

Code No: P18EET03

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HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE  
(AUTONOMOUS)

II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, JAN - 2023  
ELECTRICAL MACHINES - I  
(EEE Branch)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.	Questions	Marks	CO	KL
1	a) Define critical speed and critical field resistance of dc generator.	[2M]	1	
	b) Suggest suitable motor must adopt to control speed of dc shunt motor above the base speed and justify your answer.	[2M]	2	
	c) Why the performance of distributed transformer is mentioned in All day efficiency?	[2M]	3	
	d) What are the different tests that give the complete parameters of equivalent circuit of transformer?	[2M]	4	
	e) What is an open delta system of transformers?	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.	Questions	Marks	CO	KL
UNIT-I				
2.	a) For a singly excited magnetic system, derive the expression for the magnetic energy stored in terms of reluctance.	[5M]	1	
	b) Explain the internal and external characteristics of a separately excited dc generator.	[5M]	1	
OR				
3.	a) What is meant by back EMF? Explain the significance of Back EMF in DC motor.	[5M]	1	
	b) Derive the torque equation of a D.C. Motor.	[5M]	1	
UNIT-II				
4.	a) Explain the working of three point starter for a shunt motor with the help of neat diagram.	[5M]	2	
	b) A 240 V shunt motor has an armature resistance of 0.6 ohm and has an armature current of 15A when running at 800 rpm against full load torque. What resistance must be added in series with the armature to reduce the speed to 460 rpm at the same torque?	[5M]	2	
OR				
5.	With the help of neat circuit diagram, explain Hopkinson's test and derive the relations for efficiency of a generator and a motor with the merits and demerits.	[10M]	2	
UNIT-III				
6.	a) Does the flux in a two winding transformer will change as load on it varies? Justify.	[5M]	3	

	b)	A transformer has a HV and LV windings with turns 800 and 200 respectively. When the load current through LV winding is 80A at 0.8 pf lag, the current through HV is 25A at 0.707 lag when connect to supply .Determine the no load current of the transformer and its phase with respect to voltage.	[5M]	3	
OR					
7.	a)	The iron and full load copper loss in a 40 KVA single phase transformer are 250 W and 750 W respectively. Calculate the efficiency at half full-load, 0.8 pf leading.	[5M]	3	
	b)	Describe the effect of variation of frequency and supply voltage on losses in a transformer.	[5M]	3	
UNIT-IV					
8.		The OC test (LV side) and SC test (HV side) results of a single-phase 100 kVA, 1100/220 V transformer are 220 V, 20 A, 500 W and 90 V, 91 A, 1000 W respectively. Determine the circuit parameters referred to LV side and also calculate the regulation and efficiency of the transformer at full-load at 0.8 p.f. lagging.	[10M]	4	
OR					
9.	a)	Explain the principle of working of auto-transformer.	[5M]	4	
	b)	An auto-transformer is used to step down voltage level from 230V to 220V while connected with a load of 20W at UPF. Calculate the current in different sections of winding of auto –transformer.	[5M]	4	
UNIT-V					
10.	a)	Compare the bank of three single phase transformers and three phase transformer.	[5M]	5	
	b)	A three phase delta/star connected 11KV/400V, 50Hz transformer takes a line current of 5A, when secondary load of 0.8 pf lagging is connected. Calculate current of in each coil and output power of transformer	[5M]	5	
OR					
11.	a)	Describe the OFF tap changers of transformers.	[5M]	5	
	b)	Describe the Scott's connection of transformers.	[5M]	5	

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