



INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

Four Year B.Tech III Semester End Examinations (Supplementary) - July, 2018

Regulation: IARE – R16

ELECTRICAL TECHNOLOGY

Time: 3 Hours

(ECE)

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 DC transient response of an series RLC circuit. [7M]
- (b) For the circuit shown in Figure 1 find the current equation when the switch is changed from position 1 to position 2 at $t=0$ using differential equation approach. [7M]

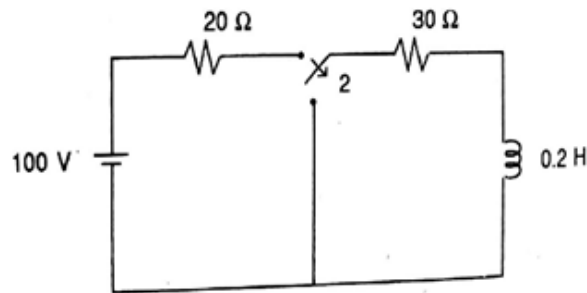


Figure 1

2. (a) Explain the DC transient response of an series RL circuit. [7M]
- (b) For the circuit shown in Figure 2 obtain the equations for $I_1(t)$ and $I_2(t)$ when the switch is closed at $t=0$ using Laplace transformation method. [7M]

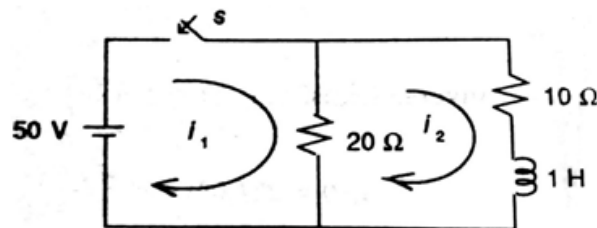


Figure 2

UNIT – II

3. (a) Explain the cascaded and parallel configurations of two port networks. [7M]
 (b) Find the Z parameters for the circuit shown in Figure 3 [7M]

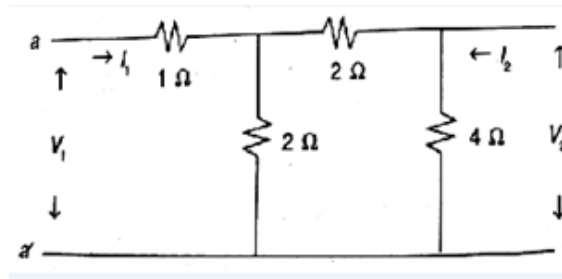


Figure 3

4. (a) Explain hybrid parameters with necessary equations. [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]

UNIT – III

5. (a) Derive the expression for characteristic impedance and design equations of π type attenuator. [7M]
 (b) Design a symmetrical lattice attenuator to have characteristic impedance of 800 ohm and attenuation of 20dB. [7M]
6. (a) Derive the characteristic impedance and cutoff frequency of band pass and band rejection filters. [7M]
 (b) Design a constant k, low pass (both π section and T section) filter having a cut off frequency of 2 kHz to operate with a terminated load resistance of 500 ohm. [7M]

UNIT – IV

7. (a) Derive the expression for EMF equation of the DC generator. [7M]
 (b) A 20KW, 440 volt short shunt compound wound DC generator has armature, shunt, and series field resistances are 0.4 ohm, 240 ohm and 0.25 ohm respectively. The losses are 75W. Calculate the full load efficiency of the generator. [7M]
8. (a) What are the different types of speed control methods in DC motors? Explain the field control method. [7M]
 (b) A 230 volts DC motor drives a load at certain speed and take a current of 45A. The load characteristics are such that its torque is proportional to its cube of the speed. It is decided to reduce the speed of motor to 80% of its initial value by adding external resistance in series with armature winding. Calculate the value of this resistance. The total armature resistance of motor is 1 ohm. [7M]

UNIT – V

9. (a) Draw and explain the phasor diagram of the transformer at no-load and on-load conditions. [7M]
- (b) A 200KVA, single phase transformer has an efficiency of 98% at full load. The maximum efficiency occurs at $3/4^{th}$ full load. Calculate: [7M]
- i. The iron losses
 - ii. The copper losses at full load
 - iii. The efficiency at half load assuming a power factor of 0.8 at all loads.
10. (a) Draw and explain the approximate equivalent circuit of a transformer with reference to the primary side. [7M]
- (b) A single phase transformer has 400 primary and 100 secondary turns. The net cross sectional area of the core is 60 cm^2 . If the primary winding is connected to a 50 Hz supply at 520 Volts. Calculate: [7M]
- i. The peak value of flux density in the core
 - ii. Voltage induced in the secondary winding
 - iii. Transformation ratio
 - iv. EMF induced per turn in both the windings

