

Padasalai.Net's Quarterly Exam 2022 - Model Question Paper

I 50% Examination - 2022-2023

Class: XI

Marks: 70

Subject: PHYSICS

Time: 3hrs

Part- I

I. Choose the correct answer

15 x 1 = 15

1. The length of a body is measured as 3.51 m, if the accuracy is 0.01mm, then the Percentage error in the measurement is
 a) 351% b) 1% c) 0.28% d) 0.035%
2. Which of the following pairs of physical quantities have same dimension ?
 a) force & power b) torque & power
 c) Impulse & momentum d) force & torque
3. Two quantities are given in which one of which is a vector and another one is scalar having the same dimensional formula are
 a) work and energy b) impulse and momentum
 c) power and pressure d) torque and work
4. Which one of the following physical Quantities cannot be represented by a Scalar?
 a) Mass b) Length c) momentum d) magnitude of acceleration
5. If a particle has negative velocity and negative acceleration, its speed
 a) Increases (b) decreases c) remains same (d) zero
6. If the momentum is increased by 20% then the kinetic energy is increased by
 a) 77%. b) 66%. c) 44%. d) 55%.
7. A vehicle is moving along the positive X direction, if sudden brake is applied, Then
 a) Frictional force acting on the Vehicle is along negative x Direction
 b) Frictional force acting on the Vehicle is along positive x direction
 c) no frictional force acts on the vehicle
 d) force acts in downward Direction
8. A body of mass 1 kg is thrown upwards with a velocity 20 m s^{-1} . It momentarily comes to rest after attaining a height of 18 m. How much energy is lost due to air friction?. (Take $g = 10 \text{ ms}^{-2}$)
 a) 20 J. (b) 30 J c) 40 J (d) 10 J
9. To take the longest possible jump, an athlete should make an angle of _____
 a) 90° with the ground b) 60° with the ground
 c) 45° with the ground d) 30° with the ground
10. A body is sliding down a rough inclined plane which makes an angle of 30 degree with the horizontal. If the coefficient of friction is 0.26, the acceleration in m/s^2 is
 a) 1.95 b) 2.78 c) 3.47 d) 4.6
11. The center of mass of a system of Particles does not depend upon,
 a) position of particles b) Relative distance between particle.
 c) masses of particles d) force acting on particle
12. Two masses 1g and 4g are moving with equal kinetic energies. The ratio of the magnitudes of their linear momenta is
 a) 4:1 b) 1:2 c) 0:1 d) 1:6
13. A round object of mass M and radius R rolls down without slipping along an inclined plane. The frictional force,
 a) Dissipates kinetic energy as heat b) Decreases the rotational motion.
 c) decreases the rotational and translational motion.
 d) Converts translational energy into rotational energy.
14. A solid sphere is rotating in free space. If the radius of the sphere is increased keeping mass same, which one of the following will not be affected ?
 a) moment of inertia b) angular momentum
 c) angular velocity d) rotational kinetic energy
15. A particle performing uniform circular motion has angular momentum L. If its angular frequency is doubled and its kinetic energy halved, then the new angular momentum is
 a) $L/2$ b) $L/4$ c) $2L$ d) $4L$

part- II

II. Answer the following questions: Q.No24 is compulsory 6 X 2 = 12

16. The length and breadth of a rectangle are (5.7 ± 0.1) cm and (3.4 ± 0.2) cm respectively. Calculate the area of the rectangle with error limits.

17. Define steradian.
18. Define angular displacement and angular velocity.
19. Under what condition will a car take safe turn on a levelled circular road?
20. Define precision and accuracy.
21. Define coefficient of restitution.
22. Find out the center of mass for the Given geometrical structures.
 - a) Equilateral triangle
 - b) Cylinder
 - c) Square
23. A stone of mass 2 kg is attached to a string of length 1 meter. The string can withstand maximum tension 200 N. What is the maximum speed that stone can have during the whirling motion?
24. A force of $(4\hat{i} - 3\hat{j} + 5\hat{k})\text{N}$ is applied at a point whose position vector is $(7\hat{i} + 4\hat{j} - 2\hat{k})\text{m}$. Find the torque of force about the origin.

Part-III

III. Answer the following questions: Q.No 29 is compulsory $6 \times 3 = 18$

25. How will you measure the diameter of the Moon using parallax method?
26. Discuss the properties of scalar products.
27. Write the difference between conservative and non-conservative forces. Give two examples each.
28. Using free body diagram, show that it is easy to pull an object than to push it.
29. Suppose an object is thrown with initial speed 10 m s^{-1} at an angle $\pi/4$ with the horizontal, What is the range covered? Suppose the same object is thrown similarly in the Moon, will there be any change in the range? If Yes, what is the change? (The acceleration due to gravity in the Moon $g_{\text{moon}} = \frac{g}{6}$)
30. Discuss rolling on inclined plane And arrive at the expression for the acceleration.
31. Find the moment of inertia of a Hydrogen molecule about an axis Passing through its center of mass and perpendicular to the inter-atomic axis. (Given: mass of hydrogen atom $1.7 \times 10^{-27}\text{ kg}$ and inter atomic distance Is equal to $4 \times 10^{-10}\text{ m}$.)
32. Derive the relationship between angular momentum and angular velocity.
33. A block of mass m slides down the plane Inclined at an angle 60° with an acceleration $g/2$. Find the coefficient of kinetic friction?

PART-IV

IV. Answer the following questions: $5 \times 5 = 25$

34. Explain in detail the various types of errors.

(or)

Explain why a cyclist bends while negotiating a curve road? Arrive at the expression for angle of bending for a given velocity.

35. Derive the kinematic equations of motion for constant acceleration.

(or)

Derive the expression for moment of inertia of a rod about its center and Perpendicular to rod.

36. Arrive at an expression for elastic collision in one dimension and discuss various cases.

(Or)

Explain the similarities and differences of centripetal and centrifugal forces.

37. Explain the motion of blocks connected by a string in Vertical motion

(or)

i) Explain the principle of homogeneity.

ii) Obtain an expression for the time period T of a simple pendulum. The time period T depends on

(i) mass ' m ' of the bob (ii) length ' l ' of the pendulum and

(iii) acceleration due to gravity g at the place where the pendulum is suspended. (Constant $k = 2\pi$)

38. State and explain work energy principle. Mention any three examples for it.

(or)

Derive the equation of motion, range and maximum height reached by the particle thrown at an oblique angle with respect to the horizontal direction.