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Code No. : 16303 O

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (EEE) III Year II Semester Old Examinations, May-2019**

**Electrical Machinery-III**

Time: 3 hours

Max. Marks: 70

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

**Part-A (10 × 2 = 20 Marks)**

1. Explain with a neat diagram, the constructional features of a salient pole synchronous machine.
2. Explain what is winding factor, distribution factor and pitch factor and their interrelationship.
3. What is meant by voltage regulation in a synchronous generator?
4. Draw and explain phasor diagram of an alternator with non salient poles.
5. Explain why synchronous motor is not self-starting motor.
6. What are various methods of starting induction motor.
7. Define transient stability limit of alternator.
8. Explain steady state, transient and sub transient reactance of an alternator with respect to three phase symmetrical short circuit.
9. List the applications of a two phase servomotor.
10. Draw the equivalent circuit of single phase induction motor based on double field revolving theory.

**Part-B (5 × 10=50 Marks)**

*(All sub-questions carry equal marks)*

11. a) What is meant by tooth ripples and how to suppress them?  
b) What is armature reaction in a synchronous machine? Explain in detail.
12. a) Describe two reaction theory for salient pole synchronous machine.  
b) Draw the open circuit and short circuit characteristics for a 150 MW, 13 kV, 0.85 pf, 50Hz, synchronous generator from the data given below:  

Field Current (A)	200	450	600	850	1200
Open Circuit Voltage( kV)	4	8.7	10.8	13.3	15.4

Determine the synchronous reactance at rated voltage.
13. a) Explain V and inverted V curves w.r.t synchronous machine.  
b) Draw and explain power angle characteristics of cylindrical synchronous machine.
14. a) Draw and explain three phase short circuit current waveforms of alternator.  
b) Explain construction and operation of a switched reluctance motor along with its circuit diagram.
15. a) Explain the construction and operation of shaded pole induction motor with a suitable diagram.  
b) Explain the construction and operation of linear induction motor with a suitable diagram.
16. a) Explain armature reaction in a synchronous generator for inductive and capacitive loads.  
b) What are the various conditions to be met before a synchronous machine can be paralleled with another synchronous machine.
17. **Answer any two of the following:**
  - a) Describe No-load & Blocked rotor tests of 3-phase Induction motor.
  - b) Discuss in detail about the synchronous condenser.
  - c) Explain with neat diagram the principle of repulsion motor.