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BET-012

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

Term-End Examination

01245

December, 2014

BET-012 : 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 alternatives. *7×2=14*

(a) Hydraulic brakes operate on

(i) Pascal's law

(ii) Bernoulli's equation

(iii) Archimedes principle

(iv) None of these

(b) Which one of these is correct ?

(i) 1 Calorie = 4186 Joule

(ii) 1 Calorie = 418·6 Joule

(iii) 1 Calorie = 41·86 Joule

(iv) 1 Calorie = 4·186 Joule

(c) The loudness of a sound

(i) 1 decibel = 1 bel

(ii) 1 decibel = $\frac{1}{10}$ bel

(iii) 1 decibel = $\frac{1}{100}$ bel

(iv) 1 decibel = $\frac{1}{1000}$ bel

(d) The light through an optical fibre suffers a series of

(i) reflections

(ii) refractions

(iii) total internal reflections

(iv) dispersion

(e) The commercial unit of electric energy is

(i) volt

(ii) watt

(iii) kWh

(iv) ohm

(f) The maximum emf developed in voltaic cell is

(i) 0·5 V

(ii) 0·02 V

(iii) 0·1 V

(iv) 1·08 V

(g) The substance which has a small negative value of magnetic susceptibility is

(i) Paramagnetic substance

(ii) Ferromagnetic substance

(iii) Diamagnetic substance

(iv) None of these

2. (a) State Pascal's law. State any one application of it. *4*

(b) A copper cube of mass 0·50 kg is weighed in water. The mass of the cube is found to be 0·40 kg. Is the cube hollow or solid ?

Take the densities of water and copper as 10^3 kg m^{-3} and $8{\cdot}96 \times 10^3$ kg m^{-3} respectively. *6*

(c) Define coefficient of viscosity. What is its SI unit ? *4*

3. (a) Derive an expression of the pressure exerted by the gas molecules on the walls of the container. *6*

(b) Write the relation for temperature between Celsius scale and Fahrenheit scale. At what temperature is the numerical value same on both the Celsius and Fahrenheit scales ? *4*

(c) What is a black body ? State Stefan-Boltzmann Law. *4*

4. (a) Define intensity of sound. What is its SI unit ? *4*

(b) Derive Newton's formula for speed of sound. How was it corrected by Laplace ? *6*

(c) A sound of wavelength 16·5 m has a frequency of 20 Hz. Calculate the velocity of sound in air. *4*

5. (a) State laws of refraction. *4*

(b) Define angle of minimum deviation in a prism. Plot a graph between angle of deviation and angle of incidence for a prism. *5*

(c) Two thin lenses are in contact and the focal length of the combination is 100 cm. If the focal length of one lens is 20 cm, calculate the power of the other lens. Which type of lens is it ? *5*

6. (a) State Ohm's law. Draw voltage-current plot for ohmic conductors. *4*

(b) Calculate the resistivity of the material of a wire 2 m long, 0·2 mm in diameter and having a resistance of 4 ohm. *6*

(c) State Faraday's laws of electrolysis. *4*

7. (a) State Biot-Savart's law. *4*

(b) What is a galvanometer ? How can a galvanometer be converted into a voltmeter ? *4*

(c) What is a Cyclotron ? Show that the maximum kinetic energy of the ion in the circular path is given by

$$E_{max} = \frac{1}{2} \frac{B^2 q^2 r^2}{m}$$

where symbols have their usual meanings. *6*

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) Three modes of heat transfer

(c) Factors affecting the speed of sound

(d) Astronomical Telescope

(e) Voltaic cell

(f) Paramagnetic substances

(g) Potentiometer