Reg. No.



VI SEMESTER B.TECH. MAKEUP EXAMINATIONS, JUNE 2024

ENERGY CONVERSION TECHNOLOGIES [ELE 4305]

OPEN ELECTIVE

REVISED CREDIT SYSTEM

Time:	Time: 3 Hours		Date: 25 MAY 2024		Max. Marks: 50	
Instructions to Candidates:						
	✤ Answer	ALL the questions.				
	✤ Missing	data may be suitably assu	med.			
1A.	With i transfo	neat sketches, diffe ormer.	rentiate between core and sh	ell type	(04)	
1B.	Explair	n briefly about losses	in transformer.		(02)	
1C.	The er transfo primar core, f	nf per turn for a sing ormer is approximat y and secondary tu or a maximum flux d	gle phase core type 2310/220 V ely 13 Volts. Calculate (a): nu rns, (b):the net cross sectional ensity of 1.4T.	, 50 Hz, mber of area of	(04)	
2A.	Explair inducti	n with neat sketch, on motor.	the working principle of wour	nd rotor	(03)	
2B.	A three from 3 speed runs a	e phase induction mo phase, 50 Hz, syste of motor when slip i t 600 rpm.	otor is wound for 4 poles and is seem. Calculate (i) synchronous sp s 0.04, (iii) rotor frequency whe	supplied beed (ii) n motor	(03)	
2C.	A three 144 sle sinuso freque	e phase, 16 pole, sta ots and 10 conductor idally distributed and ncy and the line indu	ar connected synchronous genera rs per slot. The flux per pole is (d the speed is 375 rpm. Detern nced emf. Assume full pitched co	ator has).03 ໑b, nine the il.	(04)	
3A.	With r revolvi	neat circuit, explain ng theory of single p	the working principle of doul hase induction motor.	ole filed	(03)	
3B.	With n (altern	eat diagram, illustra ator).	te the working principle of AC ge	enerator	(03)	

The shaft power output of a 3 phase, 4 pole, 50 Hz, induction motor

- **4A.** With neat diagram, explain about DC series motor and DC shunt motors.
- **4B.** With neat diagram, write a short note on stepper motor. **(03)**
- **4C.** A 250 V DC series motor takes 25 A and runs at 800 rpm. The armature resistance is 0.5Ω and series field resistance is 0.3Ω . If iron and friction losses amount to 750 W, find (i) the armature torque (ii) the shaft torque, (iii) overall efficiency. **(04)**
- **5A.** Write a short note on synchronous motors.
- 5B. Draw the equivalent circuit for alternator with the phasor diagram for lagging power factor load and derive the expression for the per phase emf induced in the armature. (04)
- **5C.** The resistance and synchronous reactance per phase of a 4 pole, 3 phase, star connected 80 KW, 400 V, 50 Hz, synchronous motor are 0.05 Ω and 0.5 Ω respectively. Determine for full load, 0.8 pf leading, the open circuit emf/phase and gross mechanical power developed. Assume an efficiency of 90%. **(04)**

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3C.

(03)

(02)