Total No. of printed pages = 3

**EI-304/EEE/3rd Sem/2014/N**

# ELEMENTS OF ELECTRICAL ENGINEERING

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Write at least three properties and uses of each of good conductor and good insulator. 4

   (b) Define with their units : work, power and energy. 3×2=6

   (c) Establish the relation between kWh and kcal. 4

2. (a) State and explain Kirchhoff's laws. 5

   (b) Name the active materials of lead acid battery. State the chemical reaction takes place during charging and discharging of a lead acid battery. 3+6=9

[Turn over

3. (a) Draw the main parts of a d.c generator. 4

(b) A 4 pole d.c shunt generator has 36 slots with 10 conductors in each slot. The flux is 0·03 Wb/pole and speed is 750 r.p.m. Calculate the emf generated for lap winding. 5

(c) What is back emf ? Draw the symbolic diagram of d.c motors. 2+3=5

4. (a) Define : Instantaneous value, cycle, RMS value, average value. 4×2=8

(b) An emf is given by 170 sin 377t. Determine

(i) its RMS value

(ii) frequency

(iii) value of the voltage after t = 3 ms. 3×2=6

5. (a) Define : Inductance, capacitive reactance, impedence and power factor. 4×2=8

(b) A coil having pure resistance of 75Ω and pure inductance of 318 mH connected in series with a 50 Hz supply source and the voltage across the 75Ω resistor is found to be 150V. Calculate the supply voltage, phase angle and power factor of the circuit. 3×2=6

6. (a) Derive the EMF equation of transformer. 5

(b) Derive the relation between transformation ratio, turn ratio and current ratio. 5

(c) What do you mean by induction motor ? 4

7. Write short notes on : $3\frac{1}{2} \times 4 = 14$

(a) Current transformer

(b) Potential transformer

(c) Working of D.C motor

(d) R-L-C series circuit.