Enrollment No: Exam Seat No:  C. U. SHAH UNIVERSITY  Winter Examination-2020							
Subject Nan	ne: Electrical Machine – I						
Subject Code: 4TE03EMC1		Branch: B.Tech (Electrical)					
Semester: 3	Date: 15/03/2021	Time: 11:00 To 02:00	Marks: 70				
(2) Instr (3) Dray	of Programmable calculator & and ructions written on main answer by neat diagrams and figures (if not ame suitable data if needed.	· · · · · · · · · · · · · · · · · · ·	ohibited.				
Q-1	Attempt the following question	ons:	(14)				
a)	d.c.generators. (A) High, low (B) Low, high (C) Low, low	for Current,	.voltage				
<b>b</b> )	<ul> <li>(D) High, high</li> <li>The critical resistance of the d.o</li> <li>(A) Armature</li> <li>(B) Field</li> <li>(C) Load</li> <li>(D) brushes</li> </ul>	c. generator is resistance of					
c)	` /	ed to have maximum efficiency at					
d)		nding is used. The number of parall	el paths				
<b>e</b> )	an						



f) Commutator converts ...... emf into.... emf.

(A) AC, DC

		(B) DC, AC	
		(C) Fixed AC, Variable AC	
		(D) Fixed DC, Variable DC	
	g	Effect of armature field on main field is known as	
	5	(A) Magnetizing characteristic	
		(B) Armature reaction	
		(C) de-magnetizing characteristic	
		(D) None of above	
	ı	a) The constant losses in transformer is/are	
	1		
		(A) copper loss.	
		(B) eddy current loss.	
		(C) hysteresis loss.	
		(D) both 2 and 3	
	i		
		(A) Lenz's Law	
		(B) Ohm's Law	
		(C) Faraday's law of electromagnetic induction	
		(D) None of the above	
	j	In a 3-phase induction motor, the rotor field rotates at synchronous speed	
		with respect to	
		(A) stator	
		(B) rotor	
		(C) stator flux	
		(D) none of the above	
	k	Give name of different test on transformer.	
	l		
		n) Explain the function of commutator.	
		h) How may the direction of rotation of a d.c. motor be reversed?	
Atten		ny four questions from Q-2 to Q-8	
111111	прса	ly four questions from Q-2 to Q-0	
Q-2		Attempt all questions	(14)
Q-2	(a)	Explain different types of D.C. generator.	(7)
	(a) (b)	Explain in detail armature reaction in dc machines.	
	(D)	Explain in detail armature reaction in de machines.	<b>(7</b> )
Q-3		Attempt all questions	(14)
Q-3	(a)	Derive the E.M.F equation for Simplex lap and wave wound generator.	
	(a) (b)	Explain the speed control of D.C. Shunt Motor.	( <b>7</b> )
	(D)	Explain the speed control of D.C. Shallt Motor.	<b>(7</b> )
Q-4		Attempt all questions	(14)
<b>V-4</b>	(a)	Explain the need of parallel operation of Transformer. What are the	
	(a)		<b>(7</b> )
	<b>(b)</b>	conditions of parallel operation of Transformers?	(7)
	<b>(b)</b>	Derive emf equation of single phase transformer.	<b>(7</b> )
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Q-5		Attempt all questions	(14)
	(a)	Explain open circuit and short circuit test on transformer with suitable	<b>(7</b> )
		diagram.	
	<b>(b)</b>	Explain the equivalent circuit of transformer with neat diagram.	<b>(7</b> )



<b>Q-6</b>		Attempt all questions	<b>(14)</b>
	(a)	A short-shunt compound generator delivers a load current of 30A at	<b>(7)</b>
		220V, and has armature, series-field and shunt-field resistances of 0.05	
		$\Omega$ , 0.30 $\Omega$ and 200 $\Omega$ respectively. Calculate the induced e.m.f. and the	
		armature current. Allow 1.0 V per brush for contact drop.	
	<b>(b)</b>	Explain different types of losses in DC machines.	<b>(7)</b>
Q-7		Attempt all questions	<b>(14)</b>
	(a)	A 30kVA, 2400/120 V, 50 Hz transformer has a high voltage winding	<b>(7)</b>
		resistance of 0.1 $\Omega$ and a leakage reactance of 0.22 $\Omega$ . The low voltage	
		winding resistance is $0.035\Omega$ and the leakage reactance is $0.012\Omega$ . Find	
		the equivalent winding resistance, reactance and impedance referred to	
		the (i) high voltage side and (ii) the low voltage side.	
	<b>(b)</b>	Explain the condition for maximum efficiency of transformer.	<b>(7</b> )
Q-8		Attempt all questions	(14)
	<b>(a)</b>	Explain construction of three phase induction motor.	<b>(7)</b>
	<b>(b)</b>	Define the term "slip" of induction motor. Draw and explain the torque-	<b>(7)</b>
		slip characteristics of a three phase induction motor.	

