EC/EEE 114 (R-22)

Total No. of Questions : 10] [Total No.of Pages : 03

I/IV B. Tech. DEGREE EXAMINATIONS, MARCH - 2023

First Semester

EC / EEE

ELECTRICAL CIRCUIT ANALYSIS

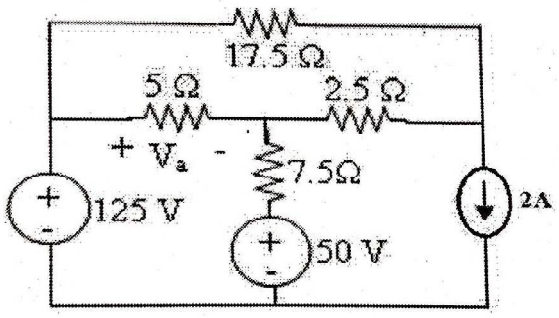
Time : **Three Hours** Maximum : **70** Marks

Answer All Questions

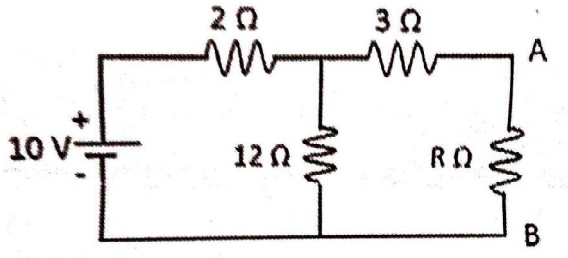
Answer ONE question from each Unit. **5x14=70 M**

UNIT - I

1. a) Find the value of V_a for the following circuit using KVL.

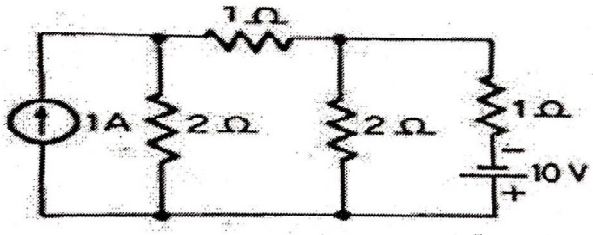


b) Find the maximum power delivered to the load by using maximum power transfer theorem for the following circuit.



(OR)

2. a) Determine the value of the current through the 10 V battery in the following network using Mesh analysis.



P.T.O.

b) Explain the concept of source transformation with examples.

UNIT - II

3. a) The impedances of parallel circuit are Z1 = (4+j6) ohms and Z2 = (12-j8) ohms. If the applied voltage is 220V, find (i) current and power factor of each branch (ii) overall current (iii) power consumed by each impedance. Draw the phasor diagram.

   b) What is the phasor ? Draw it and give relation for series RL and RC circuit.

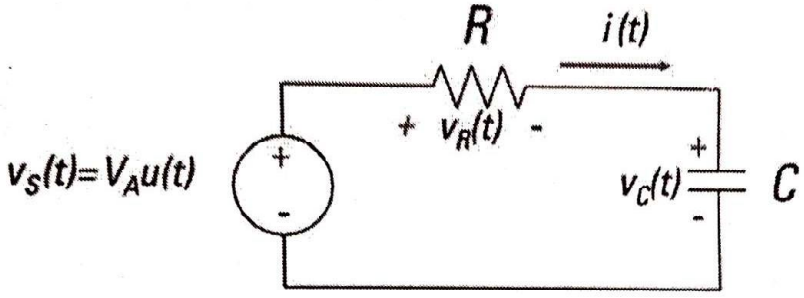
(OR)

4. a) Explain the phasor relation for parallel RLC circuit.

   b) Explain the following power factor, apparent power, active power and reactive power.

UNIT - III

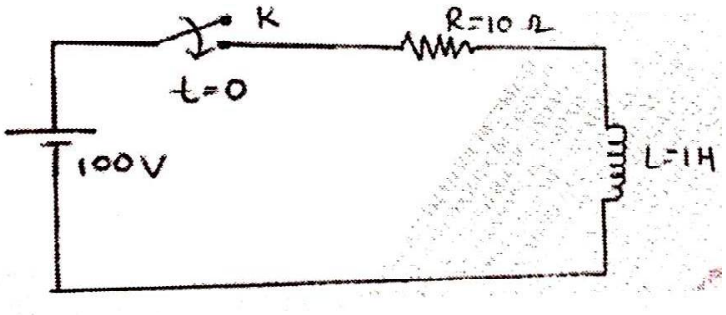
5. a) Write the second order (element) equation for the given circuit and define initial values of storage element.



   b) What is the time constant ? Explain its significance through one suitable example.

(OR)

6. a) The switch is closed at t = 0 find values of I, $\frac{dI}{dt}, \frac{d^2I}{dt^2}, \frac{d^2I}{dt^3}$ at t = 0. Asssume all initial current of inductor to be zero for circuit.



   b) Discuss briefly about energy considerations in mutually coupled circuits.

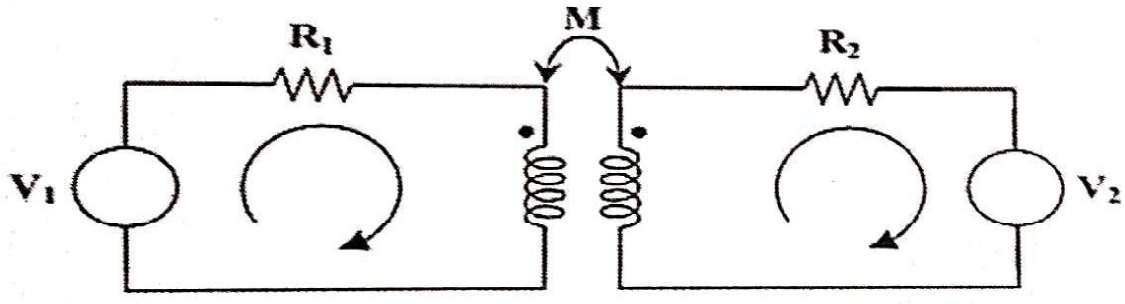
UNIT - IV

7. a) Write the property of laplace transform (i) Unit impulse (ii) Unit step and (iii) Unit ramp function.

   b) Obtain s-domain (Laplace Transform) equivalent circuit diagram of an inductor and capacitor with initial conditions.

(OR)

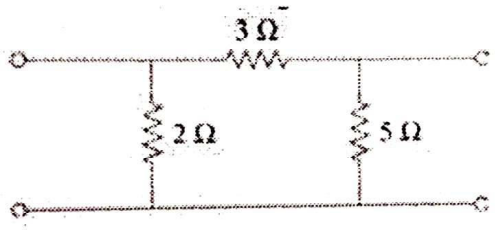
8. a) Given the circuit in Figure V1 = V2 = 10V, R1 = R2 = 10 ohms, ωL1 = ωL2 = 10 and ωM = 5, find the coupling coefficient, k, the currents in the primary and secondary circuits, I1 and I2 and the power absorbed.



   b) Explain the properties of Laplace transformation.

UNIT - V

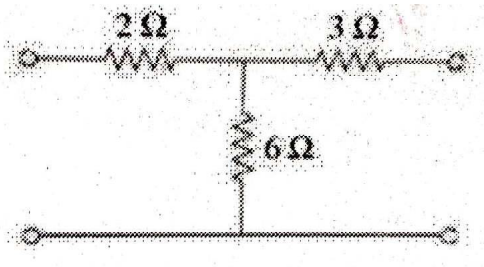
9. a) Find the Z-parameters for the following circuit.



   b) Express Z parameters in terms of ABCD parameters.

(OR)

10. a) Find the Y - parameters for the following circuit.



   b) Derive the relationship between Z and h parameters.