BRAINWARE UNIVERSITY

Term End Examination 2022
Programme – Dip.CSE-2018/Dip.ECE-2018/Dip.EE-2018/Dip.ECE-2019/Dip.CSE-2019/Dip.ME-2019/Dip.CE-2019/Dip.CSE-2020/Dip.CSE-2021/Dip.EE-2021/Dip.ME-2021
Course Name – Physics I
Course Code - DPHY010101/DECE102/DCSE102/DME102/DCE102/DEE102
(Semester I)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i)   One nanometre is equal to
   a) 10^{-6} m   b) 10^{-3} m
   c) 10^{-9} m   d) 10^{-10} m

(ii) Magnification for _____ image is always _____
   a) real, positive   b) real, negative
   c) virtual, negative   d) any, negative

(iii) When the source of light is not sun light then the photo voltaic cell is devised as
   a) Photo diode   b) Photo voltaic cell
   c) Photo detector   d) Photo transmitter

(iv) The change in the shape of a regular body is due to
   a) Bulk strain   b) Shearing strain
   c) Longitudinal strain   d) Volume strain

(v)   Which of the following unit is not of length?
   a) Light year   b) Fermi
   c) Angstrom   d) Becquerel

(vi) Cork is considered to be a good insulator because it has
   a) free electrons   b) atoms colliding frequency
   c) low density   d) porous body

(vii) Poise is the unit of
   a) Viscosity   b) Velocity
   c) Force   d) Surface tension

(viii) $[ML^{-1}T^{-2}]$ can be deduced as the dimensional formula of
   a) Force   b) coefficient of friction
   c) modulus of elasticity   d) energy

(ix) Photovoltaic cell or solar cell converts

a) Electromagnetic radiation directly into electricity   b) Thermal energy into electricity

c) Solar radiation into kinetic energy   d) Solar radiation into thermal energy

(x) The speed of light is_____ in vacuum.

a) 3×10^5 m/s   b) 3×10^6 m/s

c) 3×10^7 m/s   d) 3×10^8 m/s

(xi) The photoelectric emission could be explained by the

a) Wave nature of light   b) Particle nature of light

c) Dual nature of light   d) Quantum nature

(xii) To an astronaut in space, the sky will appear to be

a) violet   b) red

c) black   d) blue

(xiii) When the interference of light takes place at the region the light energy is

a) created   b) destroyed

c) redistributed   d) none of these

(xiv) Choose the correct ratio that expresses pressure.

a) Force/area   b) Energy/volume

c) Energy/area   d) Force/volume

(xv) Choose which pair of observables has the same dimensions.?

a) Specific Heat and Latent Heat   b) Impulse and Momentum

c) Surface Tension and Force   d) Moment of Inertia and Torque

Group-B
(Short Answer Type Questions)   3 x 5=15

2. Distinguish between the specific heat at constant pressure and the specific heat at constant (3) volume of a gas.

3. Explain the conditions to obtain the cylindrical, spherical and plane wave fronts.   (3)

4. Distinguish between fundamental and derived units giving examples.   (3)

5. Define elasticity. Explain which is more elastic-steel or rubber. Justify your answer.   (3)

OR

Determine the condiiton of equilibrium of a floating body using Archimedes' principle.   (3)

6. Explain stopping potential and threshold frequency in connection to photoelectric   (3) effect.

OR

A body floats with 40% of its volume above the surface of water. Calculate the density of the (3) material of the body.

Group-C
(Long Answer Type Questions)   5 x 6=30

7.   (5)

Young's modulus of a substance is 7.25×10^{11} dyn. cm^{-2} and its bulk modulus is 11×10^{11} dyn. cm^{-2}. Find the Poisson's ratio and the modulus of rigidity of the substance.

8. What is quasi static process? Explain reversible process and irreversible process. (5)

9. In Young's double slit experiment, red light of 620 nm wavelength is used and the two slits are 0.3 mm apart. Interference fringes observed on a screen are 1.3 mm apart. Calculate the distance of the slits from the screen. (5)

10. The ratios of the lengths and cross-sectional areas of two rods are 2:3 and 2:1 respectively. The ratio of the coefficients of thermal conductivity of the material of the rods is 2:3. If the temperatures of the two ends of the rods are T_1 and T_2, what will be the ratio of the rates of conduction of heat through the rods? (5)

OR

Force of viscosity **F** acting on a spherical body moving through a fluid depends upon its velocity (v), radius (r) and co-efficient of viscosity (η) of the fluid. Using method of dimensions obtain an expression for F. (5)

11. What is Stokes law? Establish the law by dimensional analysis. (5)

OR

A piece of pure gold of density 19.3 gm/c.c. is suspected to be hollow inside. It weighs 38.6 gm in air and 36.1 gm in water. Calculate the volume of the hollow portion in the gold, if any. (5)

12. State the factors on which the rate of emission of photo electrons depend. What do you mean by solar photo-voltaic cell? (5)

OR

Write down relation between the speed of light in a medium and its refractive index. Find the speed of light in a medium of absolute refractive index 1.5. (5)

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