B.E. (Electrical Engineering (Electronics & Power) / Power Engineering) Fourth Semester (C.B.S.) Electrical Machines-I

	ages : e : Th	2 nree Hours	*0640*	NRT/KS/19/3366/3395 Max. Marks : 80
	Note	es : 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	All questions carry marks as indicated. Solve Question 1 OR Questions No. 2. Solve Question 3 OR Questions No. 4. Solve Question 5 OR Questions No. 6. Solve Question 7 OR Questions No. 8. Solve Question 9 OR Questions No. 10. Solve Question 11 OR Questions No. 12. Assume suitable data whenever necessary. Illustrate your answers whenever necessary with the help of Use of non programmable calculator is permitted.	f neat sketches.
1.	a)	on half the follo 5 Hours 12 Hour	 VA transformer has efficiency of 98% on full load at 0.8 pow full load at 0.9 power factor. Determine all day efficiency of owing load cycle: 5 - kW at power factor of 0.6. rs - 40 -kW at p. f. of 0.8 - 30 -kW at p. f. of 0.85. 	
	b)	Draw a load.	phasor diagram of single phase transformer supplying a Lead	ding power factor 6
			OR	
2.	a)	O. C test S.C test Calculat i) Par ii) Re	ϕ 50KVA, 2000V/500V, 50Hz, Δ -Y transformer has follow t (LV side) : 500 V; 3A; 500 W (HV side) : 250V; I _{FL} ; 900 W. te: rameter of shunt branch of equivalent circuit. gulation of efficiency of transformer at full load 0.8 P. F. lag aximum efficiency & load at which it occurs at unity power f	ging.
	b)	-	how to convert single phase transformer into an auto transfo ges of auto transformer over two winding transformer.	ormer. State 5
3.	a)	Discuss	different cooling methods of transformer.	6
	b)	Explain	Back to Back test to determine regulation & efficiency of tra	ansformer. 7
			OR	
4.	a)	Explain	Scott connection i. e 3ϕ to 2ϕ Conversion & its application	n. 6
	b)	phase si	connected transformer set is rated at 11000-V on 3-phase side. When teaser transformer is loaded upto 500kW, unity pointsformer, upto 800 kW at unity power factor, calculate the	ower factor and the

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KV side.

5.	a) b)	Explain armature reaction in D. C. Machine. A 25.kW, 250V, DC machine has armature and field resistance of 0.0Ω & 100Ω	7 7			
	0)	 respectively. Determine the total armature power developed when the machine works: i) As a generator delivering 25-kW output. ii) As a motor taking 25.kW I/P from supply. 	-			
6. a)		Draw and explain torque $V_s I_a$, $N V_s J_a \& N V_s T_a$ characteristics for dc of dc series				
	b)	motor. A 2-pole series motor runs at 707 rpm, when taking 100A at 85V and with the field coils in series. The resistance of each field coil is 0.03 Ω and that of armature 0.04 Ω . If the field coils are corrected in parallel and load torque remains constant. Find (a) speed (b) Additional resistance to be inserted in series with the motor to restore the speed to 707 rpm.	7			
7.	a)	Prove the following term with respect to Induction motor:-	6			
	b)	 (1-S). Rotor Cu loss = S. Cross rotor O/P. A 20-HP, 4-Pole, 3-phase, 50-Hz, IM has friction and windage losses of 2% of its output. The full load slip is 4%. Calculate at F.L. 	7			
		i) Rotor Ohmic Lossii) Rotor inputiii) Torque develop by rotor.				
OR						
8.	a)	Explain double cage Induction motor with its torque slip characteristics.	7			
	b)	Draw torque slip characteristics of a wound rotor induction motor and explain its performance when-	6			
		i) Rotor resistance is increased gradually.ii) Applied voltage is reduced by 10%				
		iii) The rotor is made to run more than synchronous speed.				
9.	a)	What is necessity of starter in case of 3 phase Induction motor? Explain working of Auto Transformer starter in detail.	7			
	b)	A 4-pole, 50-Hz, 3-phase, 400V, Δ - Connected wound rotor induction motor has rotor resistance of 0.3 Ω /ph,runs at 1425 rpm of full load. Calculate the additional resistance to be inserted in rotor circuit to reduce the speed to 1250 rpm at constant load torque.	7			
10.		Write a short note on: any two.				
		i) Speed control of 3-phase Induction motor from supply voltage side.	7			
		ii) Crawling and cogging in 3-ph. I.M.	7			
		iii) Braking methods of 3-ph. I.M & PLUGGING Phenomenon.	7			
11.	a)	Explain why single phase IM is not self - starting? How double field revolving theory helpful in starting of $1-\phi$ IM?	1			
	b)	Explain working of shaded pole induction motor. Draw its torque speed characteristics.	6			
12. a)		OR Explain split phase I.M. What are its advantages and disadvantages?	7			
	b)	Explain working of capacitor start induction Run IM with torque speed characteristics.	6			
