00301

BET-012

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

Term-End Examination

December, 2015

BET-012 : PHYSICS

Time : 2 hours   *Maximum Marks : 70*

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

1. Choose the correct answer.

   (a) The S.I. unit of coefficient of viscosity is   *2*

      (i) Ns/m^2

      (ii) Nsm^2

      (iii) Ns^{-1}

      (iv) Nm^2

(b) The equation of continuity for a compressible fluid is given as   *2*

   (i)   ρav = constant

   (ii)   av = constant

   (iii) ρa = constant

   (iv)   ρv = constant

(c) Refractive index of a medium can be given as $1/\sqrt{2}$ and the angle of refraction is 45°. Calculate the value of sin (i) where i is the angle of incidence.   *2*

   (i)   1/4

   (ii)   1/2

   (iii) 1/8

   (iv)   1/10

(d) Sound travels fastest   *2*

   (i)   on a cold winter day

   (ii)   on a rainy day

   (iii) on a hot day

   (iv)   on a slightly warm day

(e) Two wires carrying current in same direction   *2*

   (i)   repel each other

   (ii)   attract each other

   (iii) have no attraction or repulsion

   (iv)   merge into each other

(f) Kinetic friction is usually _____ than static friction. **2**

  (i) more

  (ii) same

  (iii) less

  (iv) not related

(g) The numerical value which is the same on Celsius and Fahrenheit scales is **2**

  (i) − 20

  (ii) − 80

  (iii) − 40

  (iv) 0

2. (a) Explain in brief the stress – strain curve for a ductile material.

  (b) A copper cube of mass 0·5 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 $8·96 \times 10^3$ kg/m^3 respectively.

  (c) Derive the Bernoulli's equation for an incompressible fluid. **4+6+4**

3. (a) Explain in brief the three modes of heat transfer.

  (b) State the 1st and 2nd law of thermodynamics.

(c) A copper calorimeter weighing 250 g is at a temperature of 20°C. When 50 g of water at 30°C is poured into the calorimeter cup, the temperature of the cup water system becomes 26·8°C. Calculate the specific heat capacity of the cup. *4+4+6*

4. (a) Define intensity of sound. What are the two major factors on which the intensity of sound depends ? Also show how intensity is related with these factors.

(b) What is quality of sound ? How do we determine it ?

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

5. (a) Explain in detail the laws of refraction with suitable diagrams. Also define refractive index and give its expression.

(b) Explain Total internal reflection with suitable examples. *7+7*

6. (a) 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)   Calculate the resistance of the following circuit :
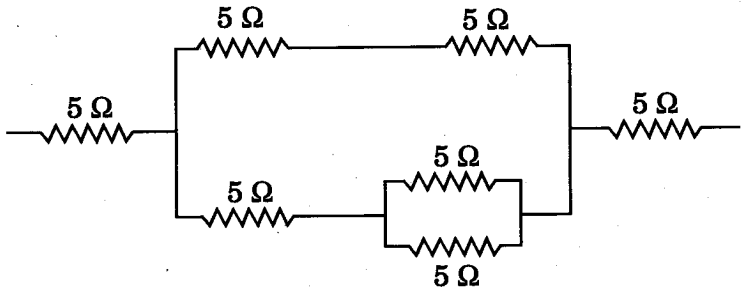
(c)   Explain in detail Kirchhoff's First and Second Rules.   *4+4+6*

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

(a)   Galvanometer

(b)   Wheatstone Bridge

(c)   Astronomical Telescope

(d)   Potentiometer

(e)   Ferromagnetic Substance

(f)   Ohm's Law