BRAINWARE UNIVERSITY

Term End Examination 2023

Programme – Dip.CSE-2022/Dip.ME-2022/Diploma in Robotics & Automation-2022/Dip.EE-2022/Dip.CE-2022

Course Name – Applied Physics

Course Code - BS201

(Semester II)

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) A heavy truck has more momentum than a passenger car moving at the same speed because the truck _____.

a) has greater mass
b) has greater speed
c) is not streamlined
d) has a large wheelbase

(ii) *1 D* is the power of the lens of focal length of _____ cm.

a) *100*
b) *10*
c) *1/10*
d) *1/100*

(iii) Identify the fundamental physical quantity.

a) Viscosity
b) Velocity
c) Force
d) Time

(iv) What is supersonic speed?

a) when the speed of any object exceeds the speed of sound
b) when the speed of any object exceeds the speed of light
c) when the speed of any object exceeds 10000 m/s
d) none of the above

(v) Interference phenomena indicates _____.

a) that light is electromagnetic wave
b) rectilinear propagation of light
c) the wave nature of light
d) none of these.

(vi) Which one of the following pairs 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

(vii) Two wires have the same material and length, but their masses are in the ratio of *4:3*. If they are stretched by the same force, calculate the ratio of their elongations.

a) *1:2* b) *5:6*
c) *3:4* d) *4:3*

(viii) The number of significant figures in 0.06900 is ___.

a) 5 b) 4
c) 2 d) 3

(ix) The materials which have the same elastic properties in all directions are called _____.

a) isotropic b) brittle
c) homogenous d) hard

(x) A force of *100 N* is applied on a body of mass *50 kg*. Calculate the acceleration of the body.

a) $5000\ m\ s^{-2}$ b) $150\ m\ s^{-2}$
c) $50\ m\ s^{-2}$ d) $2\ m\ s^{-2}$

(xi) Select the unit of work-done.

a) kg-m/s b) J
c) m/s d) Watt

(xii) Identify the material having highest elasticity?

a) Steel b) Copper
c) Rubber d) Aluminum

(xiii) A radio set of *60 watts* runs for *50 hours*. Calculate electrical energy consumed in *kWh*?

a) *2 kWh* b) *3 kWh*
c) *4 kWh* d) *6 kWh*

(xiv) Displacement is a _____.

a) scalar quantity b) vector quantity
c) derived quantity d) none of these

(xv) What is the smallest unit of power?

a) Watt b) Kilowatt
c) Horse power d) BOT unit.

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define power of a lens. State its unit? (3)
3. A heavy body and a light body have equal momentum. Test whether the kinetic energy of the light body is greater than that of the heavier one or not. (3)
4. Distinguish between basic and derived units with examples. (3)
5. (3)

The displacement of a plane sound wave is described as $y = Asin(wt - kx)$. Express the equation in terms of frequency (f) and wavelength (λ).

6. Write the similarities and differences between speed and velocity. (3)

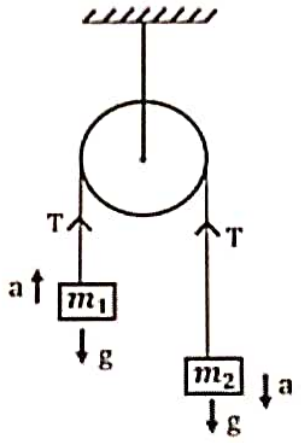
OR

Determine the relation between linear velocity and angular velocity of a moving particle. (3)

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

7. Calculate work function in electron volt for sodium metal. Given that threshold wavelength = 663 nm, $h = 6.625 \times 10^{-34}\ Js$ and $1\ eV = 1.602 \times 10^{-19}\ J$. (5)

8. Two masses m_1 and m_2 ($m_2 > m_1$) are tied at the ends of an inextensible string of tension T. The string passes over a light and frictionless pulley as shown below. Mass m_1 moves upward with acceleration a and mass m_2 moves downward with the same acceleration. Find expressions of a and T in terms of m_1 and m_2. (5)



9. Show that the dimensions of pressure and stress are same. (5)
10. Express Einstein's photoelectric equation with significance of the symbols used. (5)
11. Explain the differences between translational motion and rotational motion? Write the moment of inertia of a uniform solid cylinder about its axis. (5)
12. Discuss the effect of temperature and pressure on coefficient of viscosity. (5)

OR

Define the terms 'stress' and 'strain'. Write down their S.I and C.G.S units. (5)

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