

B. TECH. SEM –III (ELECTRICAL ENGG.) 2014 COURSE) (CBCS) :

WINTER - 2017

SUBJECT: ELECTRICAL MACHINES-I

Day: Monday
Date: 15/01/2018

W-2017-2033

Time: 10.00 AM TO 01.00 PM
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

Q.1 a) Prove the condition of maximum efficiency for single phase transformer. Find full load efficiency of 1 phase, 25 kVA, 2000/200V, 50 Hz transformer with constant losses of 750 W and variable full load losses of 1100 W at unity power factor. **(07)**

b) Write a short note on Autotransformer. **(03)**

OR

a) Explain equivalent circuit diagram of transformer, explain parameters referred to primary side and parameters referred to secondary side. **(05)**

b) A 1 phase, 20 KVA, 220/440V, 50HZ transformer has maximum flux density of 1.2 T in core of 25mm² cross-sectional area. Find number of turns on primary side consider no-load condition. **(05)**

Q.2 a) Compare single 3 phase transformer with three 1 phase transformers. **(05)**

b) State the different routine tests for 3 phase transformer. Explain any one. **(05)**

OR

a) Explain any two 3 phase transformer connections in detail and factors affecting the choice of connections. **(05)**

b) Explain the conditions for the parallel operation of 3 phase transformers. **(05)**

Q.3 a) Derive EMF induced in a coil rotating in a magnetic field. **(05)**

b) Derive torque developed in a system of permanent magnet. **(05)**

OR

a) Explain concept of conservation of energy. **(05)**

b) Explain energy developed in singly excited system. **(05)**

Q.4 a) Explain the different characteristics of DC shunt motor and DC series motor. **(07)**

b) A 4 pole, wave connected 800 conductors armature, running at 1000 rpm. If flux per pole is 20 mWb, find generated voltage. **(03)**

OR

a) A 250V shunt motor on no load runs at 1000 rpm and takes 5A. The total armature and shunt field resistance are respectively 0.2 Ω and 250 Ω . Calculate speed when loaded and taking a current of 50A, if the armature reaction weakens the field by 3%. **(05)**

b) Explain necessity of starters for DC motors, explain in short the 3 point starter. **(05)**

Q.5 a) Explain double field revolving theory in single phase induction motors. **(05)**

b) Explain construction and working of universal motors. **(05)**

OR

a) Explain in detail working of shaded pole motor. **(05)**

b) State the applications of DC servomotor and AC servomotor. **(05)**

Q.6 a) Discuss the construction and working of dry type transformer. **(05)**

b) Explain the working, application of permanent magnetic DC motor. **(05)**

OR

a) Explain construction of BLDC motor. Draw suitable diagram. **(05)**

b) Discuss working and construction of CT. **(05)**

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