**SYNCHRONOUS MACHINES**

**(EE 262)**

Attempt all questions.

1. The yoke serves the ff purposes except
2. Provide mechanical support
3. Allow for conduction of current
4. Carry armature flux
5. Protect the machine
6. Which of the ff is not an advantage of a stationary armature and rotating field system?
7. More generated voltage for same excitation.
8. No slip rings are required
9. Easier to insulate
10. Arc-overs seldom occur
11. The tangent to the lower portion of the OCC of a synchronous machine is the \_\_\_\_\_\_ line.
12. Saturation
13. Critical resistance
14. Airgap
15. Synchronous impedance
16. Which of the ff is likely to be the voltage regulation of a machine running at unity pf?
17. 14.45%
18. -14.45%
19. 3.2%
20. -3.2%
21. The ff are methods of determining the voltage regulation except
22. Zero power method
23. Synchronization method
24. EMF method
25. Ampere-turn method
26. The voltage regulation is negative for \_\_\_\_\_\_\_ loads.
27. Resistive
28. Inductive
29. Capacitive

INDEX NUMBER……………………………………………….

1. The conditions for synchronization of generators when paralleling them include all except
2. Frequencies should be the same
3. Terminal voltages must be equal
4. Phase sequence or rotation must be the same.
5. Individual phase voltages in phase.
6. The ratio of open circuit voltage to short circuit current represents
7. Unsaturated synchronous impedance
8. Critical impedance
9. Armature reaction impedance
10. Saturated synchronous impedance.
11. In the Q-P curves for a given pf, \_\_\_\_\_\_\_\_\_\_ is the limiting factor in the region from unity to rated power factor.
12. Field reactance
13. Armature heating
14. Slip ring resistance
15. Excitation voltage
16. The DC value of resistance measured is increased by \_\_\_\_\_\_\_ to account for skin effect.
17. 40%
18. 50%
19. 60%
20. 70%

**SECTION B**

1. A 3-phase 12KV 15MV star-connected synchronous generator has a synchronous impedance of (1.5+j120) ohms per phase. If the excitation voltage is 14 KV, determine
2. Maximum output of the generator (2 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Max current (2 marks)

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1. A 50KVA, 415KV, star-connected, 3-phase,4 pole synchronous generator supplies rated load at 0.8 lagging pf. Xd=4Xq=4Ω. Neglecting armature resistance, determine
2. Load angle (2 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Excitation voltage (3 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Power developed (3 marks)

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1. A 500V 60 KVA 3-phase alternator has an effective resistance of 0.3Ω and unsaturated synchronous impedance of 2.5Ω. Calculate at full load, 0.8 leading pf, the
2. no load excitation voltage (3 marks)

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1. Voltage regulation in p.u. (1 mark)

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1. Sketch the compounding curve for synchronous generators. (4 marks)

Set by;

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