| BET-012 |

DIPLOMA IN CIVIL ENGINEERING (DCLE(G)) / DIPLOMA IN MECHANICAL ENGINEERING (DME) / DCLEVI / DMEVI / DELVI / DECVI / DCSVI / ACCLEVI / ACMEVI / ACELVI / ACECVI / ACCSVI

00923

Term-End Examination

December, 2016

BET-012 : PHYSICS

Time : 2 hours   *Maximum Marks : 70*

Note : *Question no. 1 is **compulsory**. Attempt any **four** questions from questions no. 2 to 7. Use of scientific calculator is permitted.*

1.   Choose the correct answer from the given four alternatives.   *14×1=14*

   (a)   The spherical shape of the rain drops is due to

      (i)   atmospheric pressure

      (ii)   gravity

      (iii) density of water

      (iv)   surface tension

(b)   A value of surface tension of 70 dynes/cm is equal to

   (i) $7 \times 10^2 \dfrac{N}{m}$

   (ii) $7 \times 10^3 \dfrac{N}{m}$

   (iii) $70 \times 10^{-3} \dfrac{N}{m}$

   (iv) $70 \times 10^{-4} \dfrac{N}{m}$

(c)   The rate of loss of heat of a body depends on
   (i)   mass of the body
   (ii)   temperature of the body
   (iii)   surface area of the body
   (iv)   Both (ii) and (iii)

(d)   Hot water in a flask in a room takes 15 minutes to cool from 70° to 60°C. The time taken to cool from 60° to 50°C will be
   (i)   15 minutes
   (ii)   less than 15 minutes
   (iii)   more than 15 minutes
   (iv)   Can't be predicted

(e)   The ratio $\gamma = C_p/C_v$ for an ideal gas is
   (i)   1
   (ii)   more than 1
   (iii)   less than 1
   (iv)   depends on the temperature of the gas

(f) A body can radiate heat energy at

    (i)   all temperatures

    (ii) $T > 100°C$

    (iii) $T > 0°C$

    (iv) $T > 1000°C$

(g) Light is travelling from vacuum and enters in a glass medium. Which of the following characteristics of light will remain unchanged ?

    (i)   Velocity

    (ii)   Amplitude

    (iii) Wavelength

    (iv) Frequency

(h) Suppose a plane mirror is approaching you at a speed of 10 cm/s and you see your image in it. At what speed will your image approach you ?

    (i)   10 cm/s

    (ii)   20 cm/s

    (iii) 40 cm/s

    (iv) 5 cm/s

(i) The power of a lens is measured in

   (i) mm

   (ii) cm

   (iii) m

   (iv) diopter

(j) The illuminating power of a source is measured in terms of

   (i) Candle power

   (ii) Phot

   (iii) Lux

   (iv) Lambert

(k) The luminous flux is measured in

   (i) Candela

   (ii) Lux

   (iii) Steradian

   (iv) Lumen

(l) Ideally the resistance of the voltmeter should be

   (i) very low

   (ii) low

   (iii) high

   (iv) very high

(m) The magnetic susceptibility of paramagnetic substance has a

    (i) small negative value

    (ii) small positive value

    (iii) large negative value

    (iv) large positive value

(n) The Lorentz (magnetic) force depends on

    (i) the speed of the charge particle only

    (ii) the velocity of the particle

    (iii) the magnitude of the magnetic field

    (iv) the velocity of the charge particle and the magnetic field $\vec{B}$

2. (a) Derive the Bernoulli's equation and discuss its significance.

    (b) Define coefficient of viscosity and find its dimension.

    (c) Enumerate the applications of viscosity.   *6+4+4=14*

3. (a) Discuss the kinetic theory of gases and derive the expression of pressure exerted by an ideal gas.

    (b) Differentiate between the longitudinal and transverse waves. Give one example of each wave.   *10+4=14*

4. (a) Derive the expression of lens formula.

  (b) Define power of a lens. The focal length of a convex lens is 20 cm. Calculate its power.

  (c) Discuss the phenomenon of total internal reflection of light. Give one example where a natural phenomenon could be explained on the basis of it.   *6+4+4=14*

5. (a) State Coulomb's law. Calculate the force between two electrons $(q = 1.6 \times 10^{-19}$ C$)$ separated by a distance of 1 μm $(10^{-4}$ cm$)$.

  (b) Calculate the Lorentz force on a charge particle (proton, $q = 1.6 \times 10^{-19}$ C$)$ moving in a field of 1 T and perpendicular to it. The velocity of the proton is 10^4 cm/s.

  (c) What is a secondary cell ? How does it work ? Give the examples of few secondary cells.   *5+5+4=14*

6. (a) Differentiate amongst various types of magnetic materials. Give their examples.

  (b) Discuss the construction and working of galvanometer.   *10+4=14*

7. Write short notes on any *four* of the following : $4 \times 3\frac{1}{2} = 14$

(a) Boyle's Law and Charles' Law

(b) Various Modes of Heat Transfer

(c) Avogadro's Law

(d) Compound Microscope

(e) Astronomical Telescope

(f) Faraday's Law of Electrolysis

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