

**B. Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)**

Term-End Examination

00496

June, 2015

BIEE-011 : ELECTRICAL MACHINES – II

Time : 3 hours

Maximum Marks : 70

*Note : Answer any **seven** questions. All questions carry equal marks.*

1. Draw the phasor diagram of a loaded alternator for the following conditions : 10
 - (a) Lagging power factor
 - (b) Leading power factor
 - (c) Unity power factor

2. Explain the terms direct-axis synchronous reactance and quadrature-axis synchronous reactance of a salient pole alternator. Describe the 'slip test' for the measurement of these parameters. 10

3. (a) Define slip. Why cannot an induction motor run at synchronous speed ? 5
- (b) A 4-pole, 3-phase induction motor operates from a supply whose frequency is 50 Hz. Calculate :
- (i) the speed at which the magnetic field of the stator is rotating,
- (ii) the speed of the rotor for slip of 0.04,
- (iii) the frequency of the rotor currents when the slip is 0.03. 5
4. Derive the expression for starting torque of an induction motor. Also derive the condition for maximum torque. 10
5. Explain the construction and working of a 3-phase synchronous motor. What are the different methods of starting ? 10
6. What are the various phase splitting techniques for starting of single phase induction motor ? Explain any two methods. 10
7. Describe the principle of operation of a stepper motor. What are the constructional differences between variable reluctance and permanent magnet stepper motor ? 10

8. Explain the steps to draw the circle diagram of a 3-phase induction motor using the data obtained from no-load test, short circuit test and stator resistance. 10
9. What are the functions of starter in a 3-phase induction motor? Describe the construction and operation of star-delta starter for 3-phase induction motor. 10
10. Write short notes on any *two* of the following : 2×5=10
- (a) V-curves of Synchronous Machines
 - (b) Brushless DC Motor
 - (c) Repulsion Motor
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