R15, R14 & R12

Subject Code: R15A31EE05

ANURAG GROUP OF INSTITUTIONS

(Autonomous)

School of Engineering

III-B.Tech-I-Semester End Examinations, October/November-2019

Subject: Electrical Machines-III

(Only for EEE)

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

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

- **Answer All questions:**

1. What is meant by armature reaction in synchronous generator? 2M
2. What is the main idea of fractional slot windings? 3M
3. How would you show phasor diagram of salient pole alternator 2M
4. The armature resistance and synchronous reactance are 1.5 Ω and 30 Ω respectively per phase. Calculate percentage voltage regulation for a load of 1280 kW. at power factor of 0.8 lagging. 3M
5. How would you summarize the effect of change of mechanical power input in synchronous generators 2M
6. What are sub-transient, transient and steady state reactance's? 3M
7. Illustrate the variation of excitation with current and power factor. 3M
8. Explain hunting in synchronous machines. 2M
9. Recall the main principal of BLDC motor. 2M
10. What is the main difference between compensated and uncompensated series motor. 3M

Section—B (Essay questions)

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

11. A) i) Draw and explain phasor diagram of alternator. 5M
    ii) Discuss about constructional details of alternator. 5M

    OR

    B) i) Explain the presence of slot harmonics in rotating electrical machines. 5M
    ii) Explain armature reaction in alternators. 5M

12. A) i) Describe how slip test can be conducted in the laboratory , for measuring $\mathbf{X_d}$ and $\mathbf{X_q}$ 5M
    ii) Explain why the pointers of ammeter and voltmeter swing during the slip test. 5M

    OR

    B) i) Explain EMF method of determining the voltage regulation of alternator. 5M

P.T.O

ii) A30 kVA ,440V, 50Hz. 3 phase star connected alternator gave the following test data

If(A)	2	4	6	7	8	10	12	14
Vt(V)	155	287	395	440	475	530	570	592
Isc(A)	11	22	34	40	46	57	69	80

Resistance between any two terminals is 0.3 Ω, Find the regulation at full load 0.8 pf lag by synchronous impedance method. 5M

13. A) i) Describe the dark lamp method of synchronizing two alternators. 5M
ii) Explain the effect of change of excitation when two alternators are operating in Parallel. 5M

OR

B) i) Two synchronous generators are operating in parallel to feed a certain load. List the steps that should be followed in transforming a certain amount of active power load and reactive power load from one generator to another without affecting the frequency and terminal voltage of the bus. 10M

14. A) i) Explain about V and inverted V curves in synchronous motors. 5M
ii) A 3300 V star connected synchronous motor works at constant terminal voltage and constant excitation. Its synchronous impedance is (1 + 10j) Ω/phase It operates at 0.8 p.f. leading when taking 600 kW from the mains. Find the p.f. when input is increased to 900 kW. 5M

OR

B) i) What are different methods of starting synchronous motors? 5M
ii) What is meant by hunting in synchronous motors and how it is reduced? 5M

15. A) i) Explain the operation of shaded pole motor. 5M
ii) Explain the operation of universal motor. 5M

OR

B) i) Explain the operation of BLDC motor. 5M
ii) Explain the operation of stepper motor. 5M