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B.Tech. ELECTRICAL ENGINEERING**Term-End Examination****December, 2012****BIEE-020 : ELECTRICAL MACHINES AND
ELECTRONICS***Time : 3 hours**Maximum Marks : 70**Note : Answer any seven questions*

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1. (a) Derive the relationship between phase, line voltages, and currents for a star connected balanced load across a 3-phase balanced system. 5
 - (b) Three equal impedances, each $(16 + j12)\Omega$ are connected in star, and a 400V, 3 phase ac supply is applied to load. Find : 5
 - (i) the phase and line currents;
 - (ii) power factor of the load, and
 - (iii) the reading of the wattmeters, when two wattmeter method is used to measure the power.
 2. Develop the equivalent circuit of a single phase transformer and draw the phase diagram for loading power factor condition. 10

3. The iron loss of a 80 kVA, 1000/250V, 1-Ph, 50Hz transformer is 800W. The copper loss, when primary winding carries 50A is 400W. Estimate **10**
- (a) area of cross section of limit, if working flux density is 1 tesla, and there are 1,000 turns on primary (ht winding)
 - (b) current ratio (primary to secondary)
 - (c) efficiency at full load, and 0.8 p.f.
 - (d) efficiency for a load, when copper loss will equal iron loss, and p.f. remains 0.8kg.
4. Explain briefly the different methods of starting of 3-phase induction motors. **10**
5. Describe the construction and principle of operation of 1 – ϕ induction motors. **10**
6. Explain briefly the factors affecting the selection of motors in industry. **10**
7. What is an inverter ? Draw the circuit of an inverter and explain its operation. **10**
8. Explain with diagrams how power electronic devices can be used to control a.c. motors. **10**

9. Write short notes on **any two** of the following : 2x5=10
- (a) Three phase measurement by two wattmeters.
 - (b) Welding Transformer
 - (c) Slip-Torque characteristics of 3-phase induction motor.
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