BET-012

Diploma in Civil Engineering / Diploma in Electrical & Mechanical Engineering

00065

Term-End Examination

June, 2010

BET-012 : PHYSICS

Time : 2 hours *Maximum Marks : 70*

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

1. Choose the correct alternative : **14x1=14**

(a) Atmospheric pressure is measured by :

(i) hydrometer

(ii) thermometer

(iii) calorimeter

(iv) barometer

(b) Submarine is based on :

(i) pascal's law

(ii) Archimede's principle

(iii) Bernoulli's principle

(iv) None of the above

(c) Bernoulli's equation is important in the field of :

(i) electrical circuits

(ii) magnetism

(iii) photo electric effect

(iv) flow of fluids

(d) Oxygen boils at −183°C. This is approximately :

(i) −297°F

(ii) −329°F

(iii) −261°F

(iv) −215°F

(e) An ideal material for making cooking vessels must be having :

(i) small conductivity and large heat capacity

(ii) large heat capacity and large conductivity

(iii) small heat capacity and large conductivity

(iv) small heat capacity and small conductivity

(f) At a given temperature, the velocity of sound in air is independent of change in :

(i) pressure

(ii) density

(iii) humidity

(iv) none of these

(g) The magnifying power of a telescope can be increased by using :

(i) objective of large focal length

(ii) objective of small focal length

(iii) eye lens of large focal length

(iv) all of the above

(h) When a red flower is seen through a green glass, it appears :

(i) red
(ii) green
(iii) yellow
(iv) black

(i) When light passes from one medium into another medium, then the physical property which does not change is :

(i) velocity
(ii) wavelength
(iii) frequency
(iv) refractive index

(j) A plane mirror produces a magnification of :

(i) -1
(ii) $+1$
(iii) zero
(iv) between 0 and $+\infty$

(k) In SI, unit of electric field is :

(i) $A\ m^{-1}$
(ii) $N\ C^{-1}$
(iii) $C\ m^{-1}$
(iv) $C\ m^{-2}$

(l) A metallic wire of resistance 40Ω is stretched to twice its length. Its resistivity will :

(i) become half
(ii) become double
(iii) remain same
(iv) become four times

(m) The appropriate material used in the construction of resistance boxes is :

(i) copper

(ii) iron

(iii) manganin

(iv) aluminium

(n) Which one of the following substances is not magnetic ?

(i) Brass

(ii) Cobalt

(iii) Nickel

(iv) Iron

2. (a) Explain surface tension. Give its units and dimensions. **4+5+5**

(b) A steel wire of length 4.7 m and cross-section 3.0×10^{-5} m^2 stretches by the same amount as a copper wire of length 3.5 m and cross-section 4.0×10^{-5} m^2 under a given load. Determine the ratio of the Young's modulus of steel to that of copper ?

(c) Water flows through a hose (pipe), whose internal diameter is 2.1 cm at a speed of $1.0 ms^{-1}$. Calculate the diameter of the nozzle, if the water is to emerge at a speed of 4.0 ms^{-1} ?

3. (a) Distinguish between conduction and convection. Give one application in each case of conduction and convection. **4+5+5**

(b) At what temperature is the numerical value same on both the Celsius and Fahrenheit scales ?

(c) A mass of 10 kg falls through a height of 50 m and rotate a paddle wheel which churns 1 kg of water. The initial temperature of water is 2°C. Calculate the increase in the temperature.

Given : $J = 4.2 \times 10^7$ erg. Cal^{-1}.

4. (a) Define wave motion. Distinguish between transverse and longitudinal wave motion by giving examples in each case. **4+5+5**

(b) The speed of sound in air at 300 K is 348 ms^{-1}. At what temperature will the speed be 402 ms^{-1} ?

(c) A tuning fork makes 284 vibrations per second in air. Compute the wavelength of the tone emitted.

Given : speed of sound = $330 ms^{-1}$

5. (a) State the laws of reflection. Mention the characteristics of image formed by a plane mirror. **4+5+5**

(b) Determine the location and nature of the images formed by convex lens when the object is placed at :

(i) 2 F, and (ii) F.

(c) A ray of light is incident from glass on the interface separating it from air at an angle of 45° and is deviated through 20°. Calculate the critical angle for the glass-air surface.

6. (a) State Coulomb's law in electrostatics. Express the same in SI units. **4+5+5**

(b) Calculate the electric force between two charged spheres having charges 5×10^{-7} C and 8×10^{-7} C and placed 0.80 m apart in air.

(c) Calculate the resistivity of the material of a wire 8 m long, 0.4 mm in diameter and having a resistance of 4 Ω.

7. Write short notes on ***any four*** of the following : **4x3½=14**

(a) Paramagnetic Substance

(b) Magnetic Susceptibility

(c) Ammeter

(d) Galvanometer

(e) Primary Cell

(f) Faradays Laws of Electrolysis