

PHYSICS FIRST REVISION EXAMINATION

i) Check the question paper for fairness of printing

ii) If there is any lack of printing inform the hall supervisor

Time: 3hrs

[Max mark: 70]

PART-I

i) Choose the most suitable answer from the four alternatives

ii) Answer all the questions

1. An object of mass m begins to move on the plane inclined at an angle θ . The coefficient of static friction of inclined surface is μ . The maximum static friction experienced by the mass is –

- (a) mg (b) μmg (c) $\mu mg \sin \theta$ (d) $\mu mg \cos \theta$

2. A rigid body rotates with an angular momentum L . If its kinetic energy is halved, the angular momentum becomes,

- (a) L (b) $L/2$ (c) $2L$ (d) $L/2$

3. If the length and time period of an oscillating pendulum have errors of 1% and 3% respectively then the error in measurement of acceleration due to gravity is

- (a) 4% (b) 5% (c) 6% (d) 7%

4. In the absence of air resistance, horizontal velocity of the projectile is –

- (a) always negative (b) equal to 'g' (c) directly proportional to g (d) a constant

5. An engine pumps water continuously through a hose. Water leaves the hose with a velocity v and m is the mass per unit length of the water of the jet. What is the rate at which kinetic energy is imparted to water ?

- (a) $\frac{1}{3}mv^2$ (b) mv^3 (c) $\frac{1}{3}mv^2$ (d) $\frac{1}{4}mv^2$

6. A particle undergoes uniform circular motion. The angular momentum of the particle remain conserved about –

- (a) the center point of the circle. (b) the point on the circumference of the circle
(c) any point inside the circle. (d) any point outside the circle.

7. Which of the following pairs of physical quantities have same dimension?

- (a) force and power (b) torque and energy (c) torque and power (d) force and torque

8. The law which is valid in both inertial and non-inertial frame is –

- (a) Newton's first law (b) Newton's second law (c) Newton's third law (d) none

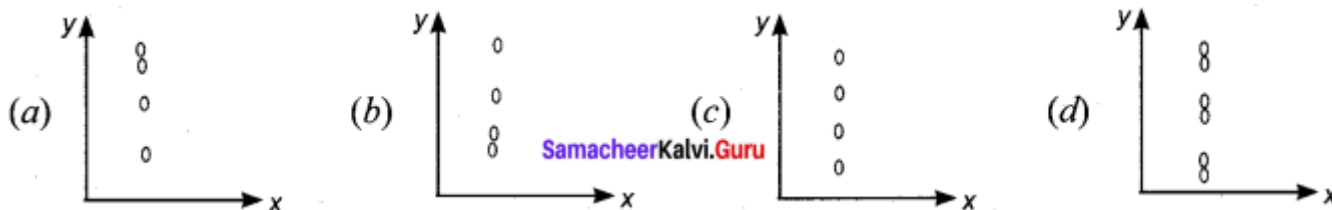
9. The potential energy of a system increases, if work is done

- (a) by the system against a conservative force (b) by the system against a non-conservative force
(c) upon the system by a conservative force (d) upon the system by a non-conservative force

10. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then, the long piece will have a force constant of

- (a) $\frac{2}{3}k$ (b) $\frac{3}{2}k$ (c) $3k$ (d) $6k$

11. A ball is dropped from some height towards the ground. Which one of the following represents the correct motion of the ball?



12. The density of a material in CGS system of units is 4 g cm^{-3} . In a system of units in which unit of length is 10 cm and unit of mass is 100 g, then the value of density of material will be

- (a) 0.04 (b) 0.4 (c) 40 (d) 400

13. Angular momentum is associated with –

- (a) rotational motion (b) linear motion (c) both (a) and (b) (d) circular motion only

14. The vector product of two vectors will have maximum magnitude when θ is equal to –

- (a) 0° (b) 90° (c) 180° (d) 360°

15. A 9 kg mass and 4 kg mass are moving with equal kinetic energies. The ratio of their momentum is

- (a) 1 : 1 (b) 3 : 2 (c) 2 : 3 (d) 9 : 4.

PART-II

i) Answer any SIX of the following questions

ii) Question number 24 is compulsory

16. Define the term "Coefficient of restitution".

17. Under what condition will a vehicle slide on a level circular road?

18. What is the relative velocity of a body moving along a same tracks in the same direction V_A and V_B ?

19. Give any four limitations of dimensional analysis.

20. Compare any four of the translation and rotational quantities.

21. Define one Newton.

22. If the earth covers one revolution in 24 hours, what is the angular displacement made by earth in one hour. Express your answer in degree.

23. Write a short note on RADAR method to measure larger distances.

24. How can an object move with zero acceleration when an external force acts on it?

PART-III

i) Answer any SIX of the following questions

ii) Question number 33 is compulsory

25. Discuss the significance of Newton's three laws.

26. Give out the rules for counting significant figures.

27. Derive the Kinematic equations of motions for constant acceleration.

28. Convert 76cm of Mercury pressure into Nm^{-2} using the method of dimensions.
29. Explain rolling in inclined plain and arrive at the expression for acceleration.
30. State and Explain Work-Kinetic energy principle.
31. Write about Impulse. Give out the graph for impulse.
32. What is the relation between Torque and angular momentum? Using it give out the Law of conservation of angular momentum.
33. An object an angle such that horizontal range is 4 times of the maximum height. What is the angle of projectile of an object?

PART-IV

i) Answer all the questions

ii) Draw diagrams wherever necessary.

34. Explain in detail the triangle law of addition.

(OR)

What do you meant by propogation of errors? Explain the propogation of errors in addition and Subtraction.

35. State and Prove parallel axis theorem.

(OR)

Explain the motion of blocks connected in vertical motion.

36. Explain with graphs the difference between work done by a constant force and by a variable force.

(OR)

Discuss the properties of Scalar product.

37. Derive an expression for moment of inertia of a rod about its centre and perpendicular to the rod.

(OR)

State and explain principle of Homogeneity of dimensions with two examples.

38. Define work. When can work done be zero? Give examples for each case.

(OR)

Apply Newtons second law to a mango hanging from a tree given that mass of a mango is 400gm.