No. of Printed Pages : 6

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 01138

June, 2013

BET-012 : PHYSICS

Time : 2 hours *Maximum Marks : 70*

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

1. (a) A drop of oil is placed on the surface of water then it will spread as a thin layer because 7x2=14

(i) Surface tension tends to give the oil a spherical surface.

(ii) Surface tension of water is greater than that of oil.

(iii) Both oil and water have nearly equal surface tension.

(iv) Oil is lighter than water.

(b) The following four wires are made of same material and same tension is applied on them. Which one will have maximum increase in length ?

(i) Length = 100cm, Diameter = 1mm

(ii) Length = 50 cm, Diameter = 0.5mm

(iii) Length = 200cm, Diameter = 2mm

(iv) Length = 300cm, Diameter = 3mm

(c) A black body is heated from 27°C to 927°C. What will be the ratio of radiations emitted ?

(i) 1 : 4

(ii) 1 : 16

(iii) 1 : 64

(iv) 1 : 256

(d) The power of lens used by a short - sighted person is -2D . Find the maximum distance of an object which he can see without spectacles ?

(i) 25 cm

(ii) 50 cm

(iii) 100 cm

(iv) 10 cm

(e) For having large magnifying power of a compound microscope :

(i) focal length of objective lens and eye lens should be small

(ii) length of microscope tube should be small.

(iii) focal length of objective lens should be large.

(iv) focal length of eye lens should be smaller than the focal length of its objective lens.

(f) Kirchoff's first rule (Junction rule) expresses the conservation of :

(i) energy

(ii) charge

(iii) momentum

(iv) none

(g) In order to increase the sensitivity of a moving coil galvanometer, one should decrease :

(i) the strength of its magnet

(ii) the restoring torque

(iii) the number of turns in its coil

(iv) the area of its coil.

2. (a) State and explain Pascal's law. 4

(b) Define Young's modulus , Bulk modulus and modulus of rigidity. 5

(c) For steel , the breaking stress is $7.9 \times 10^6 Nm^{-2}$ and its density is 7.9×10^3 kg m^{-3} Determine the maximum length of a steel wire which can be suspended without breaking under its own weight. (g = $9.8ms^{-2}$) 5

3. (a) State the zeroth law of thermodynamics. Explain the concept of temperature on its basis . 5

(b) Apply the kinetic theory of gases to account for the gas laws. 4

(c) For one gram molecule of hydrogen at STP. Calculate 5

(i) root mean square speed

(ii) mean kinetic energy

(at STP pressure = $1.01 \times 10^5 Pa$)

(density of hydrogen as 0.09kg m^{-2})

(V = 22.4 litres)

4. (a) What are transverse and longitudinal waves. 5

(b) Derive a general expression for the speed of sound and discuss the formulae due to Newton and Laplace. 5

(c) An air column, disturbed by a tuning fork of frequency 256Hz, gives resonance at column length 33.4cm and 101.8cm. Calculate the speed of sound in air. 4

5. (a) State the laws of reflection and the laws of refraction. 5

(b) Explain the concept of total internal reflection and the importance of total internal reflection in optical fibre communication. 5

(c) An object of size 3.0cm is placed at a distance of 14 cm in front of concave lens of focal length 28cm. Calculate the distance of the image formed. What type of image will it be ? 4

6. (a) State Coulomb's law and explain the concept of electric field. 4

(b) State and explain Kirchhoff is rules relating to distribution of currents in a network of conductors. 5

(c) Three resistors 2Ω, 3Ω and 5Ω are combined in series and the combination is connected to a battery of 20 volt . Calculate the total resistance of the series combination and potential drop across each resistors. 5

7. (a) Explain the working of a moving coil galvanometer. 5

(b) Describe the salient features of ferromagnetic substance. 4

(c) The radius of cyclotron's dees is 50cm and frequency is 15 MHz . Calculate the magnetic field required for accelerating protons and the kinetic energy of the proton beam produced by the Cyclotron ($e = 1.6 \times 10^{-19} C$, $m = 1.67 \times 10^{-27}$ kg) 5

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

(a) Bernoulli's equation

(b) Compound Microscope

(c) Prism

(d) Drift velocity

(e) Voltaic cell

(f) Ammeter