Model Question Paper-2 with effect from 2019-20 (CBCS Scheme)

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Fourth Semester B.E. Degree Examination

Subject: Electric Motors (18EE44)

Time: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**

		Module - 1	*Bloom's Taxonomy Level	Marks
Q.01	a	With a neat circuit diagram explain the speed control of DC series motor using field control	L2, L3 CO4, PO1	8M
	b	Briefly explain the necessity of starter to start the DC motor and with a neat circuit diagram explain the operation of 4-Point starter	L2, L3 CO4, PO1, PO2	8M
	c	Define efficiency of a DC motor and obtain the condition for maximum efficiency	L2, L3 CO2, PO2	4M
		OR		
Q.02	a	Derive the torque equation of DC Motor and briefly explain the various types of torque in a DC Motor	L2, L3 CO1, PO1	8M
	b	Draw & explain the characteristics of DC shunt motor and mention its applications	L2 CO2, PO1	6M
	c	Explain back EMF and mention its significance	L2 CO1, PO1	6M
		Module - 2		
Q.03	a	With a neat circuit diagram explain the retardation test is conducted on a DC shunt machine and show the stray losses are determined with & without fly wheel	L2, L3 CO3, PO1, PO2	8M
	b	Two shunt machines loaded for Hopkinson's test take15A at 200v from the supply. The motor current is 100A and the shunt currents are 3A & 2.5A. If the armature resistance of each machine is 0.05Ω, calculate the efficiency of each machine for this particular load condition	L3 CO3, PO2	6M
	c	With a neat circuit diagram explain the swinburne's test conducted on DC shunt motor and explain how the efficiency is determined	L2, L3 CO3, PO1, PO2	6M
		OR		
Q.04	a	Derive the torque equation of a 3 phase induction motor. Also derive the condition at which torque developed by the motor is maximum and expression for maximum torque	L2, L3 CO1, PO1	8M
	b	Define slip of a 3 phase induction motors and explain the effect of slip on rotor parameters	L2, L3 CO2, PO1	6M
	c	Draw and explain the torque slip characteristics of a 3 phase induction motor	L2 CO2, PO2	6M
		Module - 3		
Q.05	a	Draw and explain the phasor diagram of a 3 phase induction motor under loaded condition	L2, L3 CO2, PO1	6M

	b	Explain how high starting torque is obtained in case of a double cage rotors and draw the torque slip characteristics	L2 CO2, PO1	6M
	c	A 440V, 3 phase, 50Hz, 4 pole, star connected induction motor has a full load speed of 1425rpm.The rotor has an impedance of $(0.4+J4)\Omega$ and rotor/stator turns ration of 0.8. calculate (i) full load torque (ii) rotor current and full load rotor copper loss (iii) power output if windage and friction losses amount to 500W (iv) maximum torque and the speed at which it occurs (v) starting current (vi) starting torque	L2, L3, L4 CO2, PO2,PO4	8M
OR				
Q.06	a	Explain the operation of deep bar rotor induction motor along with the equivalent circuit diagram and also draw its torque slip characteristics	L2 CO2, PO1	8M
	b	Briefly explain the various losses occurring in a 3 phase induction motor	L2, L3 CO3, PO1	6M
	c	Draw the power flow diagram of a 3 phase induction motor and explain	L2, L3 CO3, PO1	6M
Module - 4				
Q.07	a	Explain the necessity of a starter to start 3 phase induction motor and with a neat circuit diagram explain the operation of rotor resistance starter	L2, L3 CO4, PO1, PO2	8M
	b	List down the various methods employed for the speed control of a 3 phase induction motor and explain the voltage control method of speed control with a neat circuit diagram	L2, L3 CO4, PO1	6M
	c	With a neat diagram explain the constructional features and operation of capacitor start & run type induction motor	L2 CO1, PO1	6M
OR				
Q.08	a	Explain the concept of double field revolving theory in a single phase IM to show that the they are not self-starting	L2, L3 CO1, PO1, PO2	8M
	b	Explain the operation of DOL & autotransformer starter	L2, L3 CO4, PO1, PO2	6M
	c	Mention the applications of all types of single phase induction motors	L2 CO1, PO1	6M
Module - 5				
Q.09	a	Why synchronous motors are not self starting and explain the various techniques employed to start the synchronous motors	L2, L3 CO5, PO1	8M
	b	Briefly explain the V & inverted V curves of a synchronous motors and how do you obtain them	L2 CO5, PO1	6M
	c	With a neat diagram explain the constructional features and operation of linear induction motor	L2 CO1, PO1	6M
OR				
Q.10	a	With a neat diagram explain the constructional features and operation of AC servo motor	L2 CO1, PO1	8M
	b	With the help of a phasor diagram explain the operation of synchronous motor subjected to variable load constant excitation, variable excitation constant load	L2, L3 CO5, PO1	6M
	c	Write short notes on synchronous condensers	L2 CO5, PO1	6M