Bachelor of Power Engineering 2nd Year 2nd Semester Examination 2017

Electrical Machines II

FM: 100

Time: 3 Hours

PART I

Q1 is compulsory and answer **any four** from the rest:

Q1. Answer **any four** of the following:

$(2.5 \times 4 = 10)$

(a) What is oscillating neutral?

(b) Draw the connection diagram of Dz6.

(c) How Group 3 and Group 4 be connected in parallel?

(d) What is the use of tertiary winding?

(e) Draw connection diagram of Double-Star connection.

(f) What are different types of surge protections for transformers?

Q2 (a). Why vector group determination is necessary for Transformers?   3

(b). A 150KW, 400V, 3-phase induction motor with power factor of 0.85 has an efficiency of 0.95 when full-load is supplied from a 6600/400V 3-phase transformer. Find currents in the H.V. and L.V phases of the transformer during full load connected as (a) delta-star; (b) star-star; (c) star-delta; (d) delta-delta.   12

Q3 (a). Draw the phasor diagram for balanced load of Scott connected transformer.   3

(b). A Scott-connected transformer is fed from a 6600V 3-phase network and supplies two phase power at 600V per phase. Calculate the line currents on the 3-phase system if the loads on the two-phase sides are 450A at 0.9p.f. lag (teaser) and 600A at 0.85 p.f. lagging.   12

Q4 (a). Why auto transformers are extensively used in power system?   3

(b). An 11000/1200V transformer, with impedance 0.06p.u, is rated at 150KVA as a two-winding transformer. To form an auto-transformer, the two windings are connected in series. Calculate its voltage and KVA ratings, and short circuit current on its H.V side.   12

Q5 (a). Draw the connection and phasor diagram of open delta connection.   3

(b). In order to convert three-phase to single-phase, open delta connection is employed. The line voltage of the three phase side is equal to the single-phase load voltage. What are the line currents on the three phase side, if the load current is 2I?   12

Q6 (a). Draw the connection diagram of Diametral connection.   03

(b). One phase of a three-phase transformer bank supplies a lightning load of 400A. Find the current distribution in the phases and in the lines when the transformers are connected (a) delta-delta; (b) delta-star; (c) star-delta; Assume a phase-to-phase turns ratio of unity.   12

Q7.   What are the different dielectric tests applied to a transformer? Describe in detail the lightning impulse test done on transformer.   3+12

Q8.   Write short notes on the following: (Any three)

(a) Failures in transformer

(b) Short Circuit Test on a Transformer $(3 \times 5 = 15)$

(c) Switching Impulse Test for Transformer

(d) Switching in Transients for Transformer

(e) Three phase to Six phase conversion