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Code No: 133AN

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, April/May - 2018

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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.

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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]

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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]

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- 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]

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- 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]

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

- 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]

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

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

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