No. of Printed Pages : 3

BIEE-020

B.Tech. IN ELECTRICAL ENGINEERING

01145

Term-End Examination

June, 2012

BIEE-020 : ELECTRICAL MACHINES AND ELECTRONICS

Time : 3 hours *Maximum Marks : 70*

*Note : Answer **any seven** questions in all.*

1. Explain how do you measure 3-phase power and Power factor angle with two wattmeters. Draw phasor diagrams. **10**

2. (a) Draw and explain equivalent circuit of 1-ϕ transformer. **5**

   (b) A 50 kVA transformer has an efficiency of 98% at full load, 0.8 p.f and an efficiency of 96.9% at $\frac{1}{4}$ full load, unity p.f. Determine the iron loss and full load copper loss. **5**

3. (a) Draw the phase diagram of a single phase transformer under loaded condition with logging power factor. **5**

   (b) Derive the condition for maximum efficiency of a transformer. **5**

4. Explain the production of rotating magnetic field in 3 phase induction motors. **10**

5. Explain why single phase induction motor is not self starting and describe the different methods of its starting. **10**

6. Draw and explain volt-ampere characteristic and Switching characteristic of an SCR. **10**

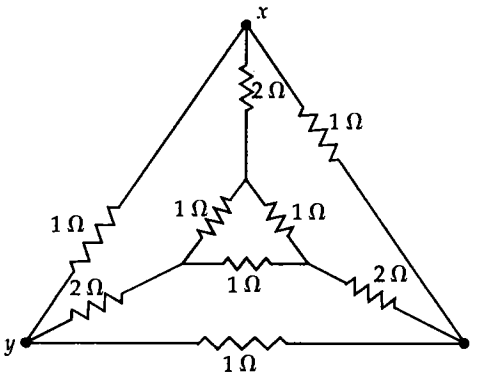
7. What is a chopper ? Draw and explain a chopper circuit with waveforms. **10**

8. Explain in detail the factors affecting selection of motors for industrial use. **10**

9. (a) A delta load of $Z_{AB} = 52 \angle 45° \Omega$; **5**

$Z_{BC} = 52 \angle -30° \Omega$ and $Z_{CA} = 10 \angle 0° \Omega$ are connected to a 230 V, 3 phase source. Find the magnitude of the line currents, when the phase sequence is ABC.

(b) Determine the resistance between the point x and y for the network given below. **5**



10. Write short note on ***any two*** of the following : **2x5=10**

(a) Welding Transformer

(b) Slip - Torque characteristic of 3-ϕ induction motor

(c) Control of dc motors by power electronic devices.