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CLASS 11

Physics

Sample Paper 4 - Questions

33 questions | 70 marks | 2026-27

Time: 3 hours. Answer all questions and subparts unless a choice is stated. Marks are shown on the right. Write answers on separate sheets. Independently prepared practice paper.

Section A - Objective questions

1. Which concept is illustrated in this example? A skater changes rotation speed while approximately conserving angular momentum. **1**

(A) Static friction
(B) Angular momentum
(C) Dimensional analysis
(D) Continuity equation

2. Which statement correctly describes Dimensional analysis? **1**

(A) Contact force adjusts up to a limiting value to oppose impending relative motion.
(B) Dimensions help test consistency of physical equations.
(C) Independent components describe ideal motion under gravity.
(D) Velocity changes at a constant rate.

3. Which concept is illustrated in this example? Horizontal velocity remains constant when air resistance is neglected. **1**

(A) Work-energy theorem
(B) Vector addition
(C) Newton's second law
(D) Projectile motion

4. Which statement correctly describes Simple harmonic motion? **1**

(A) Potential energy per unit mass is defined relative to a chosen reference.

(B) Overlapping small disturbances add in a linear system.

(C) Total momentum stays constant when net external impulse is zero.

(D) Acceleration is proportional to displacement and directed toward equilibrium.

5. Which statement correctly describes Work-energy theorem? **1**

(A) The turning effect depends on force and perpendicular lever arm.

(B) Independent components describe ideal motion under gravity.

(C) A body tends to recover after a deforming force is removed within suitable limits.

(D) Net work equals the change in kinetic energy.

6. Which statement correctly describes Superposition? **1**

(A) Overlapping small disturbances add in a linear system.

(B) Net work equals the change in kinetic energy.

(C) Magnitude and direction determine a resultant.

(D) A body tends to recover after a deforming force is removed within suitable limits.

7. Which statement correctly describes Static friction? **1**

(A) Energy conservation relates heat, work and internal energy.

(B) Potential energy per unit mass is defined relative to a chosen reference.

(C) Contact force adjusts up to a limiting value to oppose impending relative motion.

(D) Total momentum stays constant when net external impulse is zero.

8. Which statement correctly describes Uniform acceleration? **1**

(A) The turning effect depends on force and perpendicular lever arm.

(B) Magnitude and direction determine a resultant.

(C) Net work equals the change in kinetic energy.

(D) Velocity changes at a constant rate.

9. Which concept is illustrated in this example? Two colliding trolleys exchange momentum within an isolated system. **1**

(A) Projectile motion

(B) Torque

(C) Uniform acceleration

(D) Conservation of momentum

10. Which statement correctly describes First law of thermodynamics? **1**

(A) Total momentum stays constant when net external impulse is zero.

(B) Independent components describe ideal motion under gravity.

(C) Energy conservation relates heat, work and internal energy.

(D) Rotational momentum depends on configuration and angular motion.

11. Which concept is illustrated in this example? A known net force produces acceleration of a constant-mass object. **1**

(A) Newton's second law

(B) Gravitational potential

(C) Vector addition

(D) Torque

12. Which statement correctly describes Continuity equation? **1**

(A) Acceleration is proportional to displacement and directed toward equilibrium.

(B) Steady incompressible flow conserves volume flow rate.

(C) Overlapping small disturbances add in a linear system.

(D) Net work equals the change in kinetic energy.

13. Which statement correctly describes Elasticity? **1**

(A) A body tends to recover after a deforming force is removed within suitable limits.

(B) Rotational momentum depends on configuration and angular motion.

(C) Dimensions help test consistency of physical equations.

(D) Potential energy per unit mass is defined relative to a chosen reference.

14. Which statement correctly describes Gravitational potential? **1**

(A) Contact force adjusts up to a limiting value to oppose impending relative motion.

(B) Energy conservation relates heat, work and internal energy.

(C) Net work equals the change in kinetic energy.

(D) Potential energy per unit mass is defined relative to a chosen reference.

15. Which statement correctly describes Vector addition? **1**

(A) The turning effect depends on force and perpendicular lever arm.

(B) Velocity changes at a constant rate.

(C) Magnitude and direction determine a resultant.

(D) Rotational momentum depends on configuration and angular motion.

16. Which concept is illustrated in this example? A force applied farther from a hinge can produce greater turning effect. **1**

(A) Torque

(B) Uniform acceleration

(C) Dimensional analysis

(D) Simple harmonic motion

Section B - Short responses

17. A resultant force of 180 N acts on a 60 kg object. Calculate acceleration. **2**

18. Compare Projectile motion and Vector addition. Give the meaning and an appropriate application of each. **2**

19. A body starts from rest with acceleration 28 m/s^2 for 4 s. Calculate its displacement. **2**

20. State the meaning of Superposition. Identify a relevant feature in this situation: Two waves combine to produce a resultant displacement. **2**

21. A gas receives 660 J of heat and does 560 J of work. Calculate its internal-energy increase. **2**

Section C - Short responses

22. Compare Static friction and Elasticity. Give the meaning and an appropriate application of each. **3**

23. A 52 kg object moves at 5 m/s. Calculate its kinetic energy. **3**

24. State the meaning of First law of thermodynamics. Identify a relevant feature in this situation: Heat supplied partly raises internal energy and partly becomes work by the gas. **3**

25. A wave has frequency 520 Hz and wavelength 2 m. Calculate speed. **3**

26. Compare Work-energy theorem and Newton's second law. Give the meaning and an appropriate application of each. **3**

27. A body starts from rest with acceleration 27 m/s^2 for 4 s. Calculate its displacement. **3**

28. State the meaning of Simple harmonic motion. Identify a relevant feature in this situation: A suitably modelled spring-mass system oscillates about equilibrium. **3**

Section D - Case and application questions

29. Consider this situation: A skater changes rotation speed while approximately conserving angular momentum.

(a) Name the concept demonstrated in the case. **1**

(b) Explain the connection between the situation and that concept. **1**

(c) Distinguish that concept from Torque, giving an appropriate feature of each. **2**

30. Consider this situation: An expression for speed must have dimensions of length divided by time.

(a) Name the concept demonstrated in the case. 1

(b) Explain the connection between the situation and that concept. 1

(c) Distinguish that concept from Angular momentum, giving an appropriate feature of each. 2

Section E - Extended responses

31. (a) Explain Conservation of momentum and analyse this application: Two colliding trolleys exchange momentum within an isolated system. 5
(b) Explain Angular momentum and show how this second application fits it: A skater changes rotation speed while approximately conserving angular momentum.

32. (a) Explain Continuity equation and analyse this application: Water speeds up in a narrower section of a pipe. 5
(b) Explain Newton's second law and show how this second application fits it: A known net force produces acceleration of a constant-mass object.

33. (a) Explain Uniform acceleration and analyse this application: A straight-track cart gains equal velocity increments in equal times. 5
(b) Explain Newton's second law and show how this second application fits it: A known net force produces acceleration of a constant-mass object.

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