PRN:		Course Code :	ELE2502

Third Year **B. Tech** End Semester Examination Winter 2023

A C Machines

Day and Date: Friday, 01/12/2023 Max Marks: **100**

Time : 10.30am to 1.30PM Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Why single phase induction motor is not self starting? State various methods used to start single phase induction motor	08	L1	CO1
	b)	Draw and explain the construction of single phase induction motor.	08	L1	CO1
		OR			
	b)	Explain resistance start- induction run single phase Induction motor.	08	L2	CO1
Q.2		**Attempt the following**			
	a)	Derive EMF equation of alternator	08	L2	CO2
	b)	A 3-phase, 50Hz, 2 pole, star connected turbo-alternator has 54 slots with 4 conductors per slot. The pitch of the coils is 2 slots less than the pole pitch. If the machine gives 3300V between lines on open circuit with sinusoidal flux distribution, determine the useful flux per pole.	08	L4	CO4
		OR			
	b)	A 1500 KVA, 606 KV, star connected alternator has effective armature resistance of 0.5 ohm/ph & synchronous reactance of 5 ohm/ph. Find the percentage change in terminal voltage when the rated output of 1500 KVA at (i) unity p.f (ii) 0.8 p.f (iii) 0.8 leading p.f is switched off. The speed & excitation current remains unchanged	08	L4	CO4
Q.3		**Attempt any two from the following**			
	a)	Demonstrate mmf method for alternator. Define voltage regulation of alternator.	08	L3	CO2
	b)	Discuss slip test on alternator	08	L2	CO3
	c)	Explain various methods of synchronization of 3 phase alternator	08	L2	CO3
Q.4		**Attempt any two from the following**			
	a)	Describe construction and working principle of synchronous motor.	08	L2	CO1
	b)	Describe methods for starting of synchronous	08	L2	CO2
	c)	Explain V & Inverted V curve of synchronous motor with experimental setup.	08	L2	CO3

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Q.5	**Attempt any Two of the following**				
	a)	Construct and Explain direct online starter. State the necessity of starter in three phase induction motor.	09	L3	CO3
	b)	Discover the running Torque equation of the three phase induction motor.	09	L3	CO3
	c)	Explain the effects of change in slip in three phase induction motor.	09	L3	CO3
Q.6	**Attempt any Two of the following**				
	a)	Illustrate any one speed control methods of 3 phase induction motor from rotor side and explain	09	L3	CO3
	b)	A 400V, 4 pole, 3 phase, 50Hz induction motor has a rotor resistance and reactance per phase of 0.01Ω and 0.1 Ω respectively. Evaluate (i) maximum torque in N-m and the corresponding slip. (ii) the full load slip and power output in watts, if maximum torque is twice the full load torque. The ratio of stator to rotor turns is 4.	09	L5	CO4
	c)	The result of no-load and blocked rotor test on a 400V, 36.8 Kw, 50Hz, 3-phase, 4-pole induction motor are as under: No-Lod test: 400 V, 30 A, 1800 W Blocked Rotor test: 110 V, 80 A, 4000W. The motor has a star connected stator having a resistance of 0.1 ohm/phase. Draw the circle diagram and evaluate: i) full load stator current. ii) full load power factor. iii) full load slip.	09	L5	CO4

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