



BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – Diploma in Robotics & Automation-2022

Course Name – Electric Circuits and Network

Course Code - ECPC304

(Semester III)

LIBRARY
Brainware University
Barasat, Kolkata - 700123
[Stamp]

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) In network synthesis, passive components include:
- | | |
|--------------------|-----------------------------|
| a) Transistors | b) Capacitors and inductors |
| c) Microprocessors | d) Voltage sources |
- (iii) 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 |
- (iv) 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 |
- (v) Examine for an inductor that stores energy in the form of:
- | | |
|---------------------|-----------------------|
| a) Electric charge | b) Electric potential |
| c) Electric current | d) Magnetic field |
- (vi) 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 |
- (vii) 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 |
- (viii) Network synthesis is commonly used in the design of:

- a) Spacecraft navigation systems
c) Electrical circuits and filters
- b) Social media platforms
d) Agricultural irrigation systems
- (ix) Choose which of the following is an example of an independent current source.
a) Light bulb
c) Solar cell
- b) Battery
d) Photodiode
- (x) Identify which of the following parameters must be equal for a reciprocal two-port network.
a) Admittance parameters (Y-parameters)
c) Hybrid parameters (h-parameters)
- b) Scattering parameters (S-parameters)
d) None of the option
- (xi) Which of the following is a complete graph?
a) A graph with all nodes connected to each other
c) A graph with only two nodes
- b) A graph with no nodes
d) A graph with one node and one edge
- (xii) In a reciprocal two-port network, if the input impedance is Z_{in} , what is the output impedance?
a) Z_{in}
c) $1/Z_{in}$
- b) $-Z_{in}$
d) $-1/Z_{in}$
- (xiii) How many h-parameters are there for a transistor?
a) Four
c) Five
- b) Two
d) Three
- (xiv) In a symmetrical network, if you swap the input and output terminals, what should remain unchanged?
a) Input impedance
c) Both input and output impedances
- b) Output impedance
d) S-parameters
- (xv) 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
c) Symmetrical
- b) Non-reciprocal
d) Unilateral

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. Establish that every simple finite graph has two vertices of the same degree. (3)
4. Explain Thevenin's theorem. (3)
5. Explain independent and dependent sources. (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

7. Explain a) Thevenins Theorem b) Norton,s Theorem c) Superposition Theorem d) Maximum (5)
power transfer Theorem
 8. Explain Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL) in the context of DC (5)
circuits.
 9. Compare RLC series and parallel resonance circuit (5)
 10. Explain the Superposition Theorem in DC circuit analysis. How is it applied, and what are its (5)
limitations?
 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**
- Explain the transient response of a R-C circuit supplied from DC source. (5)
