Subject Code: R15A31EE05

ANURAG GROUP OF INSTITUTIONS

(Autonomous)

School of Engineering

III-B.Tech -I-Semester Supplementary Examinations, May - 2019

Subject: Electrical Machines-III

(Only for EEE)

Time: 3 Hours **Max.Marks:75**

Section – A (Short Answer type questions) **(25 Marks)**

- **Answer all questions**

1. Define i) Pitch factor ii) distribution factor. 2M
2. What do you understand by fractional slot winding? 3M
3. What are the methods to find the voltage regulation of an alternator? 3M
4. What is synchronous impedance? 2M
5. Define "synchronizing power coefficient". 3M
6. When two alternators are connected in parallel, why they tend to remain in synchronism? 2M
7. What is synchronous condenser? 2M
8. In what respect the phasor diagram of synchronous motor and generator are similar and different? 3M
9. Write the differences between BLDC and DC motors. 3M
10. Draw the speed torque characteristics of shaded pole motor. 2M

Section—B (Essay questions)

- Answer **All** questions, each question carries equal marks (5 x 10 =50 Marks)

11. A) Explain the construction of synchronous alternator with neat diagram. 10M

OR

B) i) A three phase 16 pole alternator has a star connected single layer winding with 144 slots, 10 conductors / slot and runs at 375 RPM. The flux is 50 m.wb. and breadth factor is 0.96. Calculate (a) the frequency and (b) line value of induced EMF. 5M

ii) What is the effect of armature reaction in alternators 5M

12. A) A three phase star connected alternator has an open circuit voltage of 6599 V. The armature resistance and synchronous reactance's are 0.6 ohms/phase and 6 ohms/phase respectively. find the terminal voltage and voltage regulation and δ if load current is 180 A at p.f. of ((i) 0.9 lagging (ii) 0.8 leading. 10M

OR

B) i) Explain ZPF method of determining regulation of an alternator. 5M

ii) Describe how slip test can be conducted in the laboratory, for measuring X_d and X_q 5M

13. A) i) Discuss the operation of synchronous machine connected to infinite bus when the mechanical input is constant and the excitation is varied. 5M

ii) Discuss about conditions required for parallel operation of two alternators. 5M

OR

B) A 2 pole 50Hz 3 phase turbo alternator is excited to generate the bus bar voltage of 11KV on no load. Calculate the synchronizing power per degree of mechanical displacement of the rotor and the corresponding synchronizing torque. The machine is star connected and the short circuit current for this excitation is 1200Amps. 10M

14. A) i) Explain with necessary diagrams how a synchronous motor can improve the power factor of a certain load connected to a power system. 5M

ii) A star connected Synchronous motor has a power input of 5472 watts at rated voltage of 400V, find the power angle ,armature current and power factor. Neglect resistance. 5M

OR

B) i) What are different starting methods of synchronous motors 5M

ii) Explain about V curves and inverted V curves in synchronous motors 5M

15. A) i) Explain about stepper motor 5M

ii) Explain about AC series motor. 5M

OR

B) i) Discuss about shaded pole motor 5M

ii) Discuss about universal motor 5M