

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third semester B.Tech examinations (S) September 2020

Course Code: EC201**Course Name: NETWORK THEORY**

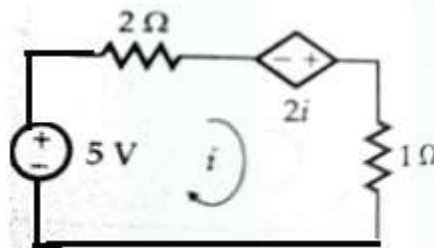
Max. Marks: 100

Duration: 3 Hours

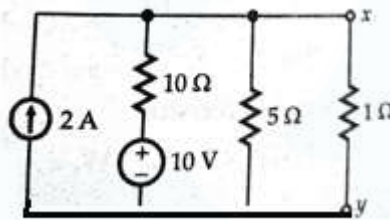
PART A*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) Explain Kirchoff's law with example (2)
- b) Explain final value theorem. Find final value of $F(s) = \frac{2}{s} - \frac{1}{s+3}$ (8)
- c) Find the value of dependent voltage source (5)



- 2 a) Find the power loss in 1 Ω resistor by Thevenin's theorem (8)



- b) Explain maximum power transfer theorem applied to dc circuits (7)
- 3 a) Find the Laplace transform of (i) $f(t) = \cos^3 3t$ and (ii) $f(t) = \frac{(1-e^{-t})}{t}$ (8)
- b) Explain tie set matrix, cut set matrix and fundamental cut set matrix with an example (7)

PART B*Answer any two full questions, each carries 15 marks.*

- 4 a) A continuous LTI system is initially relaxed and represented by the equation $y''(t) + 3y'(t) + 2y(t) = 2x(t)$. Using Laplace transform Find (a) transfer (8)

function and (b) Find response of a system for input $x(t) = 4e^{-3t}$

- b) A series RLC circuit with $R = 100\Omega$, $L = 0.1\text{ H}$ and $C = 40\text{ }\mu\text{F}$ has a dc voltage of 200 V applied at $t = 0$. Find the transient current. (7)
- 5 a) Derive the response of a series RC circuit for a step input (5)
- b) What are the restrictions on poles and zeros for the transfer function and driving point functions (10)
- 6 a) A $100\mu\text{F}$ capacitor has an initial charge $Q_0 = 0.002\text{ C}$ is connected in series with 200Ω across 50V supply at time $t=0$. Find the transient current. (8)
- b) Define poles and zeros of a transfer function. For the given transfer function find the poles and zeros and also draw the pole zero plot (7)
- $I(s) = 20(s+5) / (s^2 + 5s + 6)$

PART C

Answer any two full questions, each carries 20 mark.

- 7 a) Two inductively coupled coils have self-inductance $L_1 = 50\text{mH}$, $L_2 = 200\text{mH}$. Given $k = 0.5$. Find the mutual inductance between the coil (3)
- b) Two coupled coils have a coefficient of coupling $k = 0.83$. With coil1 open, a current of 5A flows in coil 2. Given flux in coil2 is 0.35 milli weber. Find L_1 , L_2 and M . (6)
- c) A coil having an inductance and resistance of 50 mH and 100Ω is connected in series with a capacitor and a 100V, 1 kHz source. Find the value of capacitance that will cause resonance in the circuit. Find the resulting current at resonance (6)
- d) Define characteristic impedance and image impedance (5)
- 8 a) Explain Y parameters. (6)
- b) Derive the inter relation between open circuit impedance parameters and transmission parameters (6)
- c) In a RLC series circuit, the resistance, inductance and capacitance are 10Ω , 100 mH and $10\text{ }\mu\text{F}$. Find ω_0 , ω_1 and ω_2 . Also find band width and selectivity (8)
- 9 a) Explain parallel inter connection of two port networks (6)
- b) The h parameters of a two port network are $h_{11} = 1.5\text{ k}\Omega$, $h_{12} = 2 \times 10^{-3}$, $h_{21} = 250$ and $h_{22} = 150 \times 10^{-6}$. Find Z parameters and draw its equivalent (7)
- c) Explain Double tuned coupled coils (7)
