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CLASS 11

Physics

Sample Paper 5 - 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 statement correctly describes Work-energy theorem? **1**

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

(B) Magnitude and direction determine a resultant.

(C) Independent components describe ideal motion under gravity.

(D) Velocity changes at a constant rate.

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

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

(B) Magnitude and direction determine a resultant.

(C) Resultant force equals the rate of change of momentum.

(D) Independent components describe ideal motion under gravity.

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

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

(B) Independent components describe ideal motion under gravity.

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

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

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

(A) Projectile motion

(B) Torque

(C) Newton's second law

(D) Conservation of momentum

5. Which statement correctly describes Torque? **1**

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

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

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

(D) Magnitude and direction determine a resultant.

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

(A) Conservation of momentum

(B) Superposition

(C) Vector addition

(D) Angular momentum

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

(A) Resultant force equals the rate of change of momentum.

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

(C) Magnitude and direction determine a resultant.

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

8. Which concept is illustrated in this example? A straight-track cart gains equal velocity increments in equal times. **1**

(A) Simple harmonic motion

(B) Gravitational potential

(C) Conservation of momentum

(D) Uniform acceleration

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

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

(B) Independent components describe ideal motion under gravity.

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

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

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

(A) Vector addition

(B) Newton's second law

(C) Angular momentum

(D) First law of thermodynamics

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

(A) Resultant force equals the rate of change of momentum.

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

(C) Velocity changes at a constant rate.

(D) Magnitude and direction determine a resultant.

12. Which concept is illustrated in this example? A block stays at rest under a small horizontal pull. **1**

(A) Torque

(B) Simple harmonic motion

(C) Static friction

(D) Gravitational potential

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

(A) Conservation of momentum

(B) First law of thermodynamics

(C) Angular momentum

(D) Continuity equation

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

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

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

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

(D) Independent components describe ideal motion under gravity.

15. Which concept is illustrated in this example? Water speeds up in a narrower section of a pipe. **1**

(A) First law of thermodynamics

(B) Continuity equation

(C) Dimensional analysis

(D) Superposition

16. Which concept is illustrated in this example? An expression for speed must have dimensions of length divided by time. **1**

(A) Newton's second law

(B) Dimensional analysis

(C) Static friction

(D) Gravitational potential

Section B - Short responses

17. A body starts from rest with acceleration 40 m/s^2 for 4 s. Calculate its displacement. **2**

18. Use this situation to explain Elasticity, connecting the definition to the details: A spring returns toward its original length after a small extension. **2**

19. A gas receives 780 J of heat and does 680 J of work. Calculate its internal-energy increase. **2**

20. Compare Angular momentum and Conservation of momentum. Give the meaning and an appropriate application of each. **2**

21. A wave has frequency 820 Hz and wavelength 2 m. Calculate speed. **2**

Section C - Short responses

22. Use this situation to explain Static friction, connecting the definition to the details: A block stays at rest under a small horizontal pull. **3**

23. A 70 kg object moves at 5 m/s. Calculate its kinetic energy. **3**

24. Compare Gravitational potential and Uniform acceleration. Give the meaning and an appropriate application of each. **3**

25. A resultant force of 216 N acts on a 72 kg object. Calculate acceleration. **3**

26. Compare Conservation of momentum and Torque. Give the meaning and an appropriate application of each. **3**

27. A gas receives 900 J of heat and does 800 J of work. Calculate its internal-energy increase. **3**

28. Compare Dimensional analysis and Work-energy theorem. Give the meaning and an appropriate application of each. **3**

Section D - Case and application questions

29. Consider this situation: A suitably modelled spring-mass system oscillates about equilibrium.

(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 Elasticity, giving an appropriate feature of each. **2**

30. Consider this situation: A force applied farther from a hinge can produce greater turning effect.

(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 Conservation of momentum, giving an appropriate feature of each. 2

Section E - Extended responses

31. (a) Explain Superposition and analyse this application: Two waves combine to produce a resultant displacement. 5
(b) Explain Vector addition and show how this second application fits it: Perpendicular displacement components combine using geometry.

32. (a) Explain Newton's second law and analyse this application: A known net force produces acceleration of a constant-mass object. 5
(b) Explain Work-energy theorem and show how this second application fits it: A resultant force increases a cart's speed over a distance.

33. (a) Explain First law of thermodynamics and analyse this application: Heat supplied partly raises internal energy and partly becomes work by the gas. 5
(b) Explain Work-energy theorem and show how this second application fits it: A resultant force increases a cart's speed over a distance.

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