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29.5.1

Electrical/IV/CBSGS/EM-I

QP Code : NP-19752

(3 Hours) **[Total Marks : 80**

N.B.:- (1) Question No.**1** is compulsory.
(2) **Attempt** any **three** questions out of remaining **five** questions.
(3) Assume suitable data if necessary and justify the same.

Q 1.	Answer the following questions.	20
	a) Explain eddy current loss and various factors affecting it.	
	b) Explain the principle of energy conversion and develop the model of an electromechanical energy conversion device.	
	c) Explain the Rheostatic Braking of D.C. separately excited motor with diagram.	
	d) Explain advantages and disadvantages of autotransformer over two winding transformer	
Q 2 a)	Explain with neat sketches, the armature reaction in dc machine and methods of decreasing effect of armature reaction.	10
Q 2 b)	Derive the expression for electromagnetic torque for doubly excited system in terms of angular rate of change of self and mutual inductances of stator and rotor winding.	10
Q 3 a)	Explain necessity of starter in D.C.motor and hence explain 3 point starter.	10
Q 3 b)	A 220V, 4 Pole, shunt motor has wave winding with 500 conductors. The armature circuit resistance is 0.25 ohm, field resistance is 125 ohm and the flux per pole is 0.02Wb. Armature reaction is neglected. If the motor draws 14 Ampere from the mains, then calculate:- 1) Speed 2) Internal torque developed 3) Shaft power 4) Shaft torque	10
Q 4 a)	Explain speed control methods of D.C.Shunt motor in detail.	10
Q 4 b)	A Field's test on two similar series machines gave the following data: Motor :- Armature current = 60A Voltage across armature = 500V Voltage across field = 40V Generator :- Terminal voltage = 450V Output current = 46A Voltage across field = 40V Armature resistance (including brushes) of each machine is 0.25Ω. Calculate efficiency of both the machines.	10
Q 5 a)	Explain the conditions for satisfactory parallel operation of transformer in detail.	10
Q 5 b)	A 10KVA, 200/400V, 50Hz single phase transformer gave the following test results O.C.Test:- 200 Volts, 1.3 Amp, 120 Watts, when L.V.winding connected to supply. S.C.Test:- 22 Volts, 30 Amp, 200 Watts, when L.V.winding short circuited. Calculate 1) Magnetizing current and core loss component 2) Magnetizing brance impedances 3) Approximate voltage drop when supplying full load at 0.8 power factor leading.	10
Q 6 a)	Explain saving of copper in auto transformer over two winding transformer.	10
Q 6 b)	Explain Faraday's laws. A conductor of 3m length moves under a magnetic field of flux density of 1.3 Wb/m^2 with a velocity of 1.3m/s. Calculate the magnitude of induced emf if conductor moves 1)At an angle of 60 degree to the direction of field and 1) At right angles to axis of field.	10
