Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No.....

EE-501 (GS)

B.E. V Semester

Examination, December 2017

Grading System (GS)

Electrical Machine-II

Time : Three Hours

Maximum Marks : 70

Note: i) Total number of questions are eight.
ii) Answer any five questions.
iii) All questions carry equal marks.

1. a) Derive the emf equation of polyphase synchronous machine. Also explain the methods of harmonic elimination from emf waveform of alternator. 7
   b) Explain with lab diagram the parallel operation of two alternators with bright lamp method. Also mention conditions of paralleling. 7

2. a) Describe voltage regulation in synchronous machine. Explain synchronous impedance method for finding voltage regulation with lab circuit diagram. 7
   b) A three phase, 16 pole alternator has the following specifications: 7

   No. of slots = 192; conductor per slot = 8;

   Coil span = 160 electrical degree; speed of alternator = 375rpm; flux per pole = 55mWb. Determine pitch factor, distribution factor and line voltage.

   Note: Conductors of each phase are connected in series.

3. a) Explain the principle of operation of a 3-phase synchronous motor with diagram. Why it will not run at other than synchronous speed? 7
   b) What is synchronous condenser? Explain with phasor diagram it operation. Write its advantages and applications. 7

4. a) Explain the experimental method of determining V-curves and inverted V-curve for synchronous machine. 7
   b) What is hunting? Explain why hunting is objectionable. Explain causes of hunting and means to reduce them. 7

5. a) Explain short circuit oscillogram method to determine reactance and time constant of synchronous machine. 8
   b) Explain laboratory method to perform slip test for finding X_d and X_q. 6

6. a) State the concept of Kron's primitive machine. How various windings of a machine represented by it? 7
   b) Deduce the voltage equations for Kron's machine in matrix form. What is impedance matrix? 7

7. a) Obtain Park's transformation for the three phase synchronous machine. 7
   b) Describe construction and working principle of linear induction motor. Write expression of linear force. 7

8. Explain the following topics: (any two): 14
   a) PM Brushless DC motor
   b) Solid state control of synchronous machine
   c) Switched reluctance motor

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