BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – Dip.EE-2022
Course Name – Electrical Circuit and Network
Course Code - DEEPC301
(Semester III)

Time : 2:30 Hours

Full Marks : 60

[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 transient current are associated with
a) Impedance of the circuit
b) Applied voltage to the circuit
c) Resistance of the circuit
d) Charges in stored energy in the inductor and capacitor

(ii) Select for a star connected three phase AC circuit
a) Phase voltage is equal to line voltage and phase current is three times the line current
b) Phase voltage is square root three times line voltage and phase current is equal to line current
c) Phase voltage is equal to line voltage and line current is equal to phase current
d) None of these

(iii) Identify the component is often used to describe transient responses in electrical circuits?
a) Capacitors
b) Resistors
c) Inductors
d) Diodes

(iv) Interpret Kirchhoff's voltage law is based on principle of conservation of
a) energy
b) momentum
c) mass
d) charge

(v) Relate potential difference in electrical terminology i
a) Voltage
b) Current
c) Resistance
d) Conductance

(vi) While drawing the vector diagram for a series circuit, indicate the reference vector
a) Voltage
b) Power
c) Current
d) Phase angle

(vii) Determine the dynamic impedance of a R-L-C parallel circuit at resonance
a) R/LC
b) C/LR
c) LC/R
d) L/CR

(viii) State the condition of a network is said to be linier

a) Homogeneity condition
b) Both homogeneity condition & Superposition condition
c) Superposition condition
d) None.

(ix) For a polyphase system memorize the no. of watt meter required to measure power is equal to

a) Number of wires
b) One less than number of wires
c) Number of phases
d) None of these

(x) Indicate star connected three phase AC circuit

a) Phase voltage is equal to line voltage and phase current is three times the line current
b) Phase voltage is square root three times line voltage and phase current is equal to line current
c) Phase voltage is equal to line voltage and line current is equal to phase current
d) None of these

(xi) Explain the voltage between _____ and _____ is called phase voltage.

a) line and line
b) neutral point and reference
c) line and reference
d) line and neutral point

(xii) In Superposition theorem, while considering a source, observe all other voltage sources are?

a) open circuited
b) short circuited
c) change its position
d) removed from the circuit

(xiii) Observe for ZL = ZS*, the relation between XL and XS is?

a) XL = XS
b) XL = 0
c) XL = 1
d) XL = -XS

(xiv) Determine the condition for maximum current to be transferred to the load

a) Source resistance less than load resistance
b) Source resistance greater than load resistance
c) Source resistance equal to load resistance
d) Source resistance greater than or equal to load resistance

(xv) It the roots of an equation are real and equal, than express the response

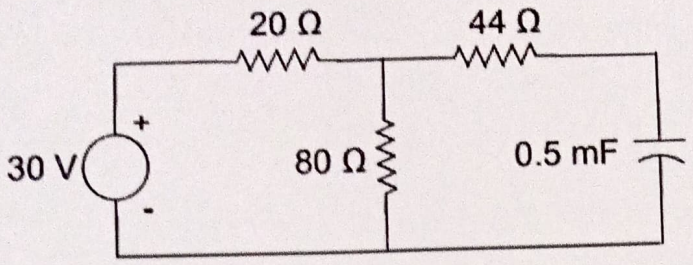
a) Critically damped
b) Under damped
c) Over damped
d) Damped

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the relation between maximum voltage, RMS voltage and average voltage of sine wave (3)
3. How to transfer the a) Current Source into a Voltage Source, b) Voltage Source into a Current source (3)
4. Convert 4A source with its parallel resistance of 15 Ohm into its equivalent voltage source with circuit diagram? (3)
5. Define time constant of RC circuit. (3)
6. In an RC circuit, having a time constant of 2.5 ms, the capacitor discharges with initial voltage of 80 V. (a) Predict the time at which the capacitor voltage reaches 55 V, 30 V and 10 V (b) Estimate the capacitor voltage at time 1.2 ms, 3 ms and 8 ms (3)

OR



Calculate the time constant of the RC circuit shown in below.

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

7. Explain the Superposition Theorem in DC circuit analysis. How is it applied, and what are its limitations? (5)
8. An alternating value is V=100sin100t discuss its- I. Amplitude II. Time period III. Frequency IV. Angular velocity V. Form factor VI. Peak factor (5)
9. A voltage V=100sin314t is applied to a circuit consisting of a 100 Ohm resistor and a 100 microfarad capacitor in series. Deduce I. Peak value of current II. Power factor III. Total power consumed by the circuit. (5)
10. Explain Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL) in the context of DC circuits. (5)
11. Assess the transient response of a R-L circuit supplied from DC source. (5)
12. A voltage V=100sin314t is applied to a circuit consisting of a 25 Ω resistor and an 80 μF capacitor in series. Deduce – I. Peak voltage of current II. Power factor III. Total power consumed by the circuit. (5)

OR

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, determine (a) the total power input and (b) the load power factor. (5)

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