| BIEE-011 |

B.Tech. ELECTRICAL ENGINEERING
Term-End Examination
December, 2011

0159

BIEE-011 : ELECTRICAL MACHINES - II

Time : 3 hours   *Maximum Marks : 70*

Note :   *Attempt **any seven** questions. All questions carry **equal** marks. All questions are to be answered in English language only. Use of calculator is permitted.*

1. Give the constructional detail of rotor of a salient **10** pole. Also draw and explain the equivalent circuit diagram and phasor diagram of a synchronous machine.

2. Define the term synchronous impedance and **10** voltage regulation of alternator. Explain the MMF method for determining the voltage regulation of an alternator.

3. A 3300 V, delta - connected motor has a **10** synchronous reactance per phase (delta) of 18Ω. It operates at a leading power factor of 0.707 when drawing 800 kW from the mains. Calculate its excitation emf.

4. Explain the effect of varying excitation on armature current and power factor in a synchronous motor. Draw V-curves and state their significance. **10**

5. Describe with neat sketch the construction and working principle of 3-phase Induction Motor. **10**

6. (a) Draw and explain the complete torque-speed characteristic of 3-phase induction motor. **5**

   (b) A 8-pole, 3-phase induction motor is supplied from 50 Hz, a.c. supply on full load, the frequency of induced emf in rotor is 2 Hz. Find full load slip and corresponding speed. **5**

7. What is the need of starter in 3-phase induction Motor. Give the name of different methods for the starting of 3-phase induction motor. Explain any two methods in detail. **10**

8. Explain, why single-phase Induction Motor is not self starting, using double revolving field theory. **10**

9. A 250 watt, 230 V, 50 Hz, $1-\phi$ capacitor start induction motor has the following constants for the main and auxiliary windings. Main winding $Zm = (4 \cdot 5 + j3 \cdot 7)\Omega$, auxiliary winding $Za = (9 \cdot 5 + j3 \cdot 5)\Omega$. Determine the value of the capacitor that will place the main and auxiliary winding currents in quadarature at starting. **10**

10. Write the short notes on *any two* of the following : **2x5=10**
    (a) Universal Motor
    (b) Brush less DC Motor
    (c) Slip test