BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.RA-2022/Dip.RA-2023
Course Name – Electric Circuits and Network
Course Code - ECPC304
(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) Choose which type of circuit element maintains a constant voltage across its terminals.
   a) Resistor b) Capacitor
   c) Inductor d) Voltage source

(ii) Predict from the following which circuit element that dissipates electrical energy in the form of heat is called a:
   a) Resistor b) Capacitor
   c) Inductor d) Transformer

(iii) Examine for an inductor that stores energy in the form of:
   a) Electric charge b) Electric potential
   c) Electric current d) Magnetic field

(iv) Determine a voltage source:
   a) Provides current in response to a voltage change b) Provides voltage in response to a current change
   c) Is independent of the current flowing through it d) Is never used in electrical circuits

(v) Choose which of the following is an example of an independent current source.
   a) Light bulb b) Battery
   c) Solar cell d) Photodiode

(vi) How many h-parameters are there for a transistor?
   a) Four b) Two
   c) Five d) Three

(vii) Identify which of the following parameters must be equal for a reciprocal two-port network.
   a) Admittance parameters (Y-parameters) b) Scattering parameters (S-parameters)
   c) Hybrid parameters (h-parameters) d) None of the option

(viii) In a reciprocal two-port network, if the input impedance is Zin, what is the output impedance?

a) Zin
b) -Zin
c) 1/Zin
d) -1/Zin

(ix) In a symmetrical network, if you swap the input and output terminals, what should remain unchanged?

a) Input impedance
b) Output impedance
c) Both input and output impedances
d) S-parameters

(x) Which type of two-port network has identical forward and reverse transmission parameters and also maintains the same input and output impedance when you swap the input and output terminals?

a) Reciprocal
b) Non-reciprocal
c) Symmetrical
d) Unilateral

(xi) In a symmetrical two-port network, if the output impedance is Zout, what is the input impedance?

a) Zout
b) -Zout
c) 1/Zout
d) -1/Zout

(xii) The primary purpose of network synthesis is to:

a) Optimize network security
b) Design efficient communication protocols
c) Create electrical circuits that meet specific requirements
d) Develop software applications

(xiii) Which type of network synthesis deals with designing filters and equalizers?

a) Active network synthesis
b) Passive network synthesis
c) Digital network synthesis
d) Control network synthesis

(xiv) Which famous engineer is known for his contributions to network synthesis theory?

a) Thomas Edison
b) Nikola Tesla
c) Claude Shannon
d) Albert Einstein

(xv) In a graph, nodes are also called:

a) Vertices
b) Edges
c) Branches
d) Paths

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Discuss the difference between RC and RL circuit on the basis of transient analysis. (3)

3. Explain Norton's theorem. (3)

4. Explain the Maximum power transfer theorem. (3)

5. Define time constant of RL circuit. (3)

6. Explain the D.C. transient response of a series R-C circuit. (3)

OR

Conclude the procedure for transient analysis of RC and RL circuits. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the application, advantage and disadvantage of Thevenin's Theorem (5)
8. Explain Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL) in the context of DC circuits. (5)
9. Represent Y parameters in terms of Z parameters. (5)

10. A series R-L circuit having R = 15 ohm and L = 0.03 H is connected across a 240 V, 50 Hz ac supply. Evaluate the value of rms current, average power aborbed by the inductance and power factor of the circuit. (5)
11. Explain the input output characteristics of CB connection. (5)

12. Assess the transient response of a R-L circuit supplied from DC source. (5)

OR

Assess the transient response of a R-C circuit supplied from DC source. (5)

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