



PANCHSHEEL PUBLIC SCHOOL

10+2 Senior Secondary School (Affiliated & Recognized by CBSE)
Jaitpur, Badarpur, New Delhi-44

Mid-Term Revision Paper(2023-24)

Time: **Subject: Physics** **Class: XI** **M. Marks: 50**
Name..... **Roll No.....** **Section** **Date:**

General Instructions:

1. The Question Paper contains Four sections. All questions are compulsory.
2. Section A has 10 questions, and each question carries 1 mark.
3. Section B has 7 questions, and each question carries 2 marks.
4. Section C has 4 questions, and each question carries 3 marks.
5. Section D has 1 question Case Study carry 4 marks.
6. Section E has 2 questions each question carries 5 marks.

Section – A

Q1. The range of a projectile fired at an angle of 15° is 50 m. If it is fired with the same speed at an angle of 45° , its range will be.

- a) 25 m b) 37 m c) 50 m d) 100m

Q2. Let the angle between two non-zero vectors A and B be 120° and its resultant be C vector

- a) C must be equal to $|A-B|$ b) C must be less than $|A-B|$
c) C must be greater than $|A-B|$ d) C may be equal to $|A-B|$

Q3. A stone is released from an elevator going up with an acceleration a. The acceleration of the stone after the release is

- a) a upward b) $g-a$ upward c) $g-a$ downward d) g downward

Q4. A unit-less quantity

- a) Never has a nonzero dimension b) Always has a non-zero dimension
c) May have a non-zero dimension d) Does not exist

Q5. A car accelerates on horizontal Road due to the force exerted by

- a) The engine of the car b) The driver of the car c) The earth d) The road

Q.6 The incorrect statement(s) from the following is/are

- I. A body having zero velocity will not necessarily have zero acceleration
II. A body having zero velocity will necessarily have zero acceleration.
III. A body having uniform speed can have only uniform acceleration
IV. A body having non-uniform velocity will have zero acceleration

- (a) II, III and IV (b) I and II (c) II and III (d) IV only.

Q7. When a body moves with a constant speed along a circle

- (a) no work is done on it (b) no acceleration is produced in the body
(c) no force acts on the body (d) its velocity remains constant

Q8. Ratio of force and acceleration measures:

- (a) inertia (b) velocity (c) impulse (d) momentum

Directions: Each of these questions contain two statements, Assertion and Reason. Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

- (a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

- (b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion.
- (c) Assertion is correct, reason is incorrect.
- (d) Assertion is incorrect, reason is correct.

Q9. Assertion: On a rainy day, it is difficult to drive a car or bus at high speed.

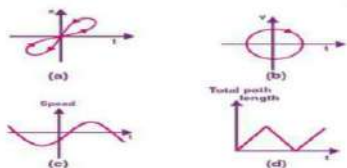
Reason: The value of coefficient of friction is lowered due to wetting of the surface.

Q10. Assertion: A bullet is fired from a rifle. If the rifle recoils freely, the kinetic energy of rifle is more than that of the bullet.

Reason: In case of rifle bullet system, the law of conservation of momentum violates.

Section – B

Q11. Look at the graphs (a) to (d) carefully and state, with reasons, which of these cannot possibly represent the one-dimensional motion of a particle.



Q12. An aircraft is flying at a height of 3400 m above the ground. If the angle subtended at a ground observation point by the aircraft positions 10 s apart is 30° , what is the speed of the aircraft? Time taken by aircraft from A to B is 10 s.

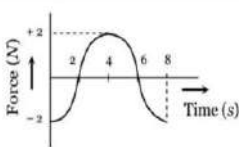
Q.13. A body of mass 5 kg is acted upon by two perpendicular forces 8 N and 6 N. Give the magnitude and direction of the acceleration of the body.

Q.14. The velocity, time and force were chosen as base quantities, find the dimensions of mass.

Q15. If P represents radiation pressure, C represents speed of light and Q represents radiation energy striking a unit area per second, then non-zero integers x, y and z such that $P^x Q^y C^z$ is dimensionless. Find x, y, z?

Q16. A particle executes the motion described by $x(t) = x_0 (1 - e^{-yt})$ where $t \geq 0$, $x_0 > 0$. Where does the particles start and with what velocity?

Q.17. The force-time (F – t) curve of a particle executing linear motion is as shown in the figure. The momentum acquired by the particle in time interval from zero to 8 second will be.



Section – C

Q18. A projectile has a range of 40m and maximum height is 10m. Find the angle at which the projectile is fired?

Q19. Two forces are such that the sum of their magnitude is 18N and their resultant is perpendicular to the smaller force and magnitude of resultant is 12. Find the magnitudes of the forces?

Q20. Two forces, with equal magnitude F, act on a body and the magnitude of the resultant force is F/3. Find the angle between the two forces.

Q21. Prove that Newton's Second law is the real law of motion.

Section – D

Q22. Momentum of a body is defined to be the product of its mass m and velocity v and is denoted By p:

$$\mathbf{p} = m \mathbf{v}$$

Momentum is clearly a vector quantity. SI unit is kg m/s. The following common experiences indicate the importance of this quantity for considering the effect of force on motion. Suppose a light-weight vehicle (say a small car) and a heavy weight vehicle (say a loaded truck) is parked on a horizontal road. We all know that a much greater force is needed to push the truck than the car to bring them to the same speed in same time. Similarly, a greater opposing force is needed to stop a heavy body than a light body in the same time, if they are moving with the same speed.

(i) If two stones, one light and the other heavy, are dropped from the top of a building, a person on the ground will find it easier to catch the light stone than the heavy stone. The mass of a body is thus an important parameter that determines the effect of force on its motion.

(ii) Speed is another important parameter to consider. A bullet fired by a gun can easily pierce human tissue before it stops, resulting in casualty. The same bullet fired with moderate speed will not cause much damage. Thus for a given mass, the greater the speed, the greater is the opposing force needed to stop the body in a certain time. Taken together, the product of mass and velocity, that is momentum, is evidently a relevant variable of motion. The greater the change in the momentum in a given time, the greater is the force that needs to be applied.

a) Define momentum. Give its SI unit.

b) Explain with example how mass of body is important for determining effect of force on its motion?

c) Explain with example how speed is important for determining effect of force on its motion?

Section – E

Q23. (a) Define inertia. What are its different types? Give examples.

(b) Explain Newton's First law of motion. Why do we call it the law of inertia?

(c) State Newton's Second law of motion. How does it help to measure force? Also, state the units of force.

OR

(a) State and explain the laws of friction.

(b) State the law of conservation of linear momentum and illustrate it with examples.

Q24. A body is projected with some initial velocity making an angle θ with the horizontal. Show that its path is a parabola. Find the maximum height attained, time for maximum height, horizontal range, maximum horizontal range, and the time of flight.

OR

State and explain the parallelogram law of vector addition.