DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Semester Examination Winter– Nov - 2019

Branch: ELETRICAL ENGINEERING **Sem.:-IV**
Subject: Electrical Machine-I (BTEEC401) **Marks: 60**
Date: - 28/11/2019 **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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(Marks)

Q.1 a) What is the three-phase transformer? Compare the advantages and limitations of a single unit of three winging transformer with a bank of three single- phase units forming a three phase transformer. **(6)**

b) i) Write down EMF equation of single phase transformer and Derive the condition for maximum efficiency of single phase transformer. **(6)**

Or

ii) Explain in details hysteresis and Eddy- current losses in the magnetic circuit

Q.2 a) What is the necessity of parallel operation of transformer? Discus the condition to be satisfied for parallel of two transformers. **(6)**

b) i) A 3-phase bank of three single-phase transformer are fed from 3-phase 33kv (Line-to-line) it supplies a land of 6000kVA at 11 kV (line-to-line). Both supply and load are 3-wire. Calculate the voltage and kVA rating of single-phase transformer for all possible 3-phase transformer connection. **(6)**

Or

ii) Explain open delta and scott connection in three-phase transformer with neat diagram.

Q.3 a) Explain construction and Working of DC machine with neat diagrams. (6)

b) Derive the equation for mechanical force acting on current carrying conductor placed in magnetic field. (6)

Q.4 a) Draw a neat diagram of lap and wave winding used in a DC Machine. Distinguish between the this windings (6)

b) An 8kW, 230 V, 1200 rpm DC shunt motor has Ra=0.7 ohm. The field current is adjusted until, on no load with a supply of 250V, the motor runs at 1250 rpm and draws armature current of 1.6 A. A load torque is the applied to the motor shaft, which causes the Ia to rise to 40 A, and the speed falls to 1150 rpm. Determine the reduction in the flux per pole due to the armature reaction. (6)

Q.5 a) Why starter is necessary for DC motor? Describe with neat diagram working of three-point starter. (6)

b) From basic principles derive the expression of shift torque equation of DC motor. (6)

Q.6 a) Explain construction and working of reluctance motor. (6)

b) Explain the permeant magnet stepper motor and their applications. (6)

Paper End