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BET-024

DIPLOMA IN CIVIL ENGINEERING (DCLE(G)) / DIPLOMA IN ELECTRICAL AND MECHANICAL ENGINEERING (DEME) / DCLEVI / DMEVI / DELVI / DECVI / DCSVI

Term-End Examination

00178

June, 2014

BET-024 : E/M ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *All questions are* ***compulsory****. Use of scientific calculator is permitted. Assume missing data if any.*

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

(a) The slow charging of battery is called

(i) Trickle charging

(ii) Instant charging

(iii) Quick charging

(iv) Re-charging

(b) The reciprocal of resistance is called

(i) Inductance

(ii) Conductance

(iii) Capacitance

(iv) Resistivity

(c) An Ammeter is essentially a Galvanometer having resistance in

(i) Parallel

(ii) Series

(iii) Perpendicular

(iv) Motion

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

(i) Ampere's law

(ii) Coulomb's law

(iii) Faraday's law

(iv) Ohm's law

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

(i) Faraday's law

(ii) Lenz's law

(iii) Biot-Savart's law

(iv) Kirchhoff's law

(f) In star connection, the relation between phase voltage and line voltage is 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) 636 J/s

(h) 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

(i) Henry is the unit of

(i) Capacitance

(ii) Inductance

(iii) Permittivity

(iv) Capacitor

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

(i) decreases

(ii) does not change

(iii) increases

(iv) does not depend

(k) PV^n = constant. Which is correct for the adiabatic process ?

(i) $n = 0$

(ii) $n = 1$

(iii) $n = \gamma$

(iv) $n = 1{\cdot}5$

(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 escalators basically are

(i) lifts

(ii) conveyor belts

(iii) cranes

(iv) chain hoists

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

(i) Psychrometric chart

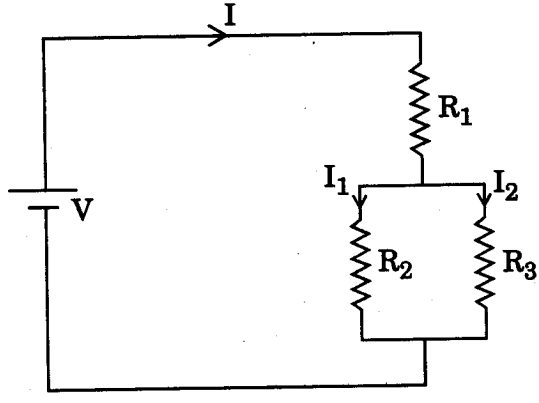
(ii) Bar chart

(iii) Mollier chart

(iv) Pie chart

2. Answer any ***two*** of the following : $2 \times 7 = 14$

(a) 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.



(b) Find the magnitude of emf induced in a 100-turns coil with cross-sectional area of $0{\cdot}16\ m^2$, if the magnetic field through the coil changes from $0{\cdot}10\ Wb\ m^{-2}$ to $0{\cdot}7\ Wb\ m^{-2}$ at a uniform rate over a period of 0·02 seconds.

(c) (i) Explain Kirchhoff's current (KCL) and voltage (KVL) laws with the 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 : *2×7=14*

(a) (i) Write Faraday's law.

(ii) What is Lenz's rule ? What are eddy currents ?

(iii) Write a short note on Solenoid.

(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 drop across each capacitor

(iv) Total stored energy.

(c) Describe Summer air-conditioning system for humid air with the help of neat sketch.

4. Answer any ***two*** of the following : *2×7=14*

(a) Compare

(i) Primary and Secondary Distribution

(ii) Overhead and Underground Distribution.

(b) Discuss briefly the comparison between four stroke and two stroke cycle engines.

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

5. Answer any ***two*** of the following : $2 \times 7 = 14$

(a) A closed vessel contains 1 kg of N_2 at 20°C temperature and 98·1 kPa abs. Heat is supplied to the vessel till the gas acquires a pressure of 196·2 kPa abs. Find (i) Final temperature of gas (ii) Heat added (iii) Change in internal energy. Take $C_v = 0{\cdot}745$ 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 the efficiency if cut-off ratio is increased to 3 ? Given $\gamma = 1{\cdot}4$.

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