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BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – Dip.EE-2024
Course Name – Electrical Circuits and Network
Course Code - DEE30101
(Semester III)

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) Interpret Kirchhoff's voltage law is based on principle of conservation of

a) energy b) momentum
c) mass d) charge

(ii) If the voltage-current characteristics are a straight line through the origin, then predict the element

a) Linear element b) Non-linear element
c) Unilateral element d) Bilateral element

(iii) If there are 8 nodes in network, determine the no of equations

a) 6 b) 7
c) 8 d) 9

(iv) Predict the alternative of impedance used in a parallel circuit.

a) Resistance b) Capacitance
c) Inductance d) Admittance

(v) Choose the form factor in term of ratio

a) Peak value to r.m.s. value b) Average value to r.m.s. value
c) r.m.s. value to average value d) None of these

(vi) Choose the correct option, in a R-L-C circuit

a) Power is consumed in resistance and is equal to IR
b) Exchange of power takes place between inductor and supply line
c) Exchange of power takes place between capacitor and supply line
d) All of these are correct

(vii) Predict among the following is the correct expression for admittance

a) Y= Z b) Y=1/Z
c) Y=Z2 d) Y=1/Z2

(viii) At resonance, select the capacitive energy in term of inductive energy.

a) Greater than
b) Less than
c) Equal to
d) Depends on the circuit

(ix) Select the name of the circuit in which current has a complete path to flow is called _______ circuit.

a) short
b) open
c) closed
d) open loop

(x) Select the correct option. The dependent source

a) is always a voltage source
b) may be a current source or a voltage source
c) is always a current source
d) none of the mentioned

(xi) Identify the situation where Ohm's law does not apply.

a) Electrolytes
b) Arc lamps
c) Insulators
d) Vacuum ratio values

(xii) For a voltage source to be neglected, observe the terminals across the source should be

a) replaced by inductor
b) short circuited
c) replaced by some resistance
d) open circuited

(xiii) Determine the efficiency in case of maximum power transfer theorem

a) 1
b) less than 50 %.
c) 0.5
d) 50 % - 100 %.

(xiv) Identify the unit of Conductance

a) mho
b) mho/m
c) ohm/m
d) m/ohm

(xv) In an R-C circuit, when the switch is closed, identify the response _____

a) Do not vary with time
b) Decays with time
c) Rises with time
d) First increase and then decrease

Group-B

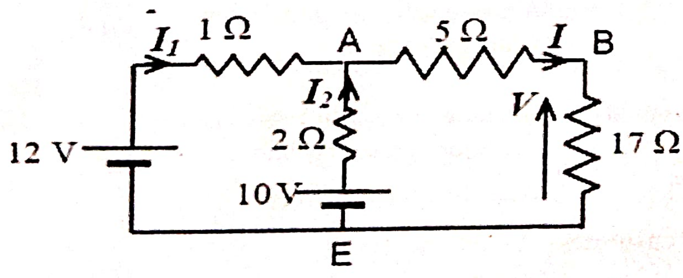
(Short Answer Type Questions) 3 x 5=15

2. Predict the equivalent resistance of the circuit where R1 = 15 Ohm, R2 = 20 Ohm and R3 = 30 Ohm are in a parallel. (3)

3. Explain the condition of maximum power transfer to a load. (3)

4. Explain the advantages of 3 phase system. (3)

5. Using superposition theorem solve load current (I). (3)



6. A coil of inductance 5mH and resistance 10 ohm is connected in parallel with a 250 nF capacitor across a 50 V variable-frequency supply. Calculate (a) the resonant frequency, (b) the dynamic resistance. (3)

OR

Compare the role of inductive and capacitive elements in determining phase angle. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Express the meaning of Node and Mesh analysis. (5)
8. A coil has resistance of 18 Ohm when its mean temperature is 20 degree c and of 20 Ohm when its mean temperature is 50 degree c. Predict its mean temperature when its mean resistance is 21 Ohm and surrounding temperature is 15degree c. (5)

9. Two wattmeters are connected to measure the input power to a balanced 3-phase load by the two-wattmeter method. If the instrument readings are 8kW and 4kW, estimate (a) the total power input and (b) the load power factor. (5)

10. In a series R-L-C circuit, R = 5 Ohm, L= 1 H, C= 1 F. A dc voltage of 20 V is applied at t=0. Measure the current. (5)

11. Explain the application, advantage and disadvantage of Thevenin's Theorem. (5)

12. A coil takes a current of 2 A from a 12 V d.c. supply. After connecting to a 240 V, 50 Hz supply, the current is 20 A.. Calculate the resistance, impedance, inductive reactance and inductance of the coil. (5)

OR

A resistance of 20 Ohm, inductor 20H and capacitor 200pF are connected in series to a single phase 230v source with variable frequency. Analyze the condition where the maximum current in the circuit will flow and explain the impedance and power factor during the condition. (5)

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