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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