

## S.E. (Electronics/Electronics &amp; Telecommunication)

## ELECTRICAL CIRCUITS

(2019 Pattern) (Semester - III) (204183)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, and Q.7 or Q.8.
- 2) Figures to the right side indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) a) Write a note on pole zeros of network functions and stability. [6]

b) Find h-parameters for the network shown in Fig. 1. [6]

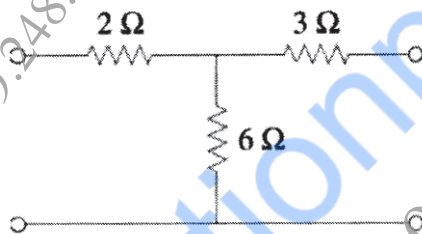


Fig. 1

c) When do we say that, an electric network is symmetrical? What are the conditions for an electrical network to be symmetrical in terms of [6]

- i) Y parameters
- ii) Z parameters

OR

Q2) a) What is network function? Give various types of network functions for two port network. [6]

b) Find Y-parameters for the network shown in Fig. 2 [6]

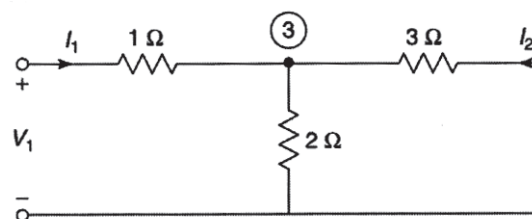


Fig. 2

P.T.O.

- c) Determine the z parameters for the circuit shown in Fig. 3 [6]

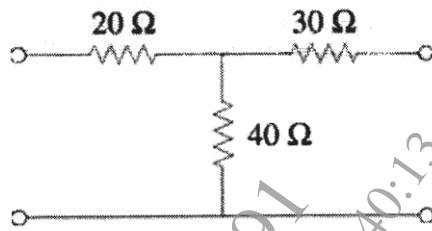


Fig. 3

- Q3) a) What do you understand by the term back e.m.f.? [5]  
b) A shunt generator has 4 pole with lap wound armature having 24 slots with 10 conductors/slot. If the flux/pole is 0.04 Wb and the speed is 1500 rpm, calculate the emf generated in the armature. What would be generated e.m.f. if the winding is wave connected? [6]  
c) What are the losses that occur in DC machines (generator/motor). [6]

OR

- Q4) a) What are the various types of DC motors? Draw circuit diagram of them and mention their application. [5]  
b) A 250V, 4 pole, wave wound DC series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 ohm. The motor takes a current of 40 A. Estimate its speed and gross torque developed if it has a flux per pole of 25mWb. [6]  
c) Draw a neat sketch of a DC generator. State the functions of each part. [6]

- Q5) a) Define slip and synchronous speed of 3 phase induction motor. A 3-phase induction motor is wound for 8 poles and is supplied from 50 Hz source. [6]

Calculate

- i) Synchronous speed.  
ii) Slip of the motor when speed is 720 rpm.  
b) Explain various power stages in three phase induction motor. [6]  
c) List the different losses that occur in an induction motor. Also mention the factors on which these losses depend. [6]

OR

- Q6)** a) Explain the difference between squirrel cage induction motor and slip ring induction motor. [6]
- b) The power input to a 3 phase induction motor is 60kW. The stator losses total 1kW. Find the mechanical power developed and the rotor copper loss per phase if the motor is running with a slip of 3%. [6]
- c) What are the advantages of using three phase system over single phase system? [6]
- Q7)** a) Compare Variable Reluctance and Permanent Magnet stepper motors. [5]
- b) Enlist the advantages and disadvantages of BLDC motor. [6]
- c) Explain the operation of stepper motor with full stepping sequence. [6]

OR

- Q8)** a) Compare Brushless DC motor with conventional DC motor. [5]
- b) What is the need of electric vehicle? Also give the advantages and disadvantage of electric vehicle. [6]
- c) What are stepper motors? How does it work? [6]

