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Question Paper Code: 54326

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Fourth Semester

Electronics and Communication Engineering

	15U	JEE426- PRINCIPLE O	F ELECTRICAL MACH	INES
		(Regul	ation 2015)	
Dur	ration: Three hours		Maximu	m: 100 Marks
		Answer A	LL Questions	
		PART A - (10	$0 \times 1 = 10 \text{ Marks}$	
1.	How the eddy cur	rent losses are reduced	in a DC machine?	CO1-R
	(a) using low hys	teresis co-efficient mate	rial	
	(b)using stalloys			
	(c)using laminate	d core		
	(d)using high elec	etrical resistive material		
2.		between torque and a prior to magnetic satura	armature current for a stion.	eries CO1-R
	(a) T ∞ KI _a	(b) T $\propto \Phi I_a^2$	(c) $T \propto \Phi I_a$	(d) T \propto I_a^2
3.	•	nt no-load primary inpu	copper loss is negligibly s ut is practically equal to	
	(a) iron loss	(b) copper loss	(c) hysteresis loss	(d) eddy current loss
4.	Give the condition	n for maximum efficien	cy of a transformer.	CO2-R

(b) iron loss + copper loss = total loss

(d) total loss = copper loss + 2(iron loss)

(a) iron loss = copper loss

(c) copper loss = $(iron loss)^2$

5.	The stator of a 3-phase induction motor has three slots per pole per phase. If supply frequency is 50Hz, calculate the number of stator poles and total number of slots on the stator.				CO3-U
	(a) 6-poles,32-slots	(b) 6-poles, 54-slots	(c) 12-poles,32-slots (d) 12-poles,	54-slots
6.	Find the slip value of starting	a 3-phase, 4-pole indu	action motor at the time of		CO3-U
	(a) 0	(b) 1	(c) 2	(d) 0.02	
7.	Which alternator is called as high-speed alternator?				CO4-R
	(a) Salient pole		(b)Smooth cylindrical type		
	(c) Projected pole typ	e	(d) a & b		
8.	A synchronous motor	is said to be over-exc	ited at the condition		CO4-R
		(b) $E_b < V$	(c) $E_b > V$	(d) $E_b =$	2V
9.	Name the additional motor to be self starti	-	rovided for a single phase	e	CO5-R
	(a) auxillary winding	(b) main winding	(c) running winding	(d) lap v	vinding
10.	Calculate the step angle of a stepper motor having three phases with 4-rotor poles and 6-stator poles			CO5-U	
	(a) 45°	(b) 60°	(c) 30°	(d) 90°	
		PART – B (5 x	x 2= 10Marks)		
11.	Draw the various char	racteristics of a DC sh	unt generator.		CO1-R
12.	. Give a view on inrush current in a transformer.			CO2-R	
13.	Why is rotor rheostat	starter unsuited for a s	squirrel cage motor?		CO3-U
14.	How can we change t	he operating speed of	synchronous motor?		CO4-U
15.	What are the various starting?	methods of making a s	single phase induction moto	r self	CO5-U
		PART - C (:	5 x 16= 80Marks)		
16.	(ii) A 230 Volts 1200rpm and dr	aws a current of 4.5 A	generator. no-load runs at a speed of Amperes. The armature and and 230 ohms respectively.		(10) (6)

Calculate the back EMF induced and speed, when loaded and drawing a current of 36 Amperes.

Or

		Or		
	(b)	Why Starters are necessary in a motor? Explain in detail the construction and working operation of 4-point starter.	CO1-U	(16)
17.	(a)	With the circuit explain how to obtain equivalent circuit by conducting Open Circuit and Short Circuit test in a single phase transformer.	CO2-U	(16)
		Or		
	(b)	(i) Derive the EMF equation of the single phase transformer.(ii) Discuss the constructional details of a single phase transformer with neat sketches and working principle.	CO2-U CO2-U	(8)
18.	(a)	(i) Develop the approximate equivalent circuit of a 3-phase induction motor.	CO3-U	(8)
		(ii) Derive the expression for torque under running condition of a 3-phase induction motor and obtain the condition for maximum torque.	CO3-U	(8)
		Or		
	(b)	With neat diagrams, explain the working of(i) Stat-Delta Starter(ii) Auto Transformer Starter for 3 phase induction motor.	CO3-U	(16)
19.	(a)	(i) Describe with neat sketches, the constructional details of an Alternator.	CO4-U	(10)
		(ii) Derive the EMF equation of an Alternator.	CO4-U	(6)
		Or		` ,
	(1.)		CO 4 II	(1.6)
	(b)	Explain about the starting methods of Synchronous motor.	CO4-U	(16)
20.	(a)	(i) Explain in detail the operation of a capacitor start and run induction motor.	CO5-U	(8)
		(ii) Discuss in detail the operation of a hysteresis motor.	CO5-U	(8)
		Or		
	(b)	Explain the construction and principle of operation of a Permanent Magnet Brushless DC Motor.	CO5-U	(16)