
c) It will remain the same d) It will become infinite

(vii) Identify that the Kirchhoff's voltage law deals with the conservation of
a) Mass b) Energy

c) Momentum d) Charge

(viii) Select which of the following is the unit of magnetic flux density.

a) Weber b) Tesla
c) ohm d) ampere

(ix) Choose out of the following, which one is not a source of electrical energy.

a) Solar cell b) Battery
c) Potentiometer d) Generator

(x) Select from the option whose unit is a kilowatt-hour (kWh).

a) Current b) Power
c) Energy d) Resistance

(xi) Select that the total emitter current

a) IE – IC b) IC + IE
c) IB + IC d) IB – IC

(xii) Label the right option: Ripple factor of a half wave rectifier is_____

a) 1.414 b) 1.21
c) 1.4 d) 0.48

(xiii) Two resistors, 4Ω and 6Ω, are connected in series. Select the total resistance;

a) 2.4 ohms b) 10 ohms
c) 24 ohms d) 1.5 ohms

(xiv) Indicate: the current through a 2Ω resistor is 3A, the voltage across the resistor is;

a) 1.5V b) 6V
c) 9V d) 12V

(xv) Indicate: The principle of operation of a transformer is based on;

a) Self-induction b) Mutual induction
c) Electromagnetic radiation d) The Hall effect

Group-B

(Short Answer Type Questions) 3 x 5=15

2. State and explain the Faraday's law of electromagnetic induction. (3)
3. Describe V-I characteristics of Zener diode. (3)

4. Name the main parts of a DC machine. (3)
5. State and explain Lenz's law. (3)
6. Mobilities of electrons and holes in a sample intrinsic germanium at room temperature are 0.36 m^2/V-s and 0.17 m^2/V-s respectively. Calculate germanium resistivity if the electron and hole densities are each equal to $2.5x10^{-19}$ m^3. (3)

OR

Calculate the conductivity of the pure silicon at room temperature when the concentration of carriers is $1.6x10^{10}$ per cm^3. Take μ_e=1500 cm^2/volt-sec and μ_h = 500 cm^2/volt-sec at room temperature. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. A 230 V, 50 Hz voltage is applied to a coil $L=5$ H and $R=2$ Ω in series with a capacitance C. Calculate the value of C have in order that the voltage across the coil be 400 V? (5)

8. Explain the working principle of a Light Emitting Diode (LED). (5)

9. Differentiate in between Half wave rectifier and Full wave rectifier. (5)

10. Explain the working principle of PN junction diode. (5)

11. Define MMF, magnetic field, permeability. (5)
12. Calculate the peak value current if the RMS value of current in an ac circuit is 10 A. (5)

OR

Calculate the peak current if the RMS value of current in an ac circuit is 25 A. (5)

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