Diploma in Civil Engineering (DCLE(G) DCLEVI/DMEVI/DELVI/DECVI/DCSVI)

Term-End Examination

01010

December, 2012

BET- 024 : E/M ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : ***All*** *questions are* ***compulsory****. Use of calculator is permitted.*

1. Select the correct answer from the given four alternatives for the following multiple choice objective type questions. **14x1=14**

   (a) The reciprocal of resistance is called :

   (i) Inductance

   (ii) Conductance

   (iii) Capacitance

   (iv) Resistivity

   (b) The slow charging of battery is called :

   (i) Trickle charging

   (ii) Instant charging

   (iii) Quick charging

   (iv) Re-charging

(c) The law that governs the force between electric charges is called :

(i) Amper's Law

(ii) Coulomb's Law

(iii) Faraday's Law

(iv) Ohm's Law

(d) An ammeter is essentially a galvanometer having shunt in :

(i) Parallel

(ii) Series

(iii) Perpendicular

(iv) Motion

(e) The D.C. Generator works on the principle laid down by :

(i) Faraday's Law

(ii) Lenz's Law

(iii) Bio-Savarts Law

(iv) Kirchhoff's Law

(f) The relation between phase voltage and line voltage in 3 phase expressed as :

(i) Phase voltage = line voltage $\times \frac{1}{\sqrt{3}}$

(ii) Phase voltage = line voltage $\times \sqrt{3}$

(iii) Phase voltage = line voltage $\times \frac{1}{\sqrt{2}}$

(iv) Phase voltage = line voltage $\times \sqrt{2}$

(g) One Horse Power (HP) is ***not*** equal to :

(i) 550 ft lb (ii) 75 kgf.m

(iii) 736 w (iv) 636J/s

(h) Henery is the unit of :

(i) Capacitance

(ii) Inductance

(iii) Permittivity

(iv) Capacitor

(i) Water gas is a mixture of :

(i) O_2 and H_2 (ii) CO and H_2

(iii) CH_4 and O_2 (iv) CO_2 and H_2

(j) PV^n = Constant. Which of the following is correct for adiabatic process ?

(i) $n = 0$ (ii) $n = 1$

(iii) $n = \gamma$ (iv) $n = 1.5$

(k) In Otto cycle, the efficiency _____ with compression ratio of (r).

(i) decreases

(ii) does not change

(iii) increases

(iv) efficiency is independent

(l) Which of the following is ***not*** a component of a vapour compression system of refrigeration ?

(i) Compressor

(ii) Expansion device

(iii) Conditioner

(iv) Evaporator

(m) The graphic representation of several properties of moist air is called :

(i) Psychrometric chart

(ii) Bar chart

(iii) Mollier chart

(iv) None of the above

(n) Basically the escalators are :

(i) lifts (ii) conveyor belts

(iii) crane (iv) chain hoist

2. Answer *any two* of the following : **2x7=14**

(a) With the help of circuits, explain series and parallel connection of resistors. Deduce equation for a single equivalent resistance across voltage source for both the circuits.

(b) The resistance of two conductors is 25 ohms when connected in series and 6 ohms when joined in parallel :

(i) Calculate the resistance of each wire

(ii) What ratio of current will be shared when in parallel ?

(c) Find the magnitude of emf induced in a 100 turns coil with cross sectional area of 0.16 m^2, if the magnetic field through the coil changes from 0.10 wbm^{-2} to 0.70 wbm^{-2} at a uniform rate over a period of 0.02 second.

3. Answer *any two* of the following : 2x7=14

(a) (i) Write down the Coulomb's law of electrostatics.

(ii) What is permittivity ?

(iii) What is a capacitor ? Draw circuits showing capacitors in series and parallel with the equations for Cs and Cp.

(b) Three capacitors of capacity 10, 20 and 40 μf are placed in series across a 350 V source. Determine :

(i) Equivalent capacitance of the combination

(ii) Charge on each capacitor

(iii) Voltage dmp across each capacitor and

(iv) Total stored energy

(c) (i) Define transformer. Write working principle of transformer.

(ii) What is voltage transformation ratio and current ratio in respect to a transformer ?

4. Answer *any two* of the following : 2x7=14

(a) Compare :

(i) Primary and secondary distribution

(ii) Overhead and underground distribution

(b) What are the components of vapour compression system ? Describe the function of each components.

(c) An inventor claims to have developed a heat engine which produces 5 kW and consumes 400kJ of heat per min. The engine operates between 1000K and 300K. Examine the claim and say if it is true.

5. Answer *any two* of the following : **2x7=14**

(a) Describe the various Air Conditioning Processes. Show the processes on Psychrometric chart.

(b) What is a lift ? Where it is used ? Distinguish between lift and an escalator.

(c) A carnot cycle machine operates between $T_1 = 30°C$ and $T_2 = 15°C$. Determine COP when it operators as :

(i) a Ref. machine

(ii) a heat pump and

(iii) its efficiency , if it operates as a heat engine.