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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]
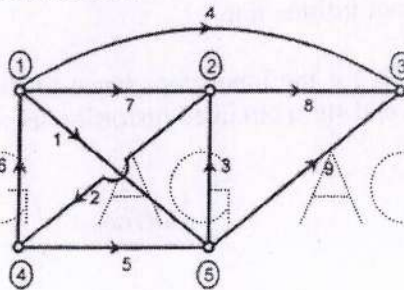

Figure: 1

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).
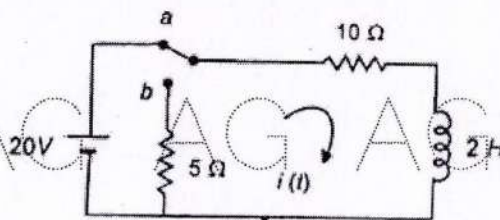

Figure: 2

 b) An inductance of 0.6 H, a resistance of 6 ohm and a capacitance of 10 µF are in series across a 230 V, AC 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]
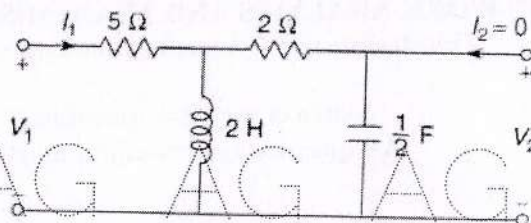

Figure: 3

6. The z-parameters of a certain two port network are Z_{11} = 5 Ω, Z_{12} = Z_{21} = 3 Ω and Z_{22} =4 Ω. 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 ohms /km; L = 0.00367 H/km; C = 0.00835µF /km and G = 10.8×10^{-6} 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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