Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S, FE) (FT/WP/S1 PT) Examinations May/June 2026 (2019 Scheme)

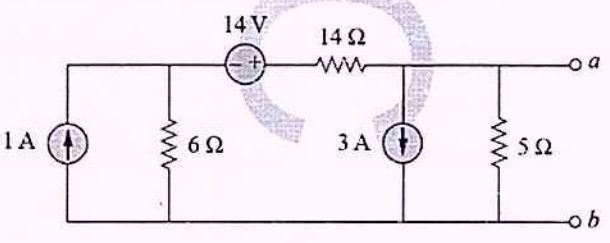
Course Code: EET201
Course Name: CIRCUITS AND NETWORKS

Max. Marks: 100 Duration: 3 Hours

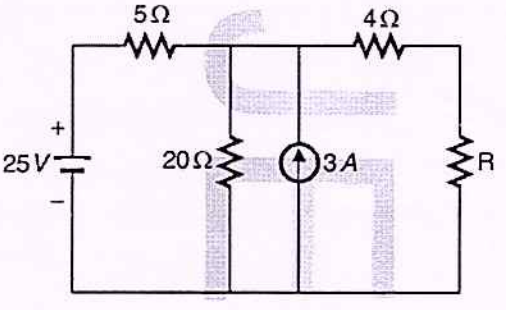
PART A

Answer all questions. Each question carries 3 marks Marks

1 Find the thevenin's equivalent circuit across the terminal a and b. (3)

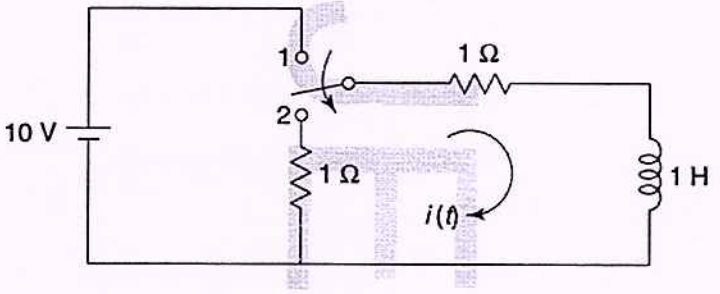


2 Determine the value of R in the circuit shown for maximum power transfer. (3)



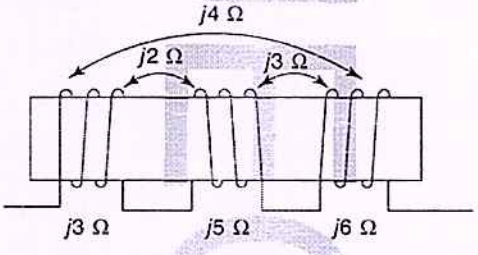
3 Determine the expression of current in an RL series circuit when a unit step input voltage is applied to it at time t=0 by means of a switch. (Inductor is initially relaxed). (3)

4 In the network shown, the switch is moved from the position 1 to 2 at t = 0, steady-state condition having been established in the position 1. Determine i(t) for t > 0. (3)



5 The combined inductance of two coils connected in series is 0.6 H or 0.1 H depending on relative directions of currents in the two coils. If one of the coils has a self-inductance of 0.2 H, find (a) mutual inductance, and (b) coefficient of coupling. (3)

6 Draw the dotted equivalent circuit and calculate the effective inductive reactance of the circuit shown. (3)



7 Define resonance in RLC circuit. Plot the variation of current and impedance in parallel RLC circuit with frequency? (3)

8 What is neutral shift. Explain with phasor diagram. What are its effects on the electrical system? (3)

9 Prove that the overall transmission parameter matrix for cascaded 2 port network is simply the matrix product of transmission parameters for each individual 2 port network in cascade. (3)

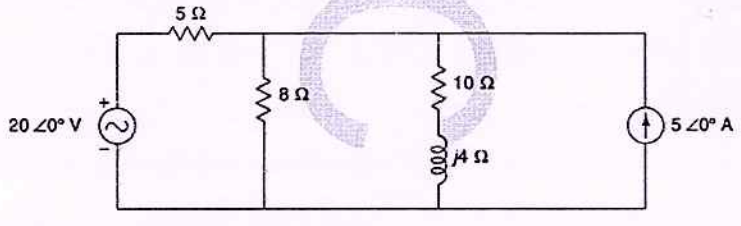
10 Derive and represent h-parameters in terms of ABCD parameters. (3)

PART B

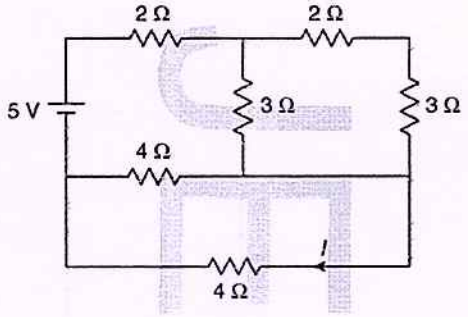
Answer any one full question from each module. Each question carries 14 marks

Module 1

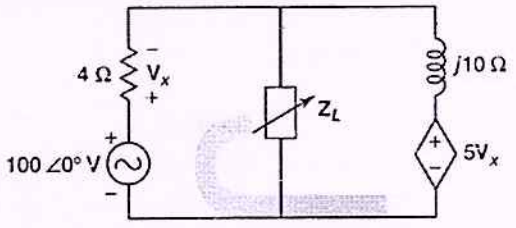
11 (a) Find the current through 8 ohm using Norton analysis. (8)



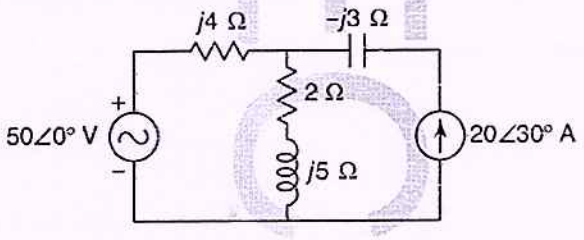
(b) Verify the reciprocity theorem for the given circuit shown in Fig. (6)



12 (a) Determine the load Z_L required to be connected in the network for maximum power transfer and the value of maximum power. (8)

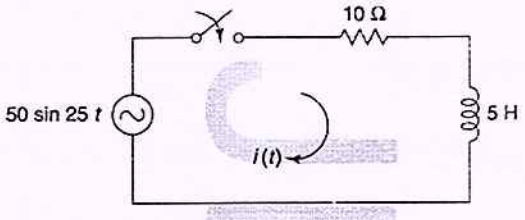


(b) Determine the voltage across the (2 + j5) ohm impedance for the network shown by using superposition theorem. (6)

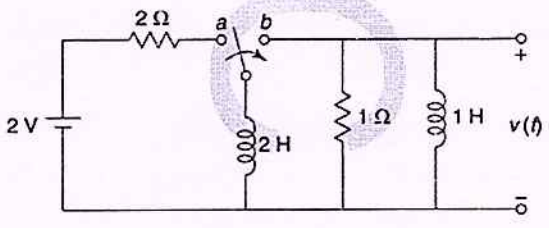


Module 2

13 (a) Obtain the current i(t) shown in the network, when the switch is closed at t =0. (7)

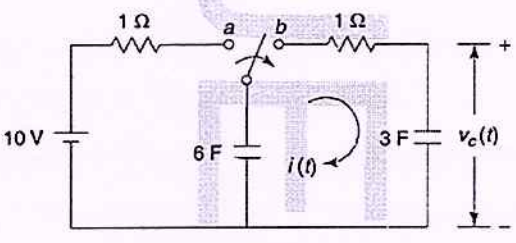


(b) The network of Fig. was initially in the steady state with the switch in the position a. At t = 0, the switch goes from a to b. Find an expression for voltage v (t) for t ≥ 0. (7)



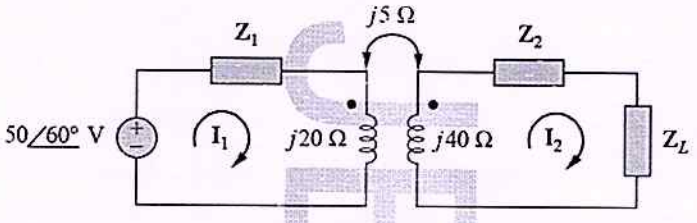
14 (a) Derive the expression for current in an RC series circuit excited by an ac source. (7)

(b) In the network of Fig., the switch is moved from a to b at t=0. Determine i (t) and v_c (t) (7)

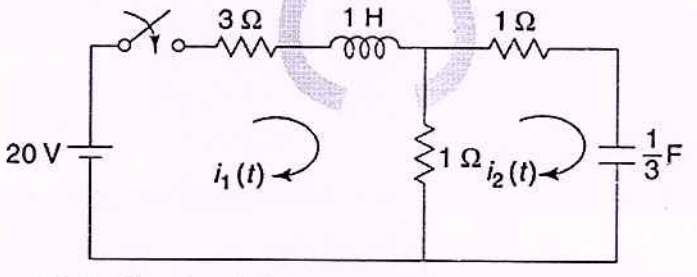


Module 3

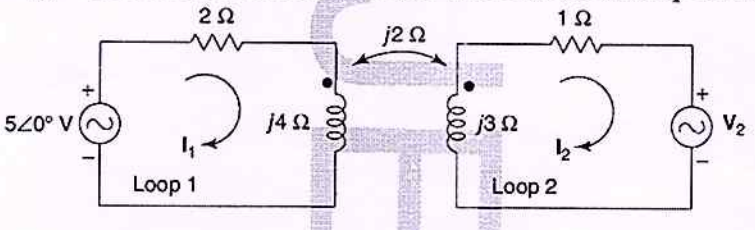
15 (a) Calculate the input impedance and current I_1. Take $\mathbf{Z_1} = 60 - j100\Omega$, $\mathbf{Z_2} = 30 + j40\ \Omega$, and $\mathbf{Z_L} = 80 + j60\ \Omega$. (7)



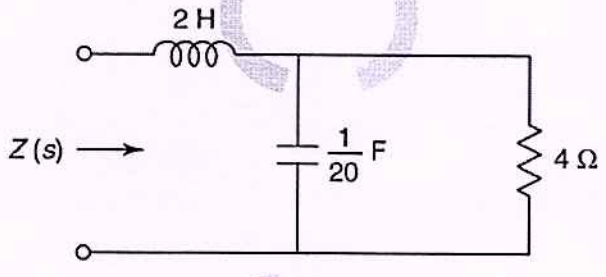
(b) For the circuit shown, the switch is closed at t=0. Convert the circuit to its s transform and find the currents $i_1(t)$ and $i_2(t)$. (7)



16 (a) Find the voltage V_2 in the circuit shown such that current in loop 1 is zero. (8)



(b) Draw the pole zero plot of the Impedance function Z(s) shown in Fig. (6)



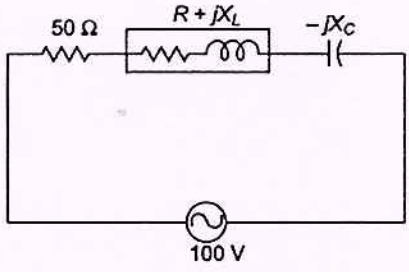
Module 4

17 (a) A Y connected alternator has 400V(line-line). It supplies a set of lighting loads at R, having phase impedance of $40\angle 0\ \Omega$, a capacitive load of $10\angle -60\ \Omega$ at phase Y and an inductive load of $5\angle 45\ \Omega$ at phase B. The loads are connected in delta. Obtain the phase current, line current and line voltages. (9)

(b) A series circuit comprising R, L and C is supplied at 220 V, 50 Hz. At resonance, the voltage across the capacitor is 550 V. The current at resonance is 1 A. Determine the circuit parameters R, L and C. (5)

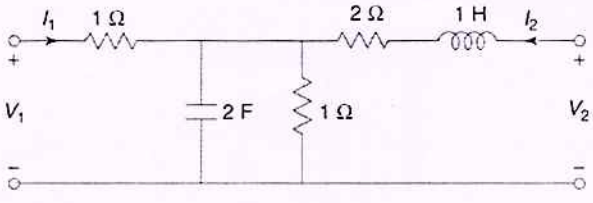
18 (a) In a four-wire three-phase system, two phases have currents of 10 A and 6 A of lagging power factor of 0.8 and 0.6 respectively, while the third phase is open circuited. Calculate the current in neutral and sketch the phasor diagram. (7)

(b) A 50 Ω resistor is connected in series with an inductor having internal resistance, a capacitor and 100 V variable frequency supply as shown in Fig. At a frequency of 200 Hz, a maximum current of 0.7 A flows through the circuit and voltage across the capacitor is 200 V. Determine the circuit constants. (7)



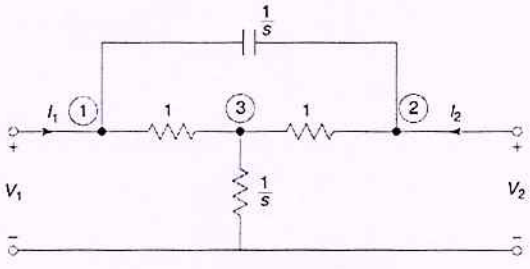
Module 5

19 (a) Find Z-parameter for the network shown in Fig. (7)

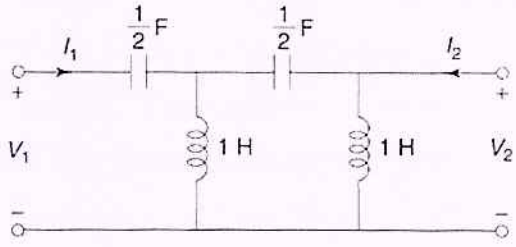


(b) Define ABCD parameters. Derive the condition for reciprocity and symmetry in terms of ABCD parameters (7)

20 (a) Obtain Y-parameters of the network shown in Fig. (7)



(b) Find h-parameters for the network shown in Fig (7)


1/2 F
1/2 F
I_1
I_2
+
+
V_1
1 H
1 H
V_2
−
−

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