Code No: 133BJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2018
NETWORK ANALYSIS
(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) What is an Ideal transformer? [2]
 b) Discuss the dot convention between magnetically coupled coils. [3]
 c) What is resonance? Explain. [2]
 d) What is the significance of power factor? [3]
 e) Explain the significance of average value. [2]
 f) What are the Laplace transform of step and exponential functions? [3]
 g) Define poles and zeros in a transfer function. [2]
 h) What is a driving point in transfer function? Explain. [3]
 i) Write the Properties of LC Networks. [2]
 j) State Foster's Reactance theorem. [3]

PART-B
(50 Marks)

2.a) Clearly explain the following:
   i) Self inductance (L)
   ii) Mutual inductance (M)
 b) An Iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the relative permeability of the Iron is 400, when a current of 1 Amp flows in the winding, determine the flux density Neglect leakage and fringing. [5+5]

OR

3. Define and explain the following with an example: [10]
   a) Oriented Graph
   b) Tree of a Graph
   c) Tie set and a basic Tie set
   d) Cut set and a basic Cut set.

4.a) R-C series circuit is suddenly excited from a step voltage V. Derive an expression for the current as a function of time and draw the graph current Vs Time.
 b) An inductive coil of Resistance R and inductance L is connected in parallel with a capacitor C. Derive the expressions for resonant frequency and Q factor. [5+5]

OR

5. A series RLC circuit is connected across a variable frequency supply and has R = 12 ohms, L = 1mH and C = 1000pF. Calculate
   a) Resonant frequency,
   b) Q factor and
   c) Half power frequencies. Derive the formulae used.   [2+2+6]

6.a) Derive expression for R.M.S and average value of a sinusoidal alternating quantity.   [5+5]

   b) A pure inductance of 5 mH carries a current of the wave form shown in figure 1. Sketch the waveform of V(t) and P(t). Determine the average value of power.
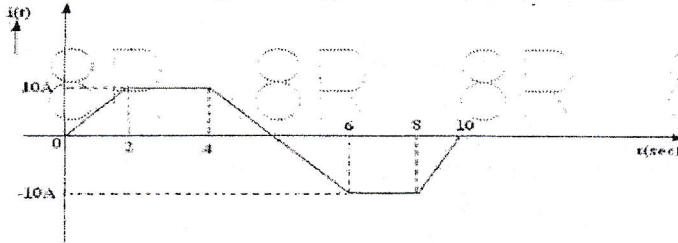

Figure: 1

OR

7.a) A capacitor of 100 µF is connected across 200 V, 50 Hz, Single phase supply. Calculate: i) The reactance of the capacitor ii) RMS value of the current iii) The maximum value of the current.

   b) When an impulse voltage is impressed across R-C circuit, derive an expression for its current response.   [5+5]

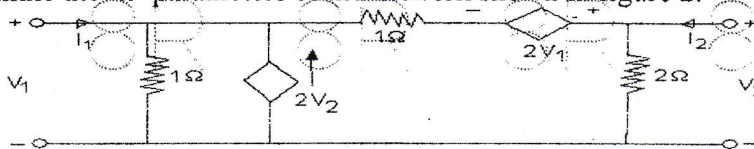8.a) Determine the 'h' parameters of the network shown in figure 2.

Figure: 2

   b) Define Z and Y parameters of a two port network and determine the relationship between the above parameters.   [5+5]

OR

9. Explain clearly the following terms:
   a) Propagation constant and characteristic impedance
   b) Attenuation constant.   [5+5]

10.a) What is a high pass filter? In what respects it is different from a low pass filter?
   b) Derive the equations to find the inductances and capacitances of a constant K high pass filter.   [5+5]

OR

11.a) Explain the variation of Attenuation, phase shift and characteristic impedance of Band pass filter.
   b) Draw the circuit diagram for T and π sections of composite filter.   [5+5]

---oo0oo---