BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(CSE)-2023
Course Name – Basic Electrical and Electronics Engineering
Course Code - ESCG201
(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) Identify the unit of frequency is

a) Cycle b) Cycle-second
c) Hertz/second d) Hertz

(ii) Calculate the peak value of a sine wave if r.m.s value is 100 A

a) 70.7A b) 141A
c) 150A d) 282.8A

(iii) Determine the identity of a pure inductive circuit

a) Actual power is zero b) Reactive power is zero
c) Apparent power is zero d) None of the above

(iv) Indicate the correct option of the fixed losses in a transformer

a) Eddy current loss b) Hysterisis loss
c) Copper loss d) Both Eddy current and hysterisis losses

(v) Choose from the following, the correct option, according to Kirchoff's voltage law

a) The algebraic sum of all the e.m.f's in the circuit is zero b) Algebraic sum all the voltage drops in the circuit is zero
c) Algebraic sum of e.m.f's plus algebraic sum of voltage drops is equal to zero d) All of these

(vi) Identify the relation between the line voltage and the phase voltage in case of three phase star connection

a) line voltage = 1.732 x phase voltage b) line voltage = phase voltage
c) phase voltage = 1.732 x line voltage d) phase voltage = 0.5 x line voltage

(vii) Calculate the rectification efficiency of a half-wave rectifier using applied input a.c. power is 100 watts and the d.c. output power obtained is 40 watts.

a) 20% b) 40%
c) 60% d) 100%

(viii) Select the reverse saturation current in junction diode is independent of

a) Potential barrier
b) Junction area
c) Doping of 'P' and 'N' type region
d) Temperature

(ix) Select the positive terminal of the battery is connected to the anode of the diode, then it is known as

a) Forward biased
b) Reverse biased
c) Equilibrium
d) Schottky barrier

(x) Choose when a forward biased is applied to a diode, the electrons enter to which region of the diode

a) P-region
b) N-region
c) P-n junction
d) Metal side

(xi) Identify during reverse bias, a small current develops which is known as

a) Forward current
b) Reverse current
c) Reverse saturation current
d) Active current

(xii) 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

(xiii) 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

(xiv) Indicate that the electron hole pairs are generated by

a) ionisation
b) thermal agitation
c) recombination
d) doping

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

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

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain why only low voltage is applied to the transformer during short circuit test. (3)

3. State Norton's theorem. (3)

4. Explain the phenomenon of diffusion of current carriers in a semiconductor. (3)

5. Illustrate short note about Avalanche Breakdown. (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. Explain the power factor and apparent power. (5)

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

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

10. Distinguish between intrinsic and extrinsic semiconductors and explain the term "Doping". (5)

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

12. A 4 pole 220 V dc shunt motor has armature and shunt field resistance of 0.2 ohm and 220 ohm respectively. It takes 20 A at 220 v from the source while running at a speed of 1000 rpm. Calculate field current, armature current, and back emf. (5)

OR

Explain the Armature control method in DC motors. (5)

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