Code No: 133AN

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, April/May - 2018
ELECTRICAL TECHNOLOGY
(Electronics and Communication Engineering)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) Give the function of commutator in a DC generator.   [2]
  b) What is an equalizer bar? How is it used?   [3]
  c) Why transformer rating in VA?   [2]
  d) Draw the phasor diagram of 1-ϕ transformer on no-load.   [3]
  e) Define slip speed of 3-ϕ I.M.   [2]
  f) Write the merits and demerits of slip-ring induction motor.   [3]
  g) What is synchronous impedance?   [2]
  h) Explain coil span factor.   [3]
  i) What is use of Damping torque?   [2]
  j) Compare spring control torque method with gravity control method.   [3]

PART-B
(50 Marks)

2.a) Explain the principle of operation of DC generator.
  b) A 6-pole, Lap wound armature has 840 conductors and flux per pole of 0.018 Wb. Calculate the emf generated when the machine is running at 600 rpm.   [5+5]

OR

3.a) Derive the torque equation of a DC motor.
  b) A 200V DC shunt motor takes a total current of 100 A and runs at 750 rpm. The resistance of the armature winding and shunt field winding is 0.1 ohms and 40 ohms respectively. Find the total copper losses.   [5+5]

4.a) Derive the induced e.m.f equation of transformer.
  b) A 1,000/200 V transformer takes 0.3 A at p.f of 0.2 on open circuit. Find the magnetizing, and iron loss component of no-load primary current.   [5+5]

OR

5.a) What do you understand by efficiency of a transformer? Derive the condition for maximum efficiency.
  b) A single phase transformer working at unity power factor has an efficiency of 80 % at both one half load and at the full load of 600 W. Determine the efficiency at 70 % of full load.
                                                                                           [5+5]

6.a) Explain working principle of 3-phase induction motor.
  b) A 3-phase, 6-pole, 50 Hz induction motor develops 4 kW including friction and windage losses at 950 rpm. If the stator loss is 250 W. Find the slip of the induction motor. [5+5]

OR

7.a) Derive the expression for Torque-Slip characteristics of a 3-phase Induction Motor.
  b) The power input to the rotor of a 400V, 50Hz, 6 pole,3-phase induction motor is 75 KW. The rotor electromotive force is observed to make 100 complete alterations per minute. Calculate (i) slip (ii) rotor speed. [5+5]

8.a) Derive EMF Equation of alternator.
  b) Discuss how regulation of an alternator can be determined by synchronous impedance method. [5+5]

OR

9.a) Derive the relation between speed, frequency and number of poles in an alternator.
  b) Give the constructional details of both salient pole and cylindrical rotor synchronous machines. [5+5]

10.a) Explain the construction and operation of Capacitor start-run motor.
  b) What are the applications of synchro? [5+5]

OR

11. Explain the construction and operation with a neat diagram Permanent Magnet Moving Coil instruments. [10]

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