

Code No: 54019

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year II Semester Examinations, November/December -2015

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to ECE, ETM)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Obtain the response of an RC network for internal energy excitation, unit step excitation and sinusoidal excitation.
- b) Solve for the current $i(t)$ in the RLC network given in figure 1. [7+8]

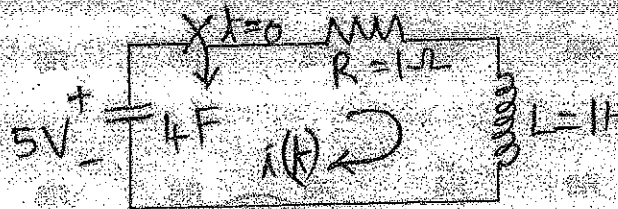


Figure: 1

- 2.a) Obtain the relationships between:
i) y and z parameters
ii) h and z parameters.
- b) Determine y-parameters of the network shown in figure 2. [6+9]

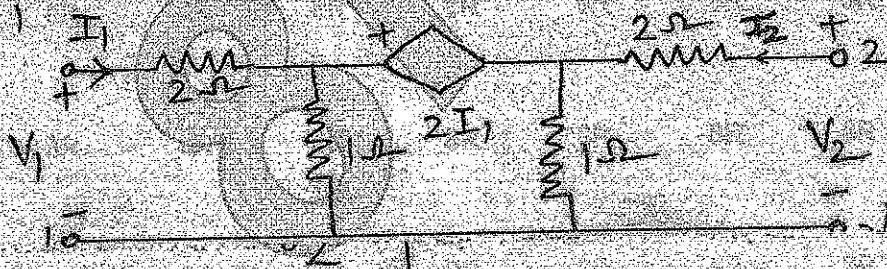


Figure: 2

- 3.a) Discuss the behaviour of:
i) Constant-K high pass filter
ii) Band elimination filter.
- b) Design an m-derived T-section low pass filter having a cutoff frequency $f_c = 2000$ Hz. Design impedance $R_k = 600\Omega$ and frequency of infinite attenuation $f_\infty = 2050$ Hz. [8+7]
4. Describe the functioning of bridge type and lattice type attenuators. [15]
- 5.a) Explain the principle of operation of DC generator.
- b) A long shunt compound DC generator delivers a load current of 100 A at 400 V. The armature, series and shunt field resistances are 0.04Ω , 0.02Ω and 200Ω respectively. Find the armature current and generated emf. Also find the same if the machine is assumed as short shunt compound. [8+7]

- 6.a) Derive the torque equation of a DC motor.
- b) A DC series motor has an armature resistance of 0.03Ω and series field resistance of 0.04Ω . The motor is connected to 400V supply. The line current is 20A when the speed of the machine is 1000 rpm. Find the speed of the machine when the line current is 50A and the excitation is increased by 20%. [7+8]
- 7.a) Draw the equivalent circuit of a transformer, explaining various terms and also draw the phasor diagram of a transformer on lagging load, referred to as secondary.
- b) Derive the condition for maximum efficiency of a transformer.
- c) Calculate the efficiency at 25% overload for a 100 KVA transformer at 0.7 pF. The core losses are 800 W and full load copper losses are 1000W. [6+4+5]
8. Write notes on the following:
- a) AC tachometers
- b) Synchros. [7+8]

