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BET-012(S)

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

00293

Term-End Examination

December, 2016

BET-012(S) : PHYSICS

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. **1** is **compulsory**. Attempt any **four** questions from questions no. 2 to 8. Use of scientific calculator is permitted.*

1. Choose the correct answer from the given four alternatives : *7×2=14*

(a) Intensity (I) of sound varies with amplitude (A) as

(i) $I \propto A^2$

(ii) $I \propto A$

(iii) $I \propto \frac{1}{A}$

(iv) $I \propto \frac{1}{A^3}$

(b) A wire of length 0·5 m carrying a current of 1·2 A is placed in a uniform magnetic field of induction 2 tesla. If the magnetic field is perpendicular to the length of the wire, then the force on the wire is

(i) 0·4 N

(ii) 1·2 N

(iii) 3·0 N

(iv) 4·2 N

(c) The resistance of an ideal voltmeter is

(i) Zero

(ii) Infinity

(iii) 100 Ω

(iv) 500 Ω

(d) A magnetic field exerts no force on

(i) a magnet

(ii) an unmagnetised iron bar

(iii) a moving charge

(iv) a stationary charge

(e) The electrical resistance of metals

(i) increases with an increase in temperature

(ii) decreases with an increase in temperature

(iii) is independent of temperature

(iv) sometimes increases, sometimes decreases with temperature

(f) The SI unit of conductivity (σ) is

(i) Ohm

(ii) $Ohm^{-1}\ m^{-1}$

(iii) $Ohm^{-1}\ m$

(iv) Ohm m

(g) If two lenses of power P_1 and P_2 are placed in contact with each other, the power of this combination (P) is given by

(i) $P = P_1\ P_2$

(ii) $P = \frac{P_1}{P_2}$

(iii) $P = P_1 + P_2$

(iv) $P = \frac{P_2}{P_1}$

2. (a) Derive an equation of continuity for a fluid flowing through a tube of different cross-sectional areas.

(b) Define surface tension of a liquid. How is it related to surface energy ?

(c) State Hooke's law. Calculate the longitudinal stress of a long copper wire of cross-sectional area $1{\cdot}2\ cm^2$ stretched by a force of $4{\cdot}8 \times 10^3$ N. *6+4+4*

3. (a) Differentiate between longitudinal wave motion and transverse wave motion.

(b) Write any four factors on which loudness of a sound depends.

(c) Define pitch of a sound. The velocity of sound in air is 330 ms^{-1}. Calculate the frequency of sound of wavelength 16·5 m. *6+4+4*

4. (a) State Ohm's law. Plot voltage – current graphs for ohmic and non-ohmic conductors.

(b) A wire is of 4 m length, 0·2 mm diameter and has a resistance of 8 Ω. Calculate the resistivity of the material of the wire. *7+7*

5. (a) Define molar heat capacity of a substance. Write its unit.

(b) State Kirchhoff's law of black body radiation. Write its mathematical formula.

(c) State the laws of refraction. *6+4+4*

6. (a) State Coulomb's law. Calculate the electric force between two charged spheres having charges 4×10^{-7} C and 6×10^{-7} C and placed 60 cm apart in air.

(b) Differentiate between primary cells and secondary cells.

(c) State Joule's law of heating. Write its mathematical form. *6+4+4*

7. (a) State Pascal's law. Explain with diagram the working of hydraulic jack based on this principle.

(b) Define coefficient of viscosity. Write its SI unit.

(c) Discuss the effect of pressure and temperature on the speed of sound in a gaseous medium. *6+4+4*

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

(a) Stress – Strain Curve for Steel Wire

(b) Cyclotron

(c) Paramagnetic Substances

(d) Electric Field

(e) Wheatstone Bridge

(f) Modes of Heat Transfer