BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(CSE)-AIML-2024/B.Tech.(CSE)-DS-2024/B.Tech.(BT)-2024/B.Tech.(CSE)-CYS-2024/B.Tech.(EE)-2024
Course Name – Basic Electrical and Electronics Engineering
Course Code - BES00002
(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 law on which the transformer works;
   a) Faraday's law of electromagnetic induction   b) Fleming's right-Hand Rule
   c) Fleming's left-hand rule   d) None of these

(ii) Choose the unilateral element from following
   a) Resistor   b) Capacitor
   c) Inductor   d) Diode

(iii) Choose the unit of Resistance from the following:
   a) Ohm   b) Siemens
   c) Ohm-meter   d) None of these

(iv) Identify the material with lots of free electrons from below.
   a) Conductors   b) Insulators
   c) Semiconductors   d) Filters

(v) Select the event that occurs as a current through the coil of an electromagnet is reversed
   a) direction of the magnetic field remains unchanged   b) direction of the magnetic field reverses
   c) magnetic field expands   d) magnetic field collapses

(vi) Choose the time period of a sine wave that goes through 10 cycles in 20 s;
   a) 20 micro sec   b) 4 micro sec
   c) 2 micro sec   d) 100 micro sec

(vii) Identify the correct option for an PN junction diode.
   a) Has low resistance in forward as well as reverse directions   b) Has high resistance in forward as well as reverse directions
   c) Conductors in the forward direction only   d) Conducts in the reverse direction only

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(viii) Identify the doping level associated with Zener breakdown in a Zener diode.

a) Lowest
b) Moderate
c) High
d) Low

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

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

(x) Indicate the results of testing a good diode with an ohmmeter.

a) high resistance when forward or reverse biased
b) low resistance when forward or reverse biased
c) high resistance when reverse biased and low resistance when forward biased
d) high resistance when forward biased and low resistance when reverse biased

(xi) Identify which of the following is kept fixed in a transformer;

a) Voltage
b) Current
c) Frequency
d) None of these

(xii) Select the purpose of the transformer core;

a) To provide low-reluctance path
b) To provide high reluctance path
c) To provide low capacitive path
d) To provide high capacitive path

(xiii) Interpret the situation if the secondary of a current transformer is open-circuited;

a) depends on other parameters
b) cool as there is no secondary current
c) hot because primary will carry heavy current
d) hot because of heavy iron losses

(xiv) The active power consumed by a circuit is 120 W, while the apparent power consumed is 200 W. Select the value of the power factor.

a) 0.8
b) 0.6
c) 0.5
d) 0.9

(xv) Determine the output impedance of a transistor is

a) high
b) zero
c) low
d) very low

Group-B
(Short Answer Type Questions)

$3 \times 5 = 15$

2. Explain three terminals of a transistor.

(3)

3. Explain the need for a starter in a DC motor.

(3)

4. Calculate the electrical conductivity of an intrinsic silicon semiconductor at 300 K. The mobility of electrons (μ_n) is 1350 cm²/V. s and the mobility of the holes (μ_p) is 450 cm²/V.s. The intrinsic carrier concentration (n_i) is 1.5×10^{10} cm^{-3}.

(3)

5. Compare a half-wave and a full-wave rectifier.

(3)

6.

$R_1 = 8\Omega$

48V

$R_2 = 16\Omega$

(3)
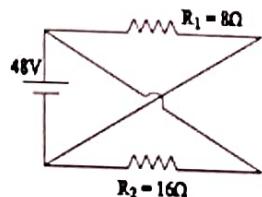
Calculate the current supplied by the battery in the given circuit.

OR

(3)
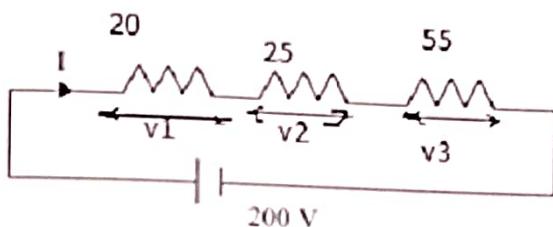
Calculate the current through each resistor.

Group-C
(Long Answer Type Questions)   5 x 6=30

7. Compare various types of filter circuits (L, C, LC, and π filter).   (5)

8. Compare in between BJT and FET.   (5)

9. Explain the Drift current and Diffusion current in a semiconductor device.   (5)

10. Explain the Armature control method in DC motors   (5)
11. Define node, junction, loop and mesh of a circuit.   (5)
12. A transistor is connected in common emitter (CE) configuration in which collector supply is (5)
    8 V and the voltage drop across resistance RC connected in the collector circuit is 0.5 V. The
    value of RC = 800 Ω. If α = 0.96, determine: (i) collector-emitter voltage (ii) base current.

OR

In a common base connection, α = 0.95. The voltage drop across 2 kΩ resistance which is (5)
connected in the collector is 2V. Find the base current.

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