USN

Degree	:	B.E	Semester	:	III
Branch	:	Electrical and Electronics Engineering	Date	:	06-01-2021
Course Title	:	Transformers and Generators	Course Code	:	18EE33
Duration	:	90 Minutes	Max Marks	:	30

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO
	PART-A			
1(a)	**Explain** the short circuit ratio and its significance.	5	Understanding K2	CO4
(b)	A 3 phase star connected alternator is rated at 1600kVA, 13500 volts. The armature resistance and synchronous reactance are 1.5 Ω and 30Ω respectively per phase. **Calculate** the percentage regulation for a load of 1280kW at a p.f 0.8 lag	5	Applying K3	CO4
(c)	**Explain** the slip test on salient pole synchronous machine to determine Xd and Xq with neat diagram	5	Understanding K2	CO5
	OR			
2(a)	**Define** regulation and **explain** effect of power factor on regulation	5	Understanding K2	CO4
(b)	The open circuit and short circuit results for 3φ star connected 1000 kVA, 1905V, 50Hz alternators are <table><tr><td>If in (A)</td><td>10</td><td>20</td><td>25</td><td>30</td><td>40</td><td>50</td></tr><tr><td>Voc line in (V)</td><td>760</td><td>1500</td><td>1700</td><td>1905</td><td>2300</td><td>2600</td></tr><tr><td>Isc in (A)</td><td>-</td><td>220</td><td>-</td><td>335</td><td>-</td><td>-</td></tr></table> The armature resistance per phase is 0.2 Ω. Draw the O.C and S.C characteristics and **find** the voltage regulation on full load 0.8 lagging p.f by MMF method	5	Applying K3	CO4
(c)	**Explain** power angle characteristics of salient pole type machine	5	Understanding	CO5

				K2	
	PART-B				
3(a)	**Explain** the ZPF method of predetermination of voltage regulation of an alternator.	5	Understanding K2	CO4
(b)	**List** the advantages of ZPF method over other methods	5	Remembering K1	CO4
(c)	**Discuss** about hunting in synchronous machine.	5	Understanding K2	CO5
	OR				
4(a)	**Explain** the EMF method of predetermination of voltage regulation of an alternator.	5	Understanding K2	CO4
(b)	**List** the different methods used to determine the voltage regulation of an alternator.	5	Remembering K1	CO4
(c)	**Explain** Lamp dark method and lamp bright method of synchronization in single phase alternator	5	Understanding K2	CO5

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Course In charge   **Head of the Department**   **Principal**

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Q. No.	Question	Marks	K Level	CO
	PART-A			
1(a)	**Explain** the MMF method of predetermination of voltage regulation of an alternator	5	Understanding K2	CO4
(b)	The open circuit and short circuit results for 3φ star connected 1000 KVA, 1905V, 50Hz alternators are 	If in (A)	10	20	25	30	40	50	 |---|---|---|---|---|---|---|
Voc line in (V)	760	1500	1700	1905	2300	2600
Isc in (A)	-	220	-	335	-	- | The armature resistance per phase is 0.2 Ω. Draw the O.C and S.C characteristics and **find** the voltage regulation on full load 0.8 lagging p.f by EMF method	5	Applying K3	CO4
(c)	**Discuss** the concept of two reaction theory in a salient pole synchronous machine	5	Understanding K2	CO5
	OR			
2(a)	**Define** regulation and **explain** effect of power factor on regulation	5	Understanding K2	CO4
(b)	**Show** that short circuit ratio of an alternator is the reciprocal of the per unit value of the synchronous reactance at rated value	5	Applying K3	CO4
(c)	**Explain** the role of damper windings in alternator	5	Understanding K2	CO5

PART-B

3(a)	**List** the significance of SCR	5	Remembering K1	CO4
(b)	**Explain** the EMF method of predetermination of voltage regulation of an alternator	5	Understanding K2	CO4
(c)	A salient pole alternator has direct axis and quadrature axis reactance of 0.8 p.u and 0.5 p.u respectively. The effective reactance is 0.02 p.u. **Calculate** percentage regulation when the generator is delivering rated rated load at 0.8 p.f lag. Assume rated voltage and rated current as one per unit.	5	Applying K3	CO5
	OR			
4(a)	**List** the advantages and limitations of synchronous impedance method	5	Remembering K1	CO4
(b)	**Explain** the open circuit and short circuit characteristics of alternator	5	Understanding K2	CO4
(c)	The single phase alternators operating in parallel have induced emfs on open circuit of $230\angle0$ and $230\angle0$ volts and respective reactances of $j2\Omega$ and $j3\Omega$. **Calculate** i) Terminal voltage ii) current iii) power delivered by each of the alternators to a load of impedance 6Ω(resistive)	5	Applying K3	CO5

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