

Code No: 153BH

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year I Semester Examinations, October - 2020**

**NETWORK ANALYSIS AND TRANSMISSION LINES**

(Electronics and Communication Engineering)

**Time: 2 hours**

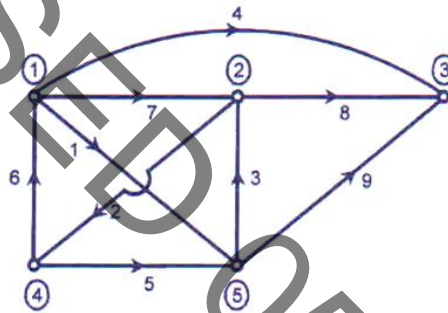
**Max. Marks: 75**

**Answer any five questions**

**All questions carry equal marks**

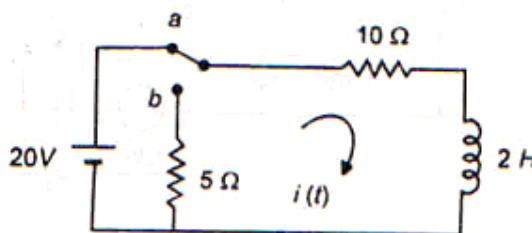
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- 1.a) Derive an expression for coefficient of coupling between two mutually coupled coils.
- b) The number of turns in two coupled coils is 250 and 750 respectively. When 2.5 A current flows in coil 1, the total flux in this coil is 0.3 milli Wb and the flux linking the second coil is 0.15 Wb. Determine  $L_1$ ,  $L_2$ ,  $M$  and  $K$ . [7+8]
- 2.a) Explain the following: (i) sub graph (ii) connected graph and (iii) Planar graph.
- b) Obtain the fundamental circuit matrix for the graph in the figure 1. Choose the tree consisting of branches 6, 7, 8 and 9. [6+9]



**Figure: 1**

3. Obtain the response of the current flowing through a Series RLC circuit when excited by a step voltage by closing the switch at  $t = 0^+$ . [15]
- 4.a) The circuit in figure 2 is operating under steady state condition when the switch is at position 'a' and at  $t = 0$ , the switch is moved to position 'b'. Determine the current  $i(t)$ .



**Figure: 2**

- b) An inductance of 0.6 H, a resistance of 6 ohm and a capacitance of  $10 \mu\text{F}$  are in series across a 230 V, A.C supply. Calculate the frequency at which the circuit resonates. Find the current at resonance, bandwidth, half power frequencies and the voltage across capacitance at resonance. [8+7]

5. Determine the driving point impedance  $\frac{V_1}{I_1}$ , transfer impedance  $\frac{V_2}{I_1}$  and voltage transfer ratio  $\frac{V_2}{V_1}$  for the network shown in Figure 3. [15]

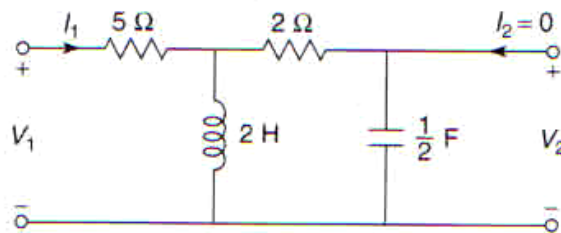


Figure: 3

6. The z-parameters of a certain two port network are  $Z_{11} = 5 \Omega$ ,  $Z_{12} = Z_{21} = 3 \Omega$  and  $Z_{22} = 4 \Omega$ . Determine its y-parameters, transmission parameters, and hybrid parameters (h) and inverse hybrid parameters (g). [15]
- 7.a) Calculate the characteristic impedance for the following line parameters:  
 $R = 10.4 \text{ ohms/km}$ ;  $L = 0.00367 \text{ H/km}$ ;  $C = 0.00835 \mu\text{F/km}$  and  $G = 10.8 \times 10^{-6} \text{ mhos/km}$
- b) State the properties of infinite line. [8+7]
8. Derive an expression for the input impedance of distortion less lines. Deduce the input impedance of open and short circuited distortion less lines. [15]

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