

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

Term-End Examination 00224

June, 2013

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. **1×14=14**
- (a) The property which supports flow of current is known as :
- (i) Resistance
 - (ii) Conductance
 - (iii) Inductance
 - (iv) Capacitance
- (b) If the diameter of a conductor is increased to double, keeping length constant, the resistance :
- (i) reduced to one fourth
 - (ii) reduced to half
 - (iii) increased to one fourth
 - (iv) increased to double

- (c) The SI unit of magnetic field is :
- (i) Tesla
 - (ii) Newton
 - (iii) Ampere
 - (iv) Ohm
- (d) A device which stores electrical charge is called :
- (i) Capacitor
 - (ii) Conductor
 - (iii) Resistor
 - (iv) Battery
- (e) A voltmeter is essentially a galvanometer having :
- (i) high resistance in series
 - (ii) high resistance in parallel
 - (iii) low resistance in series
 - (iv) low resistance in parallel
- (f) The form factor of a sinusoid is :
- (i) 1.11
 - (ii) 2.22
 - (iii) 3.33
 - (iv) 4.44
- (g) The DC Generator has two parts namely :
- (i) a stator and a motor
 - (ii) a stator and a pump
 - (iii) a motor and a pump
 - (iv) a stator and a rotor

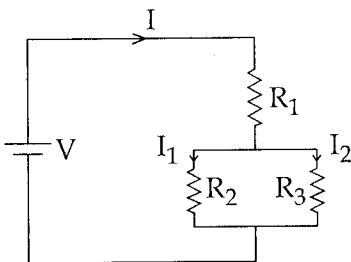
- (h) When the transformer raises the voltage it is called :
- (i) Voltage Transformer
 - (ii) Power Transformer
 - (iii) Step up Transformer
 - (iv) Step down Transformer
- (i) Lumen is the unit of :
- (i) Luminous flux
 - (ii) Luminous Intensity
 - (iii) Luminous capacity
 - (iv) Luminous Velocity
- (j) The Boyle's law is expressed as :
- (i) $pV = \text{Constant}$
 - (ii) $\frac{V}{T} = \text{Constant}$
 - (iii) $\frac{V}{m} = \text{Constant}$
 - (iv) $mT = \text{Constant}$
- (k) HCV and LCV are related as under :
- (i) $\text{HCV} + \text{LCV} = 2400 (M + 9\text{Hz}) \text{ kJ/kg}$
 - (ii) $\text{HCV} - \text{LCV} = 2400 (M + 9\text{Hz}) \text{ kJ/kg}$
 - (iii) $\text{HCV} + \text{LCV} = 2400 (M - 9\text{Hz}) \text{ kJ/kg}$
 - (iv) $\text{HCV} - \text{LCV} = 2400 (M - 9\text{Hz}) \text{ kJ/kg}$
- (l) Which is **not** a part of reciprocating engine ?
- (i) cylinder
 - (ii) piston
 - (iii) brake
 - (iv) connecting rod

- (m) Practically _____ cycle is followed in petrol engine
- (i) Diesel (ii) Otto
- (iii) Carnot (iv) Rankine
- (n) For high rise building the acceptable lift speed is
- (i) 1 m/s (ii) 2 m/s
- (iii) 5 m/s (iv) 9 m/s

2. Answer *any two* of following :

2x7=14

- (a) Calculate current flow through the $5\ \Omega$ resistor when a 100 V battery is connected across it. Also calculate conductance of the resistor and the power dissipated by this resistor,
- (b) If $R_1 = 5\ \Omega$, $R_2 = 2\ \Omega$, $R_3 = 3\ \Omega$ and $V = 10$ Volts, then calculate the current in all three resistors.



- (c) (i) Explain Kirchhoff's Current (KCL) and voltage law (KVL) with help of circuits.

- (ii) How is lead Acid battery tested ?
Write at least four points, which help
in care and maintenance of battery.

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

- (a) (i) Write faraday's laws
(ii) What is Lenz's rule ? What are eddy currents ?
(iii) Write a short note on solenoid.
- (b) Two capacitors of $4\mu\text{F}$ and $8\mu\text{F}$ are connected in parallel and this combination is connected in series with capacitor of $24\mu\text{F}$. Determine
(i) Total capacitance
(ii) Total charge, and
(iii) Charge on each capacitor.
If applied voltage is 32 volts.
- (c) List the various components of vapour compression system.

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

- (a) Distinguish between 3 phase generator and a single phase generator. Discuss merits and characteristics of a 3 phase system.
- (b) Distinguish between star and Delta connection. List out the important characteristics of these configurations.
- (c) Discuss briefly the comparison between four stroke and two stroke cycle engine.

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

- (a) A closed vessel contains 1 kg of N_2 at $20^\circ C$ temperature and 98.1 kPa abs. Heat is supplied to vessel till gas acquires a pressure of 196.2 kPa abs. Find
- (i) Final temp, of gas
 - (ii) heat added
 - (iii) change in internal energy.
Take $C_v = 0.745 \text{ kJ/kg.K}$
- (b) Calculate the efficiency of a diesel cycle for which compression ratio is 14 and cut off ratio is 2 ? What will be efficiency if cut off ratio is increased to 3 ? Given $\gamma = 1.4$
- (c) Draw a P-V diagram for Rankin Cycle. Describe the processes the cycle consists of and derive the expression for its efficiency
-