Hall Ticket No | | | | | | | | | | | Question Paper Code: AEEB02

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech II Semester End Examinations (Regular) - May, 2019

Regulation: IARE – R18

ELECTRICAL CIRCUIT ANALYSIS

Time: 3 Hours **(ECE)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Classify types of electric circuit elements depending on their characteristics and explain in detail. Differentiate resistor, inductor and capacitor elements using their voltage-current characteristics **[7M]**

   (b) Find the total power dissipated in the circuit shown in the Figure 1 all resistances are in Ohms. **[7M]**

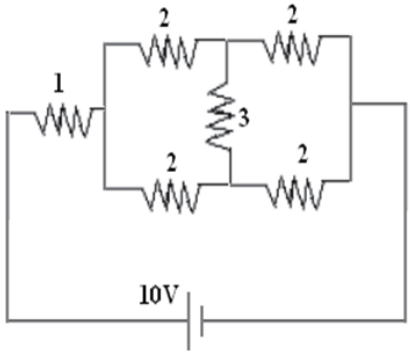

Figure 1

2. (a) What is the difference between an ideal source and a practical source? Draw the relevant characteristics of the above sources. **[7M]**

   (b) Using voltage division, calculate V_1 and V_2 in the network shown in Figure 2 . **[7M]**

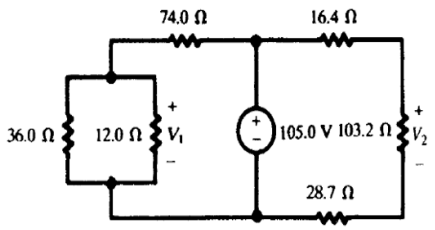

Figure 2

UNIT – II

3. (a) Define the terms peak, peak to peak, average, RMS values, peak and form factor of sine wave. **[7M]**

   (b) For the wave form as shown in Figure 3, calculate the RMS value and average value, and hence the value of form factor, if V_m=10 Volts. **[7M]**

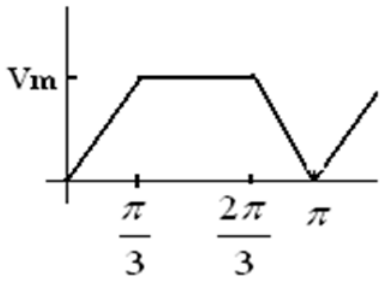

Figure 3

4. (a) Determine the voltage, current and power in series RL circuit using sinusoidal excitation **[7M]**

   (b) A series RLC circuit is connected across a variable frequency supply and has R = 12 ohms, L = 1mH and C = 1000PF. Calculate resonant frequency, Q factor and cut of frequencies. **[7M]**

UNIT – III

5. (a) Derive the equivalent inductance of series connection of coupled circuits when mutual inductance is M. **[7M]**

   (b) Two coupled coils have self-inductance L_1=10mH and L_2=20mH. The co-efficient of coupling(k) being 0.75 in the air, find voltage in the second coil and the flux of first coil provided the second coil has 500 turns and the circuit current is given by i_1=2sin314t. **[7M]**

6. (a) State Faraday's law of electro-magnetic induction. Write the expression for co-efficient of coupling and define perfect coupling. **[7M]**

   (b) Compute the value of I_2 by using Thevenin's theorem for the circuit shown in Figure 4 **[7M]**

UNIT – IV

7. (a) Obtain the expression for current i(t) for t>0 in a driven series R-L circuit and draw necessary sketches. Assume D.C excitation using differential equation approach **[7M]**

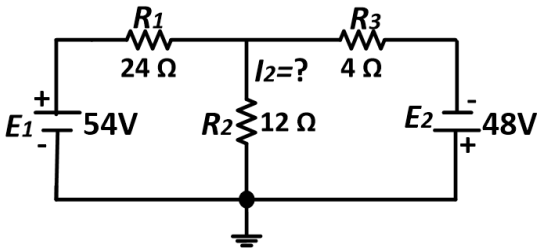

Figure 4

(b) The circuit shown in Figure 5 consists of resistance, inductance and capacitance in series with a 100V constant source, when the switch is closed at t=0 find the current response using Laplace transform method **[7M]**

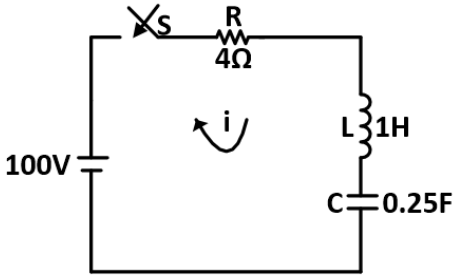

Figure 5

8. (a) What is transient response of circuit? Explain why the voltage across a capacitor and current in an inductor cannot change instantaneously. **[7M]**

(b) In the circuit shown in Figure 6, the switch is initially in closed position for a long time and opened at time t=0. Find the current i(t) for t>0 **[7M]**

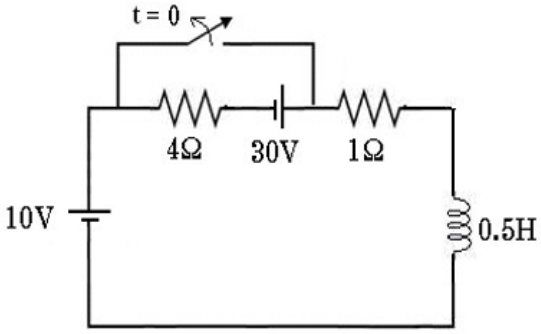

Figure 6

UNIT – V

9. (a) Define reciprocity and symmetry for a generalized two port network and derive the conditions for reciprocity and symmetry in terms of Z parameters. **[7M]**

(b) Obtain 'Z' parameters of the network shown in Figure 7 **[7M]**

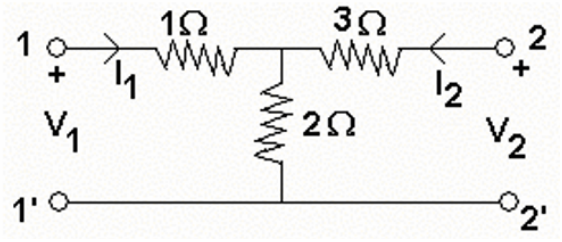

Figure 7

10. (a) Obtain the relation between impedance and admittance parameters. **[7M]**

(b) Find the transmission parameters for the network shown in Figure 8. **[7M]**

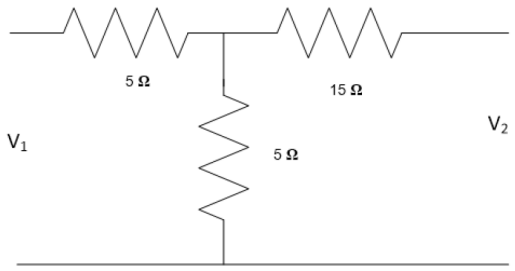

Figure 8