P. Pages : 3 Time : Three Hours			★ 4 0 1 4 ★	GUG/W/16/3889 Max. Marks : 80	
	Note	s: 1. 2. 3. 4. 5.	All questions carry equal marks. All questions are compulsory however the students may avail inte Assume suitable data wherever necessary. Illustrate your answers wherever necessary with the help of neat s Use of slide rule, Drawing instruments, and non programmable ca permitted.	rnal choice. ketches. lculator is	
1.	a)	A 3-pha 120 kV transfor currents	A at 0.8pf. The input line voltage is 11kV and the transformat mer is 0.10. Determine the line voltages, line currents, phase vol- on both the sides of a transformer.	- phase load of ion ratio of the tages and phase	8
	b)	Explain Draw ci reads ca	how open circuit test will be performed on 3 phase $Y - \Delta$ connec rcuit diagram. How will you calculate various parameters ? Justify are losses of transformer".	ted transformer. that "wattmeter	6
	c)	What do	o you mean by core & shell type transformer ?		2
			OR		
2.	a)	Find all Unity p 12 hour 8 hours 4 hours	day efficiency of a transformer having maximum efficiency of 989 f and loaded as follows: - s - one tenth of full load at 0.5 pf lagging - Half load at 0.8 p.f. lagging - Full load at unity pf	6 at 100kVA,	8
	b)	Find the	e condition for zero voltage regulation and power factor for maximu	m regulation.	4
	c)	Draw a	nd explain how to draw a phasor diagram of a transformer supplying	g inductive load.	4
3.	a)	Two sin transfor Calcula furnace	ngle phase furnaces A and B are supplied at 100 V by means of mers from a 3 - phase supply at 6kV. Furnace A is supplied from tea te the line currents on 3-phase side when furnace A takes 500kW B 600kW at 0.8 pf lagging. Draw the phasor diagram.	Scott-connected ser transformer. at unity pf and	10
	b)	Derive a winding	an expression for saving in conductor material in an auto transform g transformer of same rating.	er over a two	6
			OR		
4.	a)	Explain	V-V or open delta connection.		6

	b)	Two three phase transformers which have the same turns ratio are connected in paralleland supply a total load of 800kW at 0.8 p.f lagging. Their ratings are as follows:TransformerRatingP.V. ResistanceP.V. ReactancesA400 kVA0.02B600 kVA0.01Determine the power output and power factor of each transformer.	7							
	c)	Explain Dd ₆ connection of 3-phase transformer.								
5.	a)	A 4-pole, long shunt lap wound generator supplies 20kW at a terminal voltage of 440V. The armature resistance is 0.04Ω , series field resistance is 0.05Ω and shunt field resistance is 210 Ω . The total brush drop is 1 valt. Determining the generated emf. Also calculate number of conductors if the speed is 1500 rpm and flux per pole is 0.025 webber. Neglect the armature reaction.								
	b)	Write short note on compensating winding in d.c. generator.								
	c)	Explain external and internal characteristics of separately excited d.c. generator.								
		OR								
6.	a)	Explain armature reaction in d.c. generator.	6							
	b)	What do you mean by good and poor commutation.	2							
	c)	What is the reason for poor commutation? Explain what is mean by reactance voltage in relation to this. How it is calculated ?								
	d)	What do you mean by differential and cumulative compound generator ? Draw their diagrams for long shunt and short shunt.								
7.	a)	A 10hp 230V d.c. shunt motor has an armature resistance of 0.5Ω and field circuit resistance of 115 Ω . At no load and rated voltage the speed is 1200 rpm and armature current is 2 Amp. If load is applied speed drops to 1100 rpm. Determine the armature and supply current.								
	b)	Which are the different methods of speed control of d.c. motor. Explain various flux control methods of d.c. series motor.	7							
	c)	What do you mean by back emf in d.c. motor.	2							
		OR								
8.	a)	Why starters are necessary in d.c. motor ?	3							
	b)	What is the significance of back emf?	3							
	c)	Explain the principle of d.c. motor.								
	d)	A d.c. series motor with an unsaturated magnetic circuit and 0.5Ω total resistance, when running at a certain speed takes 60A at 500V. If the load to torque varies as the cube of the speed, calculate the resistance required (in series with armature) to reduce the speed by 25%.	7							

- 9. a) A 3-phase, 400V, delta connected 5kW, 4-pole induction motor has full load power factor 10 of 0.8 and full load efficiency of 70%. If the starting torque is 1.5 times full load torque and maximum torque is 3 times the full load torque determine:-
 - 1) Full load speed
 - 2) Speed at maximum torque
 - 3) Total rotor circuit resistance to get maximum torque at starting if rotor circuit reactance is 4Ω /phase.
 - 4) Motor input current at full load.
 - b) Explain torque- slip characteristic of 3-phase induction motor, showing clearly stable and **6** unstable region. What is the effect of varying resistance on this characteristic.

OR

10.	a)	Exp	plain no load and blocked rotor test on 3 phase induction motor.	6
	b)	A 3-phase, 8-pole, 50Hz induction motor is running at 735 rpm. Find: -		6
		1)	Synchronous speed	
		2)	Slip speed	
		3)	% slip	
		4)	Frequency of rotor induced current	
		5)	Frequency of rotor current at standstill	
		6)	Speed of rotor when slip is 4%	

c) Explain the principle of operation of 3 phase induction motor.

4