

COMMON QUARTERLY EXAMINATION - 2024

Standard XI

Reg.No.

PHYSICS

Marks : 70

Time : 3.00 hrs

Part - I

15 x 1 = 15

I. Choose the correct answer:

1. Round of the following number 19.95 into three significant figures.
 a) 19.9 b) 20.0 c) 20.1 d) 19.5
2. The dimensional formula of energy is
 a) ML^2T^{-2} b) ML^2T^{-3} c) ML^2T^{-1} d) ML^3T^{-2}
3. The dimension of $(\mu_0 \epsilon_0)^{-1/2}$ is
 a) length b) time c) force d) velocity
4. Identify the unit vector in the following
 a) $\hat{i} + \hat{j}$ b) $\frac{\hat{i}}{\sqrt{2}}$ c) $\hat{k} - \frac{\hat{j}}{\sqrt{2}}$ d) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$
5. If an object is thrown vertically up with the initial speed U from the ground, then the time taken by the object to return back to ground is
 a) $\frac{U^2}{2g}$ b) $\frac{2U}{g}$ c) $\frac{U}{2g}$ d) $\frac{U^2}{g}$
6. Two objects of masses m_1 and m_2 fall from the heights h_1 and h_2 respectively. The ratio of the magnitude of their moment a when they hit the ground is
 a) $\sqrt{\frac{h_1}{h_2}}$ b) $\sqrt{\frac{m_1 h_1}{m_2 h_2}}$ c) $\frac{m_1 \sqrt{h_1}}{m_2 \sqrt{h_2}}$ d) $\frac{m_1}{m_2}$
7. The centrifugal force appears to exist
 a) only in inertial frames b) only in rotating frames
 c) in any accelerated frame d) both in inertial and non-inertial frames
8. Two masses m_1 and m_2 are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration $\frac{a_1}{a_2}$ is
 a) 1 b) greater than 1
 c) less than 1 d) all the three cases

9. Force acting on the particle moving with constant speed is
 a) need not be zero
 b) always zero
 c) always non zero
 d) cannot be concluded
10. A ball of mass 1 kg and another of mass 2 kg are dropped from a tall building whose height is 80 m. After a fall of 40 m each towards Earth their respective kinetic energies will be in the ratio of
 a) $\sqrt{2}:1$
 b) $1:\sqrt{2}$
 c) 2:1
 d) 1:2
11. The work done by the conservative force for a closed path is
 a) always negative
 b) zero
 c) always positive
 d) not defined
12. If the linear momentum of the object is increased by 0.1% then the kinetic energy is increased by
 a) 0.2%
 b) 0.4%
 c) 0.1%
 d) 0.01%
13. A couple produces
 a) pure rotation
 b) pure translation
 c) rotation and translation
 d) no motion
14. A rigid body rotates with an angular momentum L. If its kinetic energy is halved the angular momentum becomes
 a) L
 b) $\frac{L}{2}$
 c) 2L
 d) $\frac{L}{\sqrt{2}}$
15. The speed of the centre of the wheel rolling on a horizontal surface is V_0 . A point on the rim in level with the centre will be moving at a speed of
 a) zero
 b) V_0
 c) $\sqrt{2} V_0$
 d) $2V_0$

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory) 6 x 2 = 12

16. Define precision and accuracy. Explain with one example.

17. Define one Newton.

18. What are the limitations of dimensional analysis?

19. Write down the kinematic equations for angular motion.
20. What is the condition for pure rolling?
21. State the empirical laws of static and kinetic friction.
22. Define coefficient of restitution.
23. How do you deduce that two vectors are perpendicular?
24. What are the resultants of the vector product of two given vectors is given by
 $\vec{A} = 4\hat{i} - 2\hat{j} + \hat{k}$ and $\vec{B} = 5\hat{i} + 3\hat{j} - 4\hat{k}$

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory)

6 x 3 = 18

25. State Kepler's three laws.
26. Prove that the path followed by the projectile is a parabola.
27. Discuss the properties of scalar products.
28. Using free body diagram; show that it is easy to pull an object than to push it.
29. Explain the similarities and differences of centripetal and centrifugal forces.
30. Arrive at an expression for power and velocity.
31. State and prove Parallel Axis Theorem.
32. Write the applications of Dimensional analysis.
33. A car takes a turn with velocity 50 ms^{-1} on the circular road of radius of curvature 10 m. Calculate the centrifugal force experienced by a person of mass 60 kg inside the car.

Part - IV

IV. Answer all the questions.

5 x 5 = 25

34. a) Derive the expression for moment of Inertia of a rod about its centre and perpendicular to the rod.

(OR)

- b) State and explain work-energy principle.

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XI - Physics

35. a) Briefly explain the origin of friction. Show that in an inclined plane angle of friction is equal to angle of repose.

(OR)

- b) Prove the law of conservation of linear momentum. Use it to find the recoil velocity of a gun when a bullet is fired from it.

36. a) Explain in detail the triangle law of addition.

(OR)

- b) What do you mean by propagation of error. Explain the propagation of errors in multiplication.

37. a) Discuss conservation of angular momentum with example.

(OR)

- b) Explain in detail the various types of errors.

38. a) Derive the kinematic equations of motion for constant acceleration.

(OR)

- b) What is inelastic collision? In which way, it is different from elastic collision. Mention few examples in day-to-day life for inelastic collision.
