

Code No: P21EET03

HALL TICKET NUMBER

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

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

Time: 3 hours

Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.	Questions	Marks	CO	KL
UNIT-I				
1.	a) Describe the Principle of electromechanical energy conversion of electromechanical system.	[7M]	1	2
	b) All energy conversion devices use magnetic field as a coupling medium rather than electric field. Why?	[7M]	1	2
OR				
2.	a) Obtain an expression for induced EMF of a DC generator.	[7M]	1	2
	b) A 250V short shunt compound generator is delivering 80A. Armature, series and shunt field resistances are $0.05\Omega$ , $0.03\Omega$ and $100\Omega$ respectively. Calculate the induced emf.	[7M]	1	3
UNIT-II				
3.	a) Explain the significance of Back-emf in a DC Motor.	[7M]	2	2
	b) A dc motor an armature current of 110A at 480V. The armature resistance is 0.22 Ohm .The machine has 6 poles and the machine has 6 poles and the armature is lap connected with 684 conductors . the flux per pole is 0.5 Wb. Calculate the gross torque developed by motor .	[7M]	2	3
OR				
4.	Explain the need of starter for DC Motor. With neat diagram Explain the construction and working of three point starter.	[14M]	2	2
UNIT-III				
5.	a) Explain in brief different methods of speed control of dc shunt motor.	[8M]	3	2
	b) During Swinburne's test a 250V DC machine was drawing 3A from the 250V supply. The resistances are $250\Omega$ and $0.2\Omega$ . Find the constant loss of the machine. Also find the efficiency of the machine when it is delivering a 20A at 250V.	[6M]	3	3
OR				
6.	a) Explain the working principle of single phase transformer.	[7M]	3	2
	b) Draw the equivalent circuit of a single phase transformer referred to primary side.	[7M]	3	2
UNIT-IV				
7.	a) Define All day efficiency of a distribution transformers and explain its significance.	[4M]	4	2



	b)	The OC and SC test observations of a 5kVA, 200/400V, 50Hz single phase transformer is as follow.	[10M]	4	3																		
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">OC test</th> <th colspan="3">SC test</th> </tr> <tr> <th><math>V_1</math></th> <th><math>I_1</math></th> <th><math>W_1</math></th> <th><math>V_2</math></th> <th><math>I_2</math></th> <th><math>W_2</math></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">220 V</td> <td style="text-align: center;">0.7 A</td> <td style="text-align: center;">60 W</td> <td style="text-align: center;">22 V</td> <td style="text-align: center;">10 A</td> <td style="text-align: center;">120 W</td> </tr> </tbody> </table>	OC test			SC test			$V_1$	$I_1$	$W_1$	$V_2$	$I_2$	$W_2$	220 V	0.7 A	60 W	22 V	10 A	120 W			
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OR																							
8.	a)	Describe back- back test on single phase transformers.	[10M]	4	2																		
	b)	Explain the conditions for parallel operation of single phase transformers.	[4M]	4	2																		
UNIT-V																							
9.	a)	State the advantages of three phase transformers over three single phase transformers bank.	[7M]	5	2																		
	b)	Explain the relationship between line and phase voltages and current in three phase transformer.	[7M]	5	2																		
OR																							
10.	a)	In Scott connection prove that the 3-phase currents will be balanced if the 2-phase currents are balanced. Assume upf load.	[10M]	5	2																		
	b)	Why the star delta three phase transformer is used to step down the voltage in transmission system	[4M]	5	2																		

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