BE Semester- III (Biomedical Engineering) Question Bank

(BM-302 Circuit Theory)

All questions carry equal marks (10 marks)

Q.1	Explain the following terms: 1) Linear and Nonlinear networks 2) Lumped and Distributed networks 3) Dependent source 4) Passive and Active networks 5) Time invariant and Time variant Network
Q.2	Name the three parameters of electric network. Discuss the characteristics of each one of them.
Q.3	State 7 explain Norton's theorem with example.
Q.4	Explain the following terms: 1) Reciprocity 2) Unilateral and Bilateral Network 3) Duality 4) Active & Passive Element 5) Lumped & Distributed parameters
Q.5	Explain Tree, Graph, Sub-graph & Link in detail with example.
Q.6	Discuss Duality in detail.
Q.7	State & explain Kirchhoff's Voltage Law (KVL) & Kirchhoff's Current Law (KCL).
Q.8	Derive relationship between Z-parameters and Y-parameters.
Q.9	Discuss Reciprocity and symmetry of network in detail.
Q.10	Explain the concept of poles and zeros and their significance.
Q.11	State and prove Thevenin's Theorem with example.
Q.12	Write down voltage and current relationships in resistor, inductor and capacitor. Also mention the initial and final condition for R,L and C components in the different cases.
Q.13	Explain the "Dot Convention Rule" for the magnetically coupled Network using suitable network.
Q.14	State & explain Reciprocity theorem with suitable example.
Q.15	Explain the formulation of graph, tree and Incidence Matrix using suitable example. Hence discuss the procedure of forming reduced Incidence Matrix and its advantages.
Q.16	Explain various source transformation techniques in detail.
Q.17	Explain The Laplace Transformation method. Find Laplace Transform of Unit Step, and exponential function.
Q.18	State and explain the Initial and final value theorem.
Q.19	State and explain Superposition Theorem with suitable example.
Q.20	State and Explain the "The Maximum Power Transfer Theorem". Also derive the condition for maximum power transfer to the load for D.C. and A.C. Circuit.
Q.21	Explain various Two Port parameters in detail.
Q.22	Derive the expression of A B C D parameters in terms of Z parameters.
Q.23	Explain the "Dot Convention Rule" for the magnetically coupled Network. Explain the method to put the Dots on different linked Coils using suitable example.
Q.24	Explain the concept of Duality. List all analogous quantities used in Duality.
Q.25	Explain the Poles and Zeros of the Network function. State its important features and explain its physical significance.
Q.26	Explain the various types of Interconnections of the Two port networks in detail.
Q.27	A series RLC circuit with zero inductor current and zero capacitor voltage is excited by 50V dc source, find i(0+) and di(0+)/dt. Take R=20Ω, C=10μF, L=1H.
Q.28	Explain various Initial & Final conditions in circuit elements.

Q.29	Explain & obtain the Laplace transform of unit step, unit ramp & unit impulse function.
Q.30	What is Network function? Define the terms "Driving point impedance" and "Driving point Admittance" of one-port network.
Q.31	Derive the necessary equations to find the network function of a general two port network.
Q.32	What is two port network? Write a performance equation of a two port network in terms of impedance parameters. How can these parameters be determined? Give the necessary equations.
Q.33	What are transmission parameters? How can these parameters be determined? Give the interrelation between transmission parameters & impedance parameters.
Q.34	Figure-(i) show three windings on a magnetic core. Using different shaped dots establish polarity markings for the windings and using specified current write the Kirchhoff's voltage law equations for this network.
Q.35	Determine the currents I_1, I_2, I_3 in the given network of figure-(ii) using mesh analysis.
Q.36	Determine the current through the 4 ohm resistor branch of the given network of figure-(iii) using mesh analysis.
Q.37	Determine the current I in 1 Ω resistor of network shown in figure-(iv) using source transformation method.
Q.38	Calculate the Thevenin's voltage and resistance at the terminals ab of circuit shown in figure-(v).
Q.39	Determine the current in the 10 Ω resistor of circuit shown in figure-(vi) using Norton's theorem.
Q.40	Determine the value of current I_1 using Superposition theorem in a network shown in figure-(vii).

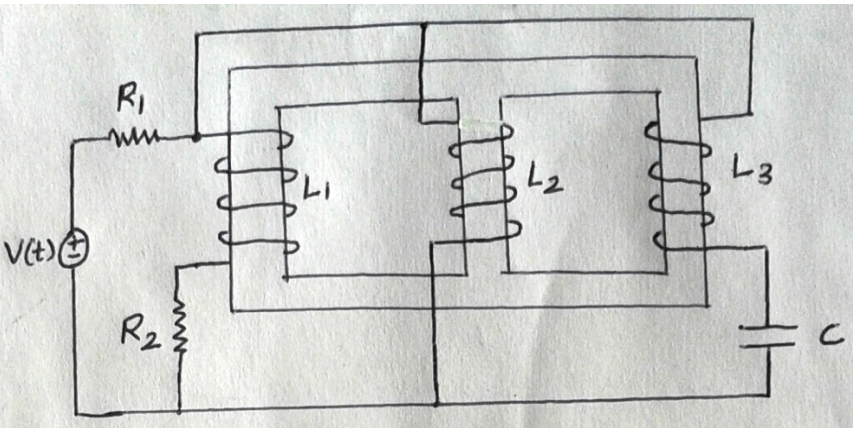

Figure-(i)

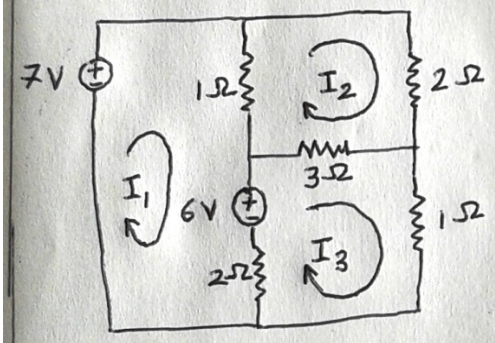

Figure-(ii)

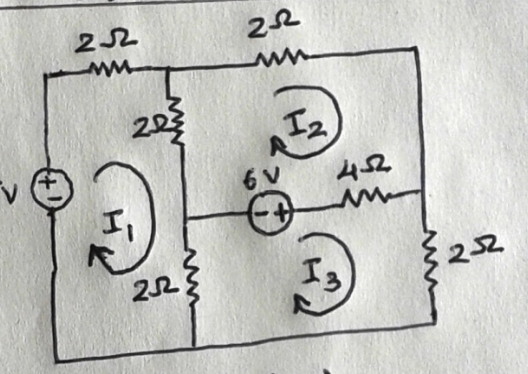

Figure-(iii)

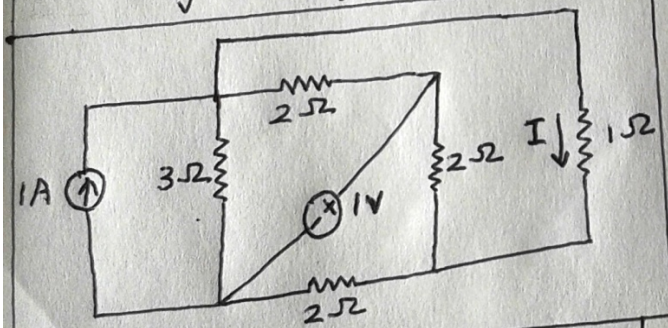

Figure-(iv)

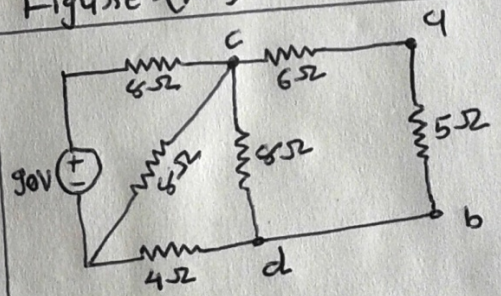

Figure-(v)

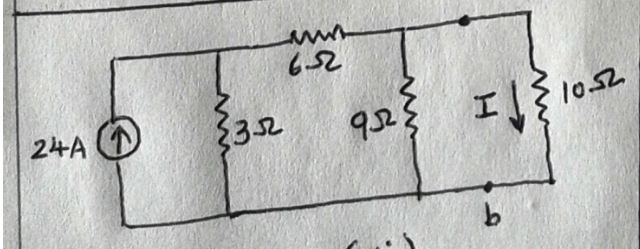

Figure-(vi)

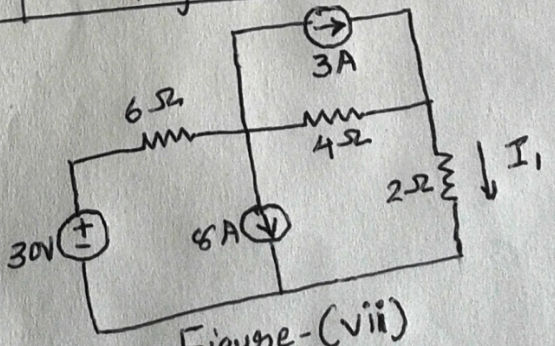

Figure-(vii)