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BET-012

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

00858

Term-End Examination

June, 2016

BET-012 : PHYSICS

Time : 2 hours *Maximum Marks : 70*

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

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

(a) One Poise is equal to

(i) 10 Pa.s

(ii) 100 Pa.s

(iii) 10^{-1} Pa.s

(iv) 10^{-2} Pa.s

(b) The surface tension of water at 20°C is about

(i) $72{\cdot}6 \times 10^{-2}\ Nm^{-1}$

(ii) $72{\cdot}6 \times 10^{-3}\ Nm^{-1}$

(iii) $72{\cdot}6 \times 10^{-4}\ Nm^{-1}$

(iv) None of these

(c) The fluid pressure at a point within the fluid is given by

(i) $P = \rho/gh$

(ii) $P = g/\rho h$

(iii) $P = \rho gh$

(iv) $P = \rho^2 gh$

(d) For an ideal gas $C_p - C_v$ is equal to

(i) Zero

(ii) R

(iii) 2R

(iv) 3R

(e) For monoatomic ideal gas the molar heat capacity at constant volume is

(i) R

(ii) $\frac{3}{2}R$

(iii) $\frac{5}{2}R$

(iv) 2R

(f) According to Stefan-Boltzmann law, the heat energy radiated per second per unit area of a black body is proportional to

(i) T^{-4}

(ii) T^{-2}

(iii) T

(iv) T^4

(g) The value of Stefan-Boltzmann constant is about

(i) $5{\cdot}6 \times 10^{-6}\ W/m^2K^4$

(ii) $5{\cdot}6 \times 10^{-7}\ W/m^2K^4$

(iii) $5{\cdot}6 \times 10^{-8}\ W/m^2K^4$

(iv) None of these

(h) The temperature at which the numerical values of Celsius and Fahrenheit scales are same is

(i) 0 deg.

(ii) – 32 deg.

(iii) – 40 deg.

(iv) 40 deg.

(i) The magnetic susceptibility of diamagnetic material is

(i) zero

(ii) small positive value

(iii) large positive value

(iv) small negative value

(j) An electron is moving along the direction of magnetic field B with velocity v. The force on this electron is

(i) qvB

(ii) $-qvB$

(iii) zero

(iv) infinite

(k) The correct expression of Lorentz force is

(i) $\vec{F} = q\vec{E} + q\vec{V} \times \vec{B}$

(ii) $\vec{F} = q\vec{E} + q\vec{B} \times \vec{V}$

(iii) $\vec{F} = q\vec{E}$

(iv) None of these

(l) The speed of sound in air is approximately

(i) 300 m/s

(ii) 330 m/s

(iii) 350 m/s

(iv) 500 m/s

(m) The phenomenon of mirage can be explained on the basis of

(i) reflection

(ii) refraction

(iii) dispersion

(iv) total internal reflection

(n) For ohmic conductors, the plot between the current and voltage is a

(i) parabola

(ii) straight line

(iii) hyperbola

(iv) None of these

2. (a) What is Hooke's law ? Explain the stress-strain curve for a metallic wire.

(b) State and explain Ohm's law.

(c) Define stress and strain. *6+4+4*

3. (a) What are the different modes of heat transfer ? Explain them by giving examples.

(b) Find the expression of root mean square speed of ideal gas molecules.

(c) Discuss the factors affecting the speed of sound in a gaseous medium *6+4+4*

4. (a) Derive the expression of mirror formula

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

(b) Explain the phenomenon of mirage in detail. *10+4*

5. (a) Show that for parallel combination of resistances R_1 and R_2, the equivalent resistance R is given by $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$.

(b) Calculate the resistivity of a material of a wire 2 m long, 0·2 mm in diameter and having a resistance of 4 ohms.

(c) What is drift velocity ? Find the expression for drift velocity of electrons. *6+4+4*

6. (a) Find the expression of magnetic field at a distance 'r' from a long current carrying wire.

(b) What are the different types of magnetic materials ? Discuss them in detail. Give the examples of each type of materials.

(c) Briefly discuss the working of cyclotron. *6+4+4*

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

(a) Archimedes principle

(b) Reynolds number

(c) Avogadro's law

(d) Total internal reflection

(e) Wheatstone bridge

(f) Potentiometer