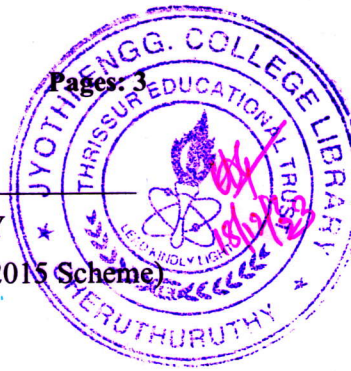Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S3 (S, FE) / S1 (PT) (S, FE) Examination December 2023 (2015 Scheme)

Course Code: EC201

Course Name: NETWORK THEORY
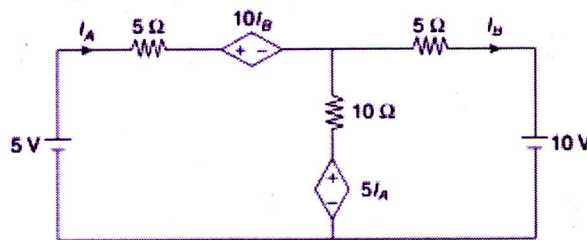
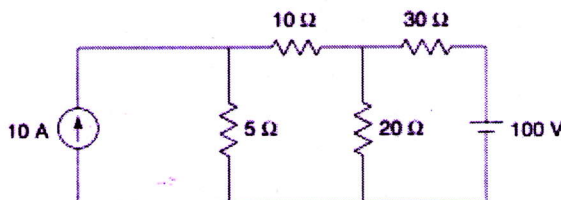Max. Marks: 100   Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.   Marks

1. a) List the classifications of dependent and independent sources.   (7)

   b) Find the currents I_A and I_B in the network using Mesh analysis.   (8)

2. a) Find the current through 10 ohm resistor using node analysis.   (7)

   b) State and prove time shifting theorem in Laplace transform.   (8)

3. a) Find the Laplace transform of $t \cos^2 t$.   (8)

   b) State and Prove maximum Power transfer theorem. Derive the expression for

   maximum power P_{max} (7)

PART B

Answer any two full questions, each carries 15 marks.

4. a) Solve $y'' + 4y = \delta(t)$, $y(0) = 0$, $y'(0) = 0$ Using Laplace transform.   (8)

b) Find the Inverse Laplace transform of the following function. (7)

$$I(s) = \frac{8}{(S+3)(S+5)}$$

5. a) How to determine the time domain behaviour of a system from the pole–zero plot? (7)

   b) Find the step and impulse response of series R-L circuit. (8)

6. a) Draw the pole - zero plot for the function $F(s) = s(s+2) / (s+3)(s+1)^2$ (5)

   b) What are the restrictions on pole and zero locations for driving point and transfer functions? (10)
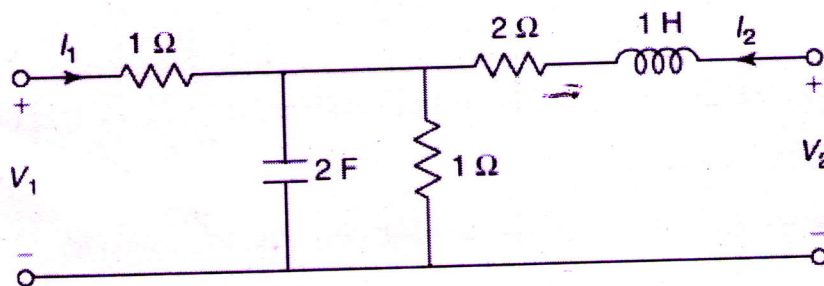
PART C

Answer any two full questions, each carries 20 marks.

7. a) Express Z parameters in terms of ABCD parameters. (8)

   b) Find the equivalent inductance of the following network. (4)
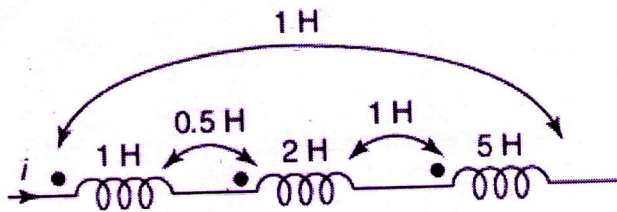
   c) Find the Z - parameter of the following network. (8)

8. a) Two two port networks are connected in cascade. Let the transmission matrices of the networks are $\begin{bmatrix} A1 & B1 \\ C1 & D1 \end{bmatrix}$ and $\begin{bmatrix} A2 & B2 \\ C2 & D2 \end{bmatrix}$ respectively. Form the

transmission parameter representation and inverse transmission parameter representation of the cascaded network. (14)

b) Explain about the following terms i) Characteristic impedance, ii) Q factor iii) Propagation constant. iv) Selectivity (6)

9. a) Compare series and parallel resonance circuits. (7)

b) Derive the expression for Quality factor of a series resonant circuit. (6)

c) A series resonant circuit has the parameter values R = 100 ohm, L = 0.01H C = 100 μF. Calculate its i) resonant frequency and ii) Band width. (7)

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