BRAINWARE UNIVERSITY

Term End Examination 2022

Programme – B.Tech.(ECE)-2019/B.Tech.(CSE)-2019/B.Tech.(CSE)-2020/B.Tech.(ECE)-2020/B.Tech.(CSE)-AIML-2021/B.Tech.(CSE)-DS-2021/B.Tech.(CSE)-AIML-2022/B.Tech.(CSE)-DS-2022/B.Tech.(RA)-2022

Course Name – Basic Electrical Engineering/Basic Electrical and Electronics Engineering/Basic Electrical and Electronics Engineering

Course Code - ESC(ECE)101/ESC(CSE)101/ESCM101/ESCD101/ESCR101

(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) Express the sum of all three generated voltages for a three phase AC circuit,

a) Infinite b) Zero
c) One d) None of the above

(ii) Plan for finding Norton's current is to

a) remove the load resistance and make the terminal short circuited b) remove the load resistance and make the terminal open circuited
c) both a and b d) none

(iii) Plan for finding the load resistance using Thevenin's theorem is

a) Shorting all voltage sources and opening all current sources b) Opening all voltage sources and shorting all current sources
c) Opening all current sources d) Shorting all voltage sources

(iv) What causes the depletion region?

a) doping b) diffusion
c) barrier potential d) ions

(v) Silicon atoms combine into an orderly pattern called a:

a) covalent bond b) crystal
c) semiconductor d) valence orbit

(vi) Forward bias of a silicon P-N junction will produce a barrier voltage of approximately how many volts?

a) 0.2 b) 0.3
c) 0.7 d) 0.8

(vii) Three different Q points are shown on a dc load line. The upper Q point represents the:

a) minimum current gain
b) intermediate current gain
c) maximum current gain
d) cutoff point

(viii) A transistor has a beta(dc) value 250 and a base current, IB, of 20 microA. The collector current, IC, equals:

a) 500 microA
b) 5mA
c) 50 mA
d) 5 A

(ix) Predict the power, if Current and Voltage are 90 Degree Out of Phase

a) Infinite
b) Maximum
c) Minimum
d) Zero

(x) If VCC = +18 V, voltage-divider resistor R1 is 4.7 kiloohm, and R2 is 1500 ohm, what is the base bias voltage?

a) 8.70V
b) 4.35 V
c) 2.90 V
d) 0.7 V

(xi) Identify the condition for which the mechanical power developed by a DC series motor is maximum?

a) Back Emf is equal to half the applied voltage
b) Back Emf is equal to applied voltage
c) Back Emf is equal to zero.
d) None of above.

(xii) Select the reason for inserting resistance at the starting of an induction motor as well as dc motor.

a) To limit starting current in both the machines
b) Induction motor has to control starting torque whereas in dc motor, it is done to avoid large current
c) To limit starting speed
d) All of the mentioned

(xiii) Estimate the power of a pure inductive circuit

a) Infinite
b) Maximum
c) Zero
d) Minimum

(xiv) Select the option for which the transformer ratings are usually expressed

a) Volt
b) Amperes
c) Kw
d) KVA

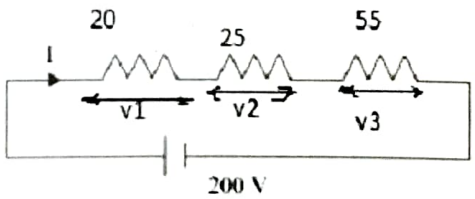
(xv) Recognize the correct relation for a power in a 3-phase circuit

a) P = 3 VPh IPh Cos(phi)
b) P = 3^0-5 VL IL Cos(phi)
c) Both a & b
d) None of The Above

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the working of NPN and PNP transistor (3)
3. Explain V-I characteristics of Zener diode. (3)
4. Develop the relation between the slip and the frequency of the rotor induced emf in a three phase induction motor. (3)
5. Evaluate the current through each resistors, (3)



OR

Explain in brief Norton's theorem with example. (3)

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

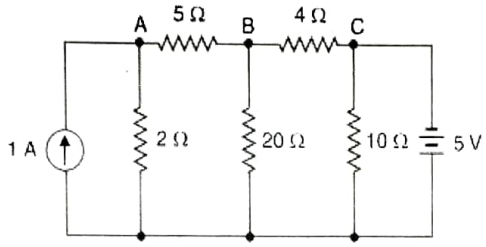
OR

Explain briefly about Hall effect and Hall field? (3)

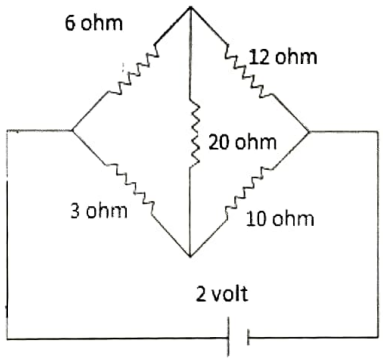
Group-C

(Long Answer Type Questions) 5 x 6=30

7. Draw the phasor diagram of ideal transformer at lagging load and describe each component? (5)
8. Calculte the value of node voltages V_A, V_B,V_C (5)



9. Calculate the current through 20 ohm resistance using thevenin's theorem. (5)



10. An n-p-n transistor with alpha=0.98 is operated in the CB configuration. If the emitter current is 3mA and the reverse saturation current is Ico=10 microA, what are the base current and the collector current? (5)
11. A series RLC circuit having a resistance of 50 ohm, an inductance of 500 mH and a capacitance of 400 µF, is energized from a 50 Hz, 230 V, AC supply. Solve a) resonant frequency of the circuit b) peak current drawn by the circuit at 50 Hz and c) peak current drawn by the circuit at resonant frequency (5)

OR

A balanced star connected load of (8+j6) ohm per phase is connected to a balanced 3-phase 400 V supply. Find the line current, power factor, power and total volt-amperes. (5)

12. Explain the center-tap Full wave rectifier with a neat diagram. (5)

OR

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