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

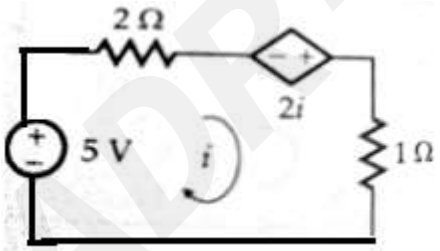
PART A

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

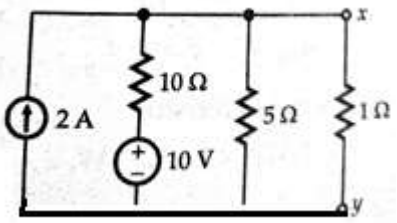
1 a) Explain Kirchoff's law with example (2)

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 Thevinin'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) + 3 y'(t) + 2 y(t) = 2 x(t) . Using Laplace transform Find (a) transfer (8)

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

b) A series RLC circuit with R= 100Ω, L= 0.1 H and C= 40 μF 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 100μF capacitor has an initial charge Qo = 0.002 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 = 50mH, L_2 = 200mH. 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 μF. Find ω_o, ω1 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 kΩ, $h_{12} = 2 \times 10^{-3}$, 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)

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