

**Code No: 133BK**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year I Semester Examinations, November/December - 2017**

**NETWORK THEORY**

**(Electrical and Electronics Engineering)**

**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.

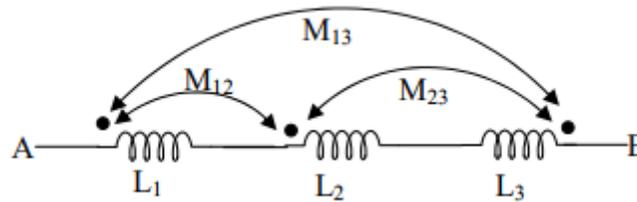
Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

**(25 Marks)**

- 1.a) Give the advantages and disadvantages of tie-set matrix. [2]
- b) Write the expression for total inductance of the three series connected coupled coils connected between A and B as shown in circuit shown in figure 1. [3]



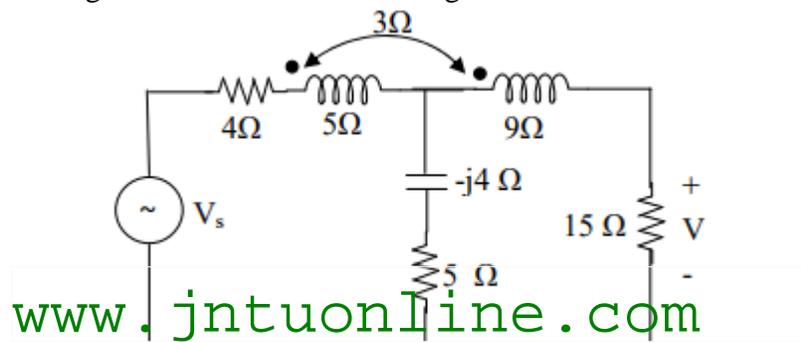
**Figure: 1**

- c) What are the advantages of poly phase system over single phase system? [2]
- d) Explain the effect of power factor on wattmeter readings in two wattmeter method. [3]
- e) Explain why the current in inductance does not change in zero time. [2]
- f) Write a short note on the procedure employed to evaluate initial conditions. [3]
- g) Define active and passive ports. [2]
- h) Express Z-parameters in terms of ABCD parameters. [3]
- i) List out the disadvantages of constant – k filters. [2]
- j) Sketch the frequency response of high pass filters. [3]

**PART-B**

**(50 Marks)**

2. Determine voltage V across a 15 ohms resistor in the magnetically coupled circuit shown in Figure 2. Take  $V_s = 30\angle 40^\circ$ . [10]



**Figure: 2**

**OR**

3. For the graph shown in Figure 3, write the incidence matrix. Express branch voltage in terms of node voltages and then write a loop matrix and express branch currents in terms of loop currents. [10]

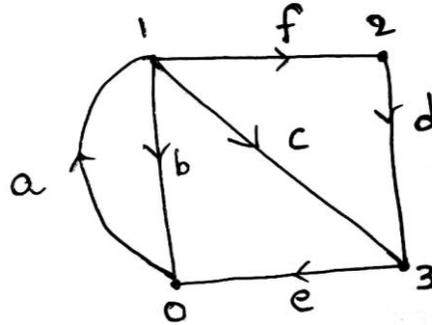


Figure: 3

- 4.a) Derive the relation between line and phase voltages and currents for a balanced STAR connected system.  
 b) The two watt meter readings in a 3-phase power measurement are 8 KW. The latter reading is being obtained after the reversal of current coil. Calculate the total power, Active Power, Reactive power and power factor of the load. [5+5]

OR

5. A three phase balanced delta connected load of  $(9+j2)$  ohm is connected across a 400V,  $3\phi$  balanced supply. Determine the phase currents and line currents. Assume the phase of sequence to be RYB. Also calculate the power drawn by load. [10]
6. With the switch open steady state is reached with  $V = 100 \sin 314 t$  volts. The switch is closed at  $t=0$ . The circuit is allowed to come to steady state again. Determine steady state current and complete solution of transient current (figure 4). [10]

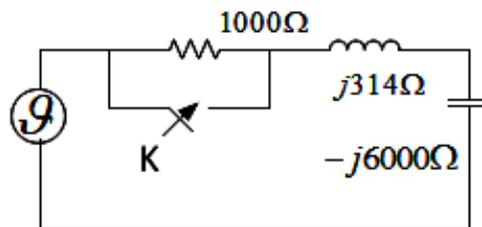
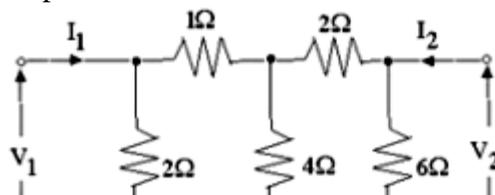


Figure: 4

OR

7. Obtain the expression for  $i(t)$  for a series RL circuit when excited by a source of  $V(t) = V_m \sin(\omega t + \theta)$  using Laplace transform. [10]
8. Find the Y-parameters for the circuit shown in figure 5. [10]



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Figure: 5

OR

9. The Z-parameters of a two- port network are  $Z_{11}=15\Omega$ ,  $Z_{12}=Z_{21}=6\Omega$  and  $Z_{22}=24\Omega$ . Determine ABCD parameters. [10]
10. Design a band pass filter with cutoff frequencies of 2000Hz and 5000Hz with a design impedance of 500 ohms. [10]
- OR**
11. Design a m-derived low filter with a design impedance of  $300\Omega$  and the cut off frequency at 2 KHz and infinite attenuation at 2345Hz. [10]

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