Reg. No.															

Question Paper Code	12651

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

Electronics and Communication Engineering

20ECPC201 – CIRCUIT ANALYSIS

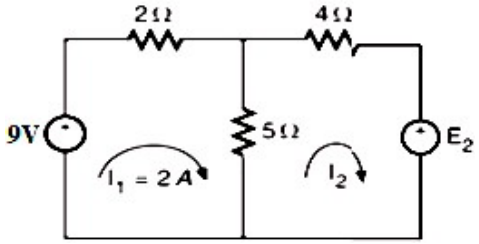
Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	Marks	K – Level	CO
1. Define Kirchhoff's laws.	2	K1	CO1
2. Define tree, link and cotree.	2	K1	CO1
3. Find the value of I_2 and E_2 in the circuit shown in fig.	2	K2	CO2

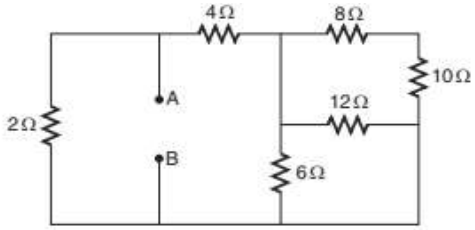


4. Distinguish between mesh and loop of a circuit.	2	K2	CO2
5. Define self-inductance	2	K1	CO4
6. Define coefficient of coupling.	2	K1	CO4
7. Distinguish between steady state and transient state.	2	K1	CO5
8. Define time constant of an RC circuit.	2	K2	CO5
9. Define a two port network.	2	K1	CO6
10. Draw the general equivalent model of Z parameters.	2	K1	CO6

PART - B (5 × 13 = 65 Marks)

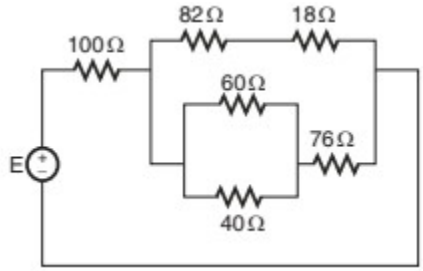
Answer ALL Questions

11. a) In the network shown in fig, find the equivalent resistance between A and B.	13	K2	CO1

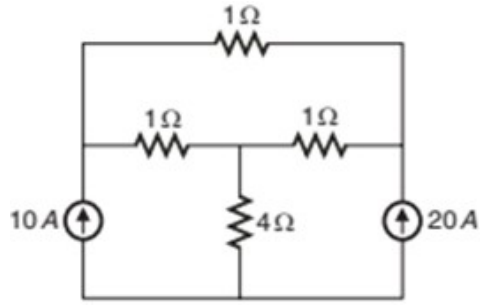


OR

b) In the circuit shown in fig, find the total resistance across the supply voltage. *13 K2 CO1*

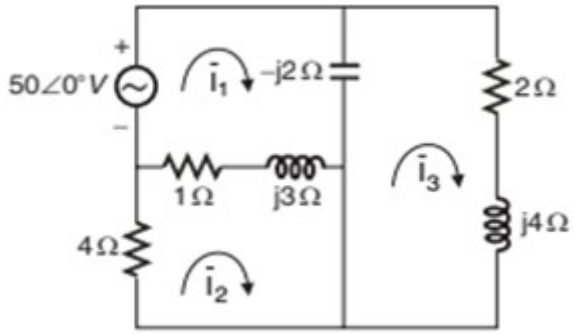


12. a) Find the power in the 4Ω resistor of the circuit shown in fig, using the nodal method. *13 K2 CO2*



OR

b) Determine the mesh currents of the circuit shown in fig. *13 K2 CO2*

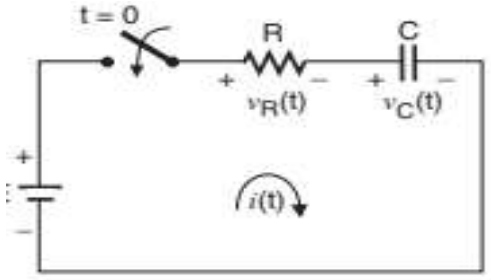


13. a) A coil having an inductance of 100 mH is magnetically coupled to another coil having an inductance of 900 mH. The coefficient of coupling between the coils is 0.45. Calculate the equivalent inductance if the two coils are connected in a) series aiding, b) series opposing, c) parallel aiding and d) parallel opposing. *13 K3 CO4*

OR

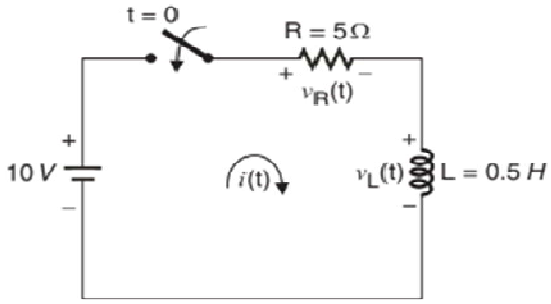
b) Consider two coils A and B consisting of 500 turns and 1500 turns, respectively. A current of 5 A in coil-A produces a flux of 0.6×10^{-3} Wb and the flux linking coil-B is 0.3×10^{-3} Wb. Determine the inductance, coefficient of coupling and mutual inductance of the coils. *13 K3 CO4*

14. a) Consider the RC circuit with no initial capacitor voltage and excited by a step voltage of E volts as shown in fig. Let the switch be closed at t = 0. Obtain the expression for voltage and current in each element. Comment on its initial conditions, final conditions, transient / steady state response. *13 K2 CO5*

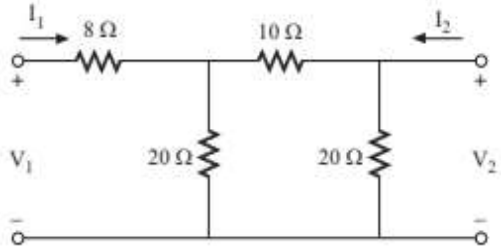


OR

b) In the RL circuit of Fig, the switch is closed at t = 0. Find the current i(t) and the voltage across resistance and inductance. *13 K2 CO5*

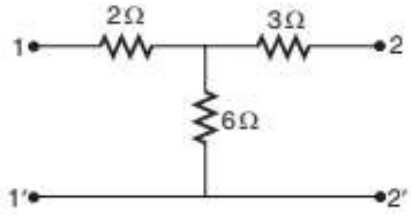


15. a) Determine the impedance (Z) parameter and draw the T-equivalent circuit for the given two port network in Fig. Also, derive the transmission line (ABCD) parameters from Z parameter. *13 K2 CO6*

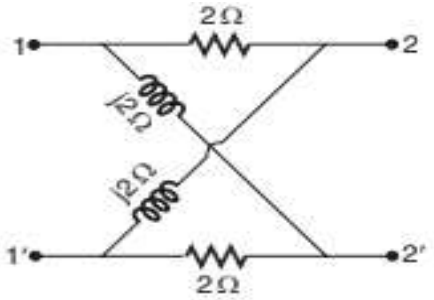


OR

b) i) Determine the h-parameters of the two-port network shown in fig. *6 K2 CO6*

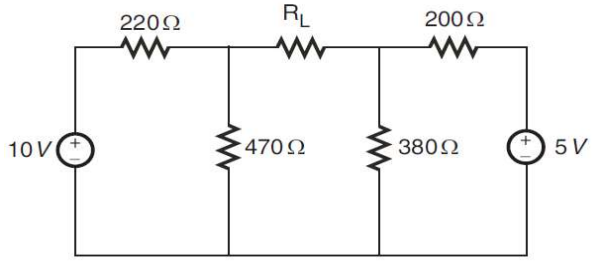


ii) Determine the Z-parameters of the lattice network shown in fig. *7 K2 CO6*



PART - C (1× 15 = 15 Marks)

16. a) In the circuit shown in fig, determine the maximum power delivered to R_L, where R_L = 100 Ω using Norton's theorem. Also, determine the value of R_L for maximum power transfer. *15 K2 CO3*



OR

b) Use the principle of superposition to determine the current I_L through the 5Ω resistance in the circuit shown in Fig. *15 K2 CO3*