Total No. of Questions : 8]

SEAT No. :

PE4257

[Total No. of Pages : 3

[6582]-28

S.E. (Electronics/E & TC Engineering)

ELECTRICAL CIRCUITS

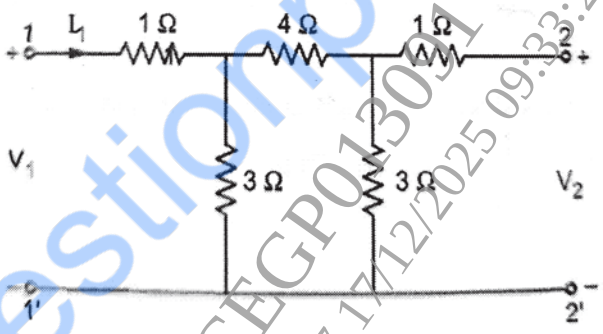
(2019 Pattern) (Semester - III) (204183)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, and Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***

Q1) a) Find y-parameters of the network shown **[6]**

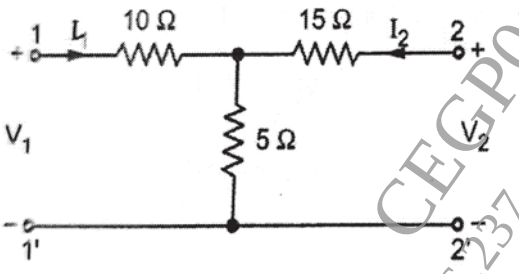


b) Explain the significance of pole and zeros. How the locations of poles and zeros of networks affect the network stability? **[6]**

c) Define Z-parameters and draw its equivalent circuit. **[6]**

OR

Q2) a) Find z-parameters of the network shown **[6]**



b) Define Y-parameters and draw its equivalent circuit. **[6]**

c) Explain the condition of reciprocity and symmetry by giving examples. **[6]**

P.T.O.

Q3) a) Derive the emf equation of DC generator. **[6]**

b) Explain the methods of speed control of DC shunt motors. Draw the necessary circuit diagrams. **[6]**

c) A 4 pole, lap wound, DC generator has 42 coils with 8 turns per coil. It is driven at 1200 rpm. If useful flux per pole is 21 mWb, calculate the generated emf. Find the speed at which it is to be driven to generate the same emf as calculated above with same wave wound armature. **[5]**

OR

Q4) a) Derive an expression for torque of a DC motor. **[6]**

b) Explain the torque speed and torque current characteristic of DC shunt motor. **[6]**

c) Find the useful flux per pole on no-load of a 250V, 6 pole shunt motor having a two circuit connected armature winding with 220 conductors. At normal working temperature, the overall armature resistance including brushes is 0.2Ω. The armature current is 13.3 A at the no-load speed of 908rpm. **[5]**

Q5) a) Explain the construction and working principle of three phase induction motor. **[6]**

b) A 4 pole, 3 phase induction motor is supplied from 50Hz supply. Determine its synchronous speed. On full load, its speed is observed to be 1410 rpm. Calculate its full load slip. **[6]**

c) Explain speed control with v/f method. **[6]**

OR

Q6) a) Compare squirrel cage rotor and slip ring rotor. **[6]**

b) The input to 3-phase, 400V, 6 pole, 50Hz induction motor is 10kW, while running at 950rpm. The stator losses are 600 watt and mechanical losses are 400 watt/Calculate motor output and its efficiency. **[6]**

c) Derive the relationship between P2, Pm and Pc. **[6]**

Q7) a) Explain the construction of brushless DC motor. Draw and explain it's torque-speed characteristics. **[6]**

b) What are stepper motors? How they are classified? **[6]**

c) Compare EV and IC engine vehicles. **[5]**

OR

Q8) a) Define the following terms related to stepper motor: **[6]**

i) Holding torque

ii) Detent Torque

iii) Step Angle

iv) Critical torque

v) Limiting Torque

vi) Slew Rate

b) Explain construction and working of EV. **[6]**

c) Compare variable reluctance and permanent magnet stepper motor. **[5]**

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