Karunya University
(Karunya Institute of Technology and Sciences)
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1965)

End Semester Examinations - 2015-16 Even Semester - May 2016

14EE2005 DC Machines and Transformers

Set B

Time : 3 hrs
Total Marks: 100

1. a. Draw and explain the electromechanical energy conversion system. (8)

   b. A separately excited DC Generator running at 1000 rpm is supplied 110 A at 220V to a resistive load. If the load resistance remains constant, what will be the load current if the speed is reduced to 800 rpm? Armature resistance is 0.02 ohms. Field current is unaltered. Assume a voltage drop of 1V per brush. Ignore the effect of armature reaction. (8)

   c. List out the applications of Shunt and Series Generator. (4)

OR

2. Illustrate its principle of operation and constructional details of DC Generator with neat diagrams.

3. a. Derive the emf equation of a DC Generator. (6)

   b. A 110 kW belt driven DC Shunt generator runs at 375 RPM on 220 V Bus bar continues to run as a DC Motor when the belt breaks taking a Power of 5.5 KW. Obtain its speed as a DC Motor, if the armature and field resistances are 0.025 ohms and 110 ohms respectively. Assume BCD as 1V per brush. (10)

   c. Sketch the External Characteristics of DC Generator. (4)

OR

4. a. Determine the no load speed, full load speed and speed regulation, for a 4-pole, 230 V, 20 kW DC shunt motor having the following details: I_f or I_{sh} = 4A, R_a = 0.04 ohms, Φ = 0.04wb,

   Z = 160, A = 2, full load current I_{lf} = 84A, no load current I_{lo} = 8A. (10)

   b. Describe the Characteristics of Shunt and Series Motors in detail. (10)

5. a. How DC Motors are classified? (5)

   b. Derive the Torque equation of DC Motor. (8)

   c. Briefly explain about the swinburn's test. (7)

OR

6. a. With neat diagrams, discuss the various speed control methods of DC Motor. (14)

   b. A DC Shunt Motor runs at 900 rpm on a 220V supply mains. Its armature resistance is 0.6 ohms and the current taken is 40 A in addition to the field current. What resistance must be placed in series with armature in order to reduce the speed to 500 rpm, when the armature current remains the same? (6)

7. Draw and explain the loaded phasor diagram of a single phase transformer with necessary equations.

OR

8. a. Obtain the emf equation of a transformer. (8)

   b. A 3.3 kV/240 V 1- phase transformer draws a no-load current of 0.7A and absorbs 650W on no-load. Find the magnetizing current (I_m) and iron loss current (I_w or I_l). (6)

   c. Sketch the no load phasor diagram of a single phase transformer. (6)

9.	Derive the equivalent circuit of ideal single phase transformer in steps with reference to the primary side with necessary diagrams	

Wishing you All the Best