

ELECTRICAL ENGINEERING (Revision 2003)
BASIC ELECTRICAL AND ELECTRONICS

(Maximum marks 100)

Time: 3 hours

Note: Part A: Question I is compulsory.
Part B: Answer any 8 questions

PART A

I. Answer the following questions in one or two sentences: (Each question carries two marks)

1. Define electromotive force with units
2. What are the two general classes of magnet
3. What do you understand by a secondary cell
4. Explain the working principle of generator
5. Why the armature is laminated
6. Give the relation between maximum value and RMS value
7. What is synchronous speed
8. What do you mean by transformer
9. What are the main advantages of auto transformer
10. For what purpose is the breather fitted in a transformer

PART B

- II a) State and explain ohms law. 4
- b) Derive the equation for calculating the effective resistance, when three resistances, connected in series and parallel. 6
- III a) Differentiate between secondary cell and primary cell. Name two cells in each case. 4
- b) Mention four indications of a fully charged battery 3
- c) State faradays laws of electrolysis 3
- IV a) State faradays laws of electromagnetic induction. 3
- b) Compare electric circuit and magnetic circuit. 3
- c) What is hysteresis loss? How is it minimizing? 4
- V a) Three capacitors of $15\mu\text{F}$, $30\mu\text{F}$, $60\mu\text{F}$ are connected in series across a 100V supply: Determine 1. Equivalent capacitance 4
2. PD across each capacitor.

- b) What are the factors on which the capacity of a capacitor depends? 3
- c) Derive an expression for three capacitors when connected in series and parallel. 3
- VI a) Define frequency and RMS value of an alternating current. 3
- b) Draw three-circuit diagram for measuring the three-phase delta connected squirrel cage induction motor by two-wattmeter method. 3
- c) An inductance of 0.2Henry coil is connected in series with a resistance of 4 ohm. It is connected in parallel with 200V 50Hz supply.
- Find
1. Current taken by the coil.
 2. Power consumed.
 3. Power factor
- 4
- VII a) Define effective value and peak value of an alternating quantity 3
- b) A 150hm resistance and 0.5H. Inductance coil is connected to 230V 50c/s A.C supply finds
1. Impedance
 2. Current
 3. Power consumed
- 4
- c) Define the following
1. Amplitude
 2. Form factor
 3. Time period
- 3
- VIII a) Name six applications of universal motor. 3
- b) Explain the working principle of a single-phase capacitor start induction motor. 4
- c) Write short note on thermostat 3
- IX a) Explain the working principle of transformer. 4
- b) What is transformer? 2
- c) A 2000/200V 20KVA transformer has 66 turns in the secondary. Calculate the primary turns and the primary and secondary full load current. 4
- X a) What is armature reaction and how it can be prevented 3