Reg No.:_

Name:_

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third semester B.Tech examinations (S) September 2020

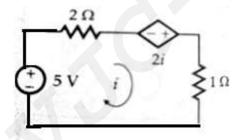
Course Code: EC201 Course Name: NETWORK THEORY

Max. Marks: 100

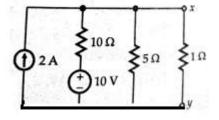
PART A

Answer any two full questions, each carries 15 marks.

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



2 a) Find the power loss in 1 Ω resistor by Thevinin's theorem



- 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 (7) example

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

Duration: 3 Hours

Marks (2)

(8)

(5)

(8)

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

- b) A series RLC circuit with R= 100 Ω , L= 0.1 H and C= 40 μ F has a dc voltage of (7) 200 V applied at t= 0. Find the transient current.
- 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 (10) point functions
- 6 a) A 100 μ F capacitor has an initial charge Qo = 0.002 C is connected in series with (8) 200 Ω across 50V supply at time t=0. Find the transient current.
 - b) Define poles and zeros of a transfer function. For the given transfer function find (7) the poles and zeros and also draw the pole zero plot
 I (s) = 20 (s+5) / (s² + 5s+ 6)

PART C

Answer any two full questions, each carries 20 mark.

- 7 a) Two inductively coupled coils have self-inductance $L_1 = 50$ mH, $L_2 = 200$ mH. (3) Given k = 0.5. Find the mutual inductance between the coil
 - b) Two coupled coils have a coefficient of coupling k= 0.83. With coil1 open, a (6) current of 5A flows in coil 2. Given flux in coil2 is 0.35 milli weber. Find L₁, L₂ and M.
 - c) A coil having an inductance and resistance of 50 mH and 100Ω is connected in (6) 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
 - 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 (6) transmission parameters
 - c) In a RLC series circuit, the resistance, inductance and capacitance are 10 Ω , (8) 100 mH and 10 μ F. Find ω_0 , ω 1 and ω_2 . Also find band width and selectivity

(6)

(7)

- 9 a) Explain parallel inter connection of two port networks
 - b) The h parameters of a two port network are $h_{11} = 1.5 \text{ k}\Omega$, $h_{12} = 2 \text{ x } 10^{-3}$, $h_{21} = (7)$ 250 and $h_{22} = 150 \text{ x } 10^{-6}$. Find Z parameters and draw its equivalent
 - c) Explain Double tuned coupled coils
