Total No. of Questions : 8]

SEAT No. : ____

P1487

[Total No. of Pages : 3

[6002]-114

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 Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) What is a two port network? Mention the application of two port network parameters **[6]**

b) Determine the z parameters for the circuit shown in Fig. 1. **[6]**

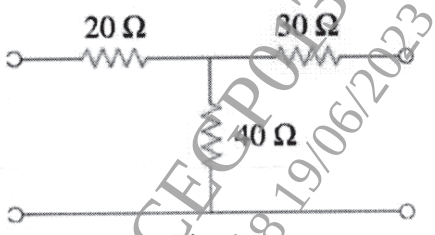

Fig. 1

c) Find the condition for symmetry and reciprocity of Z parameter. **[6]**

OR

Q2) a) Explain the pole-zeros of network function. Also state its significance. **[6]**

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

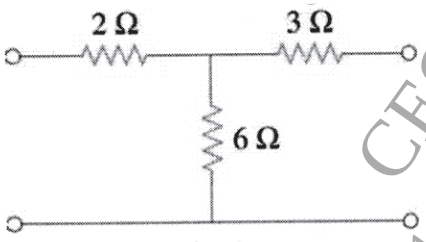

Fig. 2

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c) Determine Z(s) in the network shown in Fig.3. Find poles and zeros of Z(s) and plot them on s-plane. **[6]**

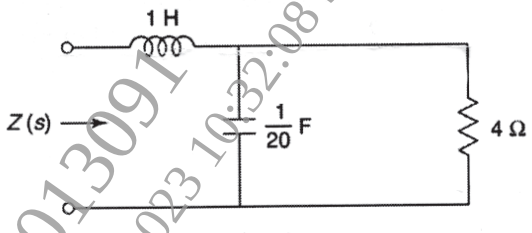

Fig. 3

Q3) a) What are the types of DC motor? A series motor should not be started on no load. Why? **[5]**

b) Draw a neat sketch of a DC generator. State the functions of each part. **[6]**

c) A 200 V lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5 Ω and that of field winding is 200 Ω. The motor takes a current of 21 A, the flux per pole is 30 m Wb. Find the speed and torque developed in the motor. **[6]**

OR

Q4) a) Explain significance of back e.m.f. in a DC motor. **[5]**

b) A 4 pole DC shunt generator with lap connected armature has field and armature resistances as 50 Ω and 0.1 Ω respectively. If the generator has to supply 60 lamps, with rating 100V/40 W each. Calculate **[6]**

i) Total armature current

ii) Current in each armature conductor

iii) Generated EMF

Take 1V per brush as contact drop.

c) Why starter is required in a DC motor? Under what condition the mechanical power developed in a dc motor will be maximum? **[6]**

Q5) a) Explain the effect of loading on induction motor. **[6]**

b) What are different methods of speed control for three phase induction motor. Explain any one. **[6]**

c) The power input to a 500V, 50Hz, 6 pole, 3 phase induction motor running at 975 rpm is 40kW. The stator losses are 1kW and the friction and windage losses total 2 kW. Calculate: **[6]**

i) slip

ii) rotor copper loss

iii) shaft power

iv) efficiency

OR

Q6) a) State any 4 use of single phase induction motor? Differentiate between "capacitor start" & "Capacitor start capacitor run" Single phase induction motor? **[6]**

b) What are types of 3-phase induction motor? Explain any one in detail. **[6]**

c) The power input to the rotor of a 440V, 50 hz, 6 pole, 3 phase induction motor is 100kW. The rotor electromotive force is observed to make 120 cycles per minute. Calculate: Rotor speed. **[6]**

i) Mechanical power developed

ii) Rotor copper loss per phase

Q7) a) Give types and applications of stepper motor. **[5]**

b) What is Brushless DC motor? Explain working and construction of any one type of BLDC motor. **[6]**

c) What is the need of electric vehicle? Also give the advantages and disadvantage of electric vehicle. **[6]**

OR

Q8) a) Compare Brushless DC motor with conventinal DC motor. **[5]**

b) Explain the construction and operation of permanent magnet stepper motor. **[6]**

c) Draw the block diagram and explain components of electric vehicle. **[6]**

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