



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Regular) - December, 2017

Regulation: IARE – R16

ELECTRICAL TECHNOLOGY

(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the Transient response of an series RL circuit using differential equations approach. [7M]
- (b) Determine the current equations for i_1 and i_2 for the circuit given in Figure1 when the switch is closed at $t=0$. [7M]

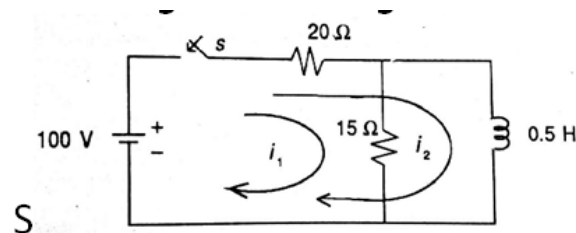


Figure 1

2. (a) Explain the Transient response of an series RC circuit using differential equations approach. [7M]
- (b) In the circuit shown in Figure 2 determine the current $i(t)$ when the switch is moved from position 1 to 2 at time $t=0$ using Laplace transform. [7M]

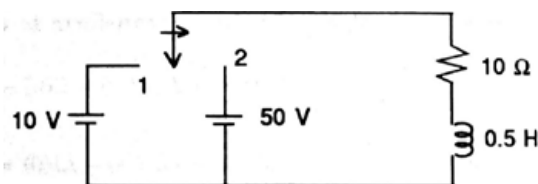


Figure 2

UNIT – II

3. (a) Explain the hybrid parameters of a two port network. [7M]
- (b) The Z parameters of a two port network are $z_{11} = 6\text{ohm}$, $z_{22} = 4\text{ohm}$, $z_{12} = z_{21} = 3\text{ohm}$. Find the equivalent Y parameters and ABCD parameters. [7M]

4. (a) Discuss the interconnection of two port networks. [7M]
 (b) Find out the ABCD parameters of the network shown in the Figure 3. Also find the image parameters for the network. [7M]

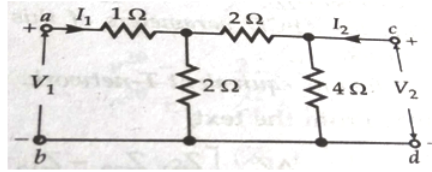


Figure 3

UNIT – III

5. (a) Explain any two types of attenuators. [7M]
 (b) Design a constant k, high pass (both π section and T section) filter having a cut off frequency of 1 kHz to operate with a load resistance of 600 ohm. [7M]
6. (a) Describe design equations of band pass filters. [7M]
 (b) Design a π type attenuator to have characteristic impedance of 100 ohm and attenuation of 20 dB. [7M]

UNIT – IV

7. (a) Derive the armature torque expression of a dc motor. [7M]
 (b) A 250V shunt motor runs at 1000rpm at no load and takes 8A. The total armature and shunt field resistances are 0.2 ohm and 250 ohm respectively. Calculate the speed when loaded and taking 50A. Assume the flux to be constant. [7M]
8. (a) What are the different types of speed control methods in DC motors? And explain the field control method. [7M]
 (b) A 240 V, 4-pole shunt motor has $N = 1000$ rpm, output = 15 HP, $I_a = 50$ A, $R_a = 0.1 \Omega$, $I_{sh} = 1$ A. Brush drop 1V/brush, winding = wave, $Z = 540$. Find useful torque, total torque, and useful flux per pole, rotational losses and efficiency. [7M]

UNIT – V

9. (a) Explain the various losses in a transformer. How these losses are minimized? [7M]
 (b) In a 25 KVA, 2000/200V transformer the iron and copper losses are 350 Watts and 400 Watts respectively. Calculate the efficiency at full load and 0.8 power factor lagging. [7M]
10. (a) Explain the constructional details and working principle of transformer with neat sketch. [7M]
 (b) A single phase, 2850/500V transformer gave the following results: [7M]
 Open Circuit test: 250V, 1A, 80W (LV side)
 Short circuit test: 20V, 12A, 100W (HV side)
 Draw the equivalent circuit by showing all the circuit constants.