Exam. Code: 0933
Sub. Code: 6652

2074

B.E. (Electrical and Electronics Engineering)

Third Semester

EE-301: Electric Machinery - I

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Missing data (if any) can be appropriately assumed.

x-x-x

Q1. Explain briefly. **(5x2=10)**

a) Illustrate the magnetizing characteristic of D.C. generator.
b) How the autotransformer is different from two winding transformer?
c) Derive the condition for maximum efficiency of a single-phase transformer.
d) A 2 pole, 3-phase Induction motor runs at 2910 rpm on a 50Hz supply. Find (i) synchronous speed and (ii) frequency of rotor emf.
e) What is meant by cogging in three phase induction motor? How can it be eliminated?

Part A

Q2. A) Explain current and potential transformers in details. Can current transformer be replaced by the potential transformer or vice-versa? **(05)**

B) The test results of 2.5kVA, 230/115V single-phase transformer are as follows: **(05)**
OC Test : 115V, 1.2A, 60W
SC Test : 12V, 10.86A. 120W
Find (i) efficiency at 50% full load, 0.8 pf (ii) regulation at 30% full load, 0.8 pf lag and lead.

Q3. A) Explain construction of DC machine with the help of neat diagram. **(05)**

B) An 8 pole lap wound armature having 40 slots with 12 conductors/ slot generates 500V. Determine speed at which machine is running if the flux per pole is 50 mWb. **(05)**

Q4. A) Explain different methods of speed control of dc shunt motor. **(05)**

B) Draw the phasor diagram of an ideal transformer on no load. Also, draw a phasor diagram of a practical transformer supplying lagging power factor load. **(05)**

P.T.O.

Part B

Q5. A) Determine approximately the starting torque of an induction motor in terms of full load torque when started by means of i) star delta starter (ii) auto transformer with 50% tapping. Ignore Iμ. The short circuit current of motor at normal voltage is 5 times the full load current and slip at full load is 5%. . **(05)**

B) Find the line current drawn from the supply when a 3-phase Induction motor is started using (i) a star-delta starter, (ii) Auto transformer of ratio 0.5, if the line current drawn from the supply is 6A without any starter. **(05)**

Q6. A) Explain double field revolving theory. Based on double field revolving theory, prove that a single phase induction motor is not self starting. **(05)**

B) Explain clearly how a rotating magnetic field is setup around the stator of a 3- phase Induction motor when a 3-phase supply is fed to it. **(05)**

Q7. A) Explain the principle of operation of an induction generator. **(05)**

B) Explain the working of shaded pole motor. **(05)**

x-x-x