Code No: 133AN

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2018
ELECTRICAL TECHNOLOGY
(Common to ECE, ETM)

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)   What is the function of brushes in a d.c generator?   [2]
  b)   Define speed regulation of d.c. motor.   [3]
  c)   What are the various losses present in a transformer?   [2]
  d)   Draw equivalent circuit of a short circuit test.   [3]
  e)   Define efficiency of IM.   [2]
  f)   Give the application of 3-ϕ I.M.   [3]
  g)   What is synchronous reactance?   [2]
  h)   What is distribution factor?   [3]
  i)   Define Deflecting torque.   [2]
  j)   Why PMMC not measure AC quantity.   [3]

PART-B
(50 Marks)

2.a)   Explain how will you classify DC generators in detail and also explain the types of DC
       generators.
  b)   A 6-pole wave connected DC generator having 60 slots on its armature with 6 conductors
       per slot, runs at 750 rpm and generates an open circuit voltage of 230 V. Find the useful
       flux per pole.   [5+5]
OR
3.a)   Explain the losses that occur in a DC machine.
  b)   A 4-pole DC shunt generator with lap connected armature supplies a load of 100 A at
       200 V. The armature resistance 0.1 ohms and the shunt field resistance is 80 ohms find
       the Total armature current .   [5+5]

4.a)   Derive from the fundamentals, the E.M.F equation of a single phase transformer.
  b)   Draw a no load phasor diagram and explain it.   [5+5]
OR
5.   A 15kVA, 1-phase, 50Hz, 500/250V transformer gave following test results:
       OC test (LV) side: 250V, 3.0A, 200W
       SC test (HV) side: 25V, 20A, 300W
       Calculate efficiency and regulation at full-load, 0.8 p.f lagging.   [10]

6.a) Explain construction and working principle of 3-phase Squirrel cage motor.
  b) Three phase induction motor is wound for 4 – poles and is supplied from a 230V, 50 Hz supply. Calculate:
     i) The synchronous speed
     ii) The speed of the motor when the slip is 2%
     iii) The rotor frequency.   [5+5]

OR

7.a) Explain different starting methods of 3-Ø Induction motor.
  b) The frequency of emf in the stator of a 4-pole induction motor is 50Hz, and that of rotor is 1.5Hz. Calculate slip and at what speed will the motor run?   [5+5]

8.a) Explain constructional features of alternator.
  b) How e.m.f is induced in an 3-phase alternator? Derive the expression for e.m.f?   [5+5]

OR

9.a) Draw the phasor diagram of the synchronous generator on load.
  b) A 50Hz alternator has a flux of 0.1 Wb/pole, sinusoidally distributed. Calculate the rms value of the emf generated in one turn of the winding, which spans 3/4 of a pole pitch.
                                                                                   [5+5]

10.a) Derive the torque equation of Moving iron instruments.
   b) Discuss the classification of electrical instruments.   [5+5]

OR

11.a) Explain the construction and operation of stepper motor.
   b) Explain the construction and operation split phase 1-phase induction motor.   [5+5]

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