

Code No: 133AN

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, May/June - 2019

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) Why series motor cannot be started on no-load? [2]
- b) What are Faradays laws of Electro Magnetic Induction? [3]
- c) Draw the equivalent circuit of a transformer. [2]
- d) What will happen if DC supply is given on the primary of a transformer? [3]
- e) Why starters are necessary for starting of 3-phase induction motors? [2]
- f) Define slip and explain significance of slip in three phase induction motor. [3]
- g) Define the term pitch factor. [2]
- h) Define synchronous reactance and synchronous impedance of synchronous generator. [3]
- i) How the direction of rotation is reversed for capacitor start capacitor run motor? [2]
- j) Write the applications of shaded pole motor. [3]

PART-B

(50 Marks)

- 2.a) Explain different types of DC generators.
 - b) A Shunt generator delivers 50 KW at 250 V and 400 rpm. The armature and field resistances are 0.02Ω and 50Ω respectively. Determine the speed of the machine running as a shunt motor and taking 50 KW input at 250 V. Allow 1V per brush for contact drop. [5+5]
- OR**
- 3.a) Explain different characteristics of DC shunt motor.
 - b) The armature of a 4 – pole Shunt Motor has a lap winding accommodated in 60 slots, each containing 20 conductors. If the useful flux per pole is 23 m Wb, Calculate the Total torque developed when the armature current is 50 A. [5+5]
4. A 50 kVA, 2200 / 220V transformer when tested, given the following results: OC test, measurements on LV side: 405 W, 5 A, 220 V SC test, measurements on HV side: 805 W, 20.2 A, 95 V Draw the circuit model of the transformer referred to the HV and LV sides. Label all the parameters. [10]

OR

- 5.a) What are the various losses that occur in a transformer? Derive the condition for maximum efficiency of a transformer.
- b) A 11000/400 V distribution transformer takes a no load primary current of 1 A at a power factor of 0.24 lagging. Find: (i) Core loss current. (ii) Magnetizing current. (iii) Iron loss. [5+5]

- 6.a) Explain any one method of starting of an induction motor with neat diagram. [5+5]
b) Explain torque-slip characteristics of three phase induction motor. [5+5]

OR

- 7.a) Explain how the rotating magnetic field is developed in a 3- ϕ induction Motor?
b) Calculate the slip speed and rotor frequency of three-phase, 50Hz, 4-pole Induction motor running at 1440rpm. [5+5]

- 8.a) Write the differences between salient pole and non salient pole rotor.
b) A 600V, 60kVA, 3-phase alternator has an effective resistance of 0.2 ohms. A field current of 10 A produces an armature current of 210A on short-circuit and e.m.f. of 480 V on open circuit. Calculate Full-load regulation with 0.8 p.f. lagging. [5+5]

OR

9. With a neat sketch, explain the EMF method for predetermining the voltage regulation of an alternator. [10]

10. Explain the construction, principle of operation and applications of stepper motor. [10]

OR

11. Explain the following with reference to the indicating instruments:
a) Deflecting torque
b) Controlling torque
c) Damping torque. [10]

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