

(DEE 415)

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Fourth Year)

ELECTRICALS AND ELECTRONICS ENGINEERING

Paper – V : Electrical Machine Design

Time : 3 Hours

Maximum Marks : 75

Answer question No. 1 compulsory

(15)

Answer any ONE question from each unit

(4 x 15 = 60)

- 1) a) Explain about electromechanical energy conversion system.
- b) Explain about cylindrical rotating machines.
- c) Explain about classification in DC machines.
- d) Give the classification of transformers.
- e) Explain the use of CRGO material in a transformer.
- f) Explain about types of windings using in armature of DC machines.
- g) Explain about coil span and winding pitch in DC machines.
- h) Explain the difference between core type and shell type transformers.
- i) Explain about the purpose of using stators in DC shunt motors.
- j) Explain about the field test for DC series machines.
- k) Explain about the retardation test in DC machines.
- l) Explain about the braking in DC motors.
- m) Explain about back EMF in DC motor.
- n) What are the application of shunt & series DC motors?
- o) Explain about armature reaction in DC motors.

Unit - I

- 2) a) Show how torque can be determined in the multiply excited non-linear system.
- b) In a rectangular electromagnetic relay the exciting coil has 800 turns. Cross sectional area of the core is $A = 5 \text{ cm}^2$. Neglect reluctance of the magnetic circuit and fringing effects. Calculate maximum force on armature if saturation flux on density in the iron part is 1.8T.

OR

- 3) a) Explain the following terms as applied to a DC armature winding.
- i) Front pitch
 - ii) Back pitch
 - iii) Pole pitch
 - iv) Commutator pitch
- b) An eight pole wave connected armature has 300 conductors and runs at 800 rpm determine the use full flux/pole if the electromotive force generated on open circuit is 500V.

Unit – II

- 4) a) What is meant by predetermination? What parameters are predetermined by conducting O.C & S.C tests on single-phase transformer? Explain with neat circuit diagrams.
- b) Explain the working principle of operation of single-phase transformer with phasor diagrams, under leading load conditions.

OR

- 5) a) Derive the expression for efficiency and voltage regulation of a transformer.
- b) Enumerate the various losses in a transformer. How these losses can be minimized.

Unit – III

- 6) a) Explain the principle of operation of induction motor.
- b) Define slip. Explain the slip-torque characteristics of induction motors.

OR

- 7) a) Define the of an alternator and explain how will you find the regulation by synchronous impedance method.
- b) Why three phase induction motors are self starting? Explain in detail with operation.

Unit – IV

- 8) A 400V, 10kVA, 3 phase alternator with star connected stator winding has an effective armature resistance per phase of 1.0 ohm. The alternator generates an open circuit voltage per phase of 90V with a field current of 1.0A. During the short circuit test, with 1.0A of field current the short circuit current owing in the armature is 15A. Calculate.
- The synchronous impedance
 - Synchronous reactance.

OR

- 9) a) Define the of an alternator and explain how will you find the regulation by synchronous impedance method.
- b) Derive the out put equation of an alternator?

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