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BEE304

Third Semester B.E./B.Tech Degree Supplementary Examination, June/July 2024

Transformers and Generators

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	With neat diagram discuss the principle of operation of a transformer. Also write any 5 differences of 1 – ϕ core and shell type transformer.	8	L3	CO1
	b.	With the help of phasor diagram, explain the practical transformer on load.	6	L2	CO1
	c.	What do you mean by back to back test? With neat circuit diagram explain how sumpness test conducted on two identical transformer.	6	L2	CO1
OR					
Q.2	a.	Derive emf equation of single phase transformer.	5	L3	CO1
	b.	A 10 KVA, 2500/250V, 1 - ϕ transformer. Gave the following test results : OC test : 250V, 0.8V, 50W SC test : 60V, 3A, 45W i) Calculate the efficiency at 75% of F.L and 125% of F.L at 0.8 pf log ii) Calculate the load KVA at which maximum efficiency occurs and also the value of max efficiency at 0.8 pf iii) Compute the voltage regulation and secondary terminal voltage under rated full load at i) 0.8 pf log	10	L4	CO1
	c.	Develop the equivalent circuit of a transformer referred to primary and explain.	5	L3	CO1
Module – 2					
Q.3	a.	Explain the different transformer connections for three phase operation : i) Star/star ii) Delta/Delta iii) Star/Delta.	6	L2	CO2
	b.	Discuss the need and conditions for parallel operation of 2 transformers.	6	L2	CO2
	c.	Derive an expression for the currents shared by between two transformer connected in parallel supplying a common load when no load voltages of these transformers are unequal.	8	L3	CO2
OR					
Q.4	a.	Explain with a neat diagram on load and off load tap changer.	8	L2	CO2
	b.	Derive an expression for saving of copper when an auto transformer is used.	6	L3	CO2
	c.	Two transformers A and B are joined in parallel to the same load. Determine the current derived by each transformer, given open circuit emf is 6600 V for A and 6400 V for B. Equivalent impedance on secondary are $(0.3 + j3)\Omega$ for A $\{(0.2 + j1)\Omega$ for B { load impedance is $(8 + j6)\Omega$. Also find the circulating current at no load.	6	L4	CO2
1 of 2					

Module – 3

Q.5	a.	Describe the construction of salient non-salient pole type rotor. Explain the working principle of alternator.	8	L2	CO3
	b.	Derive emf equation of an alternator. Also discuss the types of armature windings.	7	L3	CO3
	c.	What are the methods used to reduce harmonic local characteristics of alternator.	5	L2	CO3

OR

Q.6	a.	Define voltage regulation of an alternator and explain local characteristics of alternator.	5	L2	CO3
	b.	Name the various methods for determining voltage regulation for a three phase alternator and describe any one method in detail.	8	L2	CO3
	c.	A 600V, 60 KVA, Single phase alternator has on effective resistance of 0.2Ω . A field current of 10A produces on armature current of 210 on short circuit and on emf of 480V on open circuit. Calculate : i) Synchronous impedance reactance ii) Regulation with 0.8 pf lagging/unity and 0.6 pf loading.	7	L2	CO3

Module – 4

Q.7	a.	Explain the Lamps dark and Lamps bright method used to synchronize single phase alternators.	10	L2	CO4
	b.	What is synchronizing of alternator of what are the condition for proper synchronization? How three phase alternative are synchronized.	10	L2	CO4

OR

Q.8	a.	How parallel operation of alternators are carried out? What are the conditions to be satisfied.	7	L2	CO4
	b.	Write short notes on capability curve.	5	L2	CO4
	c.	What is hunting in synchronous machines? Explain the role of damper and winding.	8	L2	CO4

Module – 5

Q.9	a.	With a neat diagram, explain the basic components of wind energy conversion systems.	10	L2	CO5
	b.	Discuss the types of wind generators.	5	L2	CO5
	c.	What are the advantages and disadvantages of wind energy conversion systems.	5	L2	CO5

OR

Q.10	a.	Discuss the principle of working of a solar cell.	5	L2	CO5
	b.	With a neat diagram, explain basic solar photo voltaic system for power generation.	10	L3	CO5
	c.	What are advantages and disadvantages of solar energy?	5	L2	CO5

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