

Model Question Paper (CBCS Scheme)

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Third Semester BE Degree Examination Course Title–Transformer & Generator

TIME: 03 Hours

Max.Marks:100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Q.No.	Module1	Marks
Q1	a Draw and explain the Full load Phasor Diagrams of Single Phase transformer for lagging, leading and Unity power factor loads	08
	b A 4 KVA, 200/400V Single phase Transformer supplying full load current of 0.8 pf lagging The OC & SC test results are: OC Test: 200V, 0.8A, 70W SC Test: 20V, 10A, 60W (LV Side) i) Calculate efficiency and secondary voltage ii) The load at UPF corresponding to maximum efficiency	08
	c What is all day efficiency of transformer? How to calculate it?	04
OR		
Q2	a Show that open delta connection has a KVA rating of 58% of the rating of the normal delta delta connection. Also list the limitations of open delta connection	08
	b It is desired to transform 2,400 V, 5000 KVA three phase power to 2-phase power at 600V by scott -connected transformers. Determine the voltage current and current ratings of both primary and secondary of each transformer. Neglect the transformer no load currents	08
	c State the advantages of single 3- phase unit transformer over bank of single phase transformers	04
Module 2		
Q3	a With a neat circuit diagram explain in detail sumpner test for determining the efficiency and voltage regulation of transformer	08
	b Derive an expression for the currents and load shared by two transformers connected in parallel supplying a common load when no load of these are equal.	06
	c Two single phase Transformers, rated at 250KVA each are operated in parallel on both sides. Impedances of transformers are $(1+j6) \Omega$ and $(1.2+j4.8) \Omega$ respectively .Find the load shared by each when the total load is 500KVA at 0.8pf Lagging	06
OR		

Q4	a	What is an Auto Transformer? Derive an expression for the saving of copper in an Auto transformer as compared to an equivalent two winding transformer. What are the advantages and limitations?	08
	b	With the help of sketches explain the working of on load tap changer	08
	c	A 10KVA 230/110V transformer is used to be as step up transformer to step up 230V to 340V. What will be the output rating of the transformer	04
Module 3			
Q5	a	What is the necessity of tertiary winding and explain its operation in star/star transformers.	08
	b	What is armature reaction? With neat figures, explain the armature reaction in dc machines under normal working conditions	08
	c	A four pole lap wound armature running at 1400 rpm delivers a current of 100A and has 64 commutator segments. The brush width is equal to 1.4 segments and inductance of each coil is 0.05mH. Calculate the value of reactance voltage assuming i) linear commutation. ii) Sinusoidal commutation	04
OR			
Q6	a	Derive EMF equation and expression for distribution factor and pitch factor of Synchronous Generator	08
	b	Explain Synchronous reactance of Synchronous generator	07
	c	A 4 pole, 3phase, 50Hz star connected alternator has 60 slots with 4 conductors/slot. The coils are short pitched by 3 slots. If the phase spread is 60°, find the phase voltage induced for a flux/pole of 0.943wb. sinusoidally distributed in space. All the turns/phase are in series	05
Module 4			
Q7	a	Name the various methods for determining the voltage regulation for 3 phase alternator and describe any one method in detail	07
	b	A 2300V, 50Hz, 3-phase star connected alternator has an armature resistance of 0.2Ω. A field current of 35A produces a current of 150A on short circuit and an open circuit emf 780V(line). Calculate the voltage regulation at 0.8pf lagging and 0.8pf leading for the full load current of 25A	08
	c	With a neat sketch explain OCC & SCC characteristics of an alternator	05
OR			
Q8	a	The following test results are obtained on a 6600V alternator: Open circuit voltage 3100 5000 6600 7500 8300 Field current(amps) 16 25 37.5 50 70 A field current of 20A is found necessary to circulate full load current on short circuit of the armature. Using ampere-turn method, find the full load regulation at 0.8 pf lagging	12
	b	Explain Short circuit ratio (SCR) and its significance.	08
Module 5			
	a	Write a note on V Curves of synchronous Generator	06

Q9	b	With a neat circuit diagram, explain the slip test on salient pole synchronous machine and indicate how X_d and X_q can be determined from slip test.	08
	c	Write a note on capability curve of synchronous generator	06
OR			
Q10	a	What is hunting in synchronous machines? Explain the role of damper winding.	08
	b	Derive the expression for synchronizing power	06
	c	Explain Two Reaction Theory of salient pole alternators.	06