



ST. JOSEPH'S COLLEGE, PRAYAGRAJ
HALF-YEARLY EXAMINATION 2025-26

PHYSICS
CLASS – IX

TIME: 2 Hours

MM: 80

SECTION – A [40 Marks]

1. Multiple choice questions (MCQs)

[20]

1. A Vernier callipers has 10 vernier divisions equal to 9 main scale divisions. If 1 main scale division = 1 mm, the least count is:
a) 0.1 mm b) 0.01 mm c) 0.9 mm d) 0.001 mm
2. A simple pendulum of length 1 m makes 50 oscillations in 100 seconds. If the acceleration due to gravity is increased, the time period will:
a) Increase b) Decrease
c) Remain the same d) First decrease, then increase
3. Which of the following is a vector quantity?
a) Speed b) Distance c) Displacement d) Time
4. A passenger moves forward when a bus suddenly stops. This is due to
a) Gravitational force b) Inertia of motion c) Reaction force d) Centrifugal force
5. The slope of a velocity-time graph for uniformly accelerated motion represents:
a) Average velocity b) Displacement
c) Instantaneous velocity d) Constant acceleration
6. A car moves with uniform velocity. If it covers 0.06 km in 0.1 minutes, its acceleration is:
a) 2.32 m/s^2 b) 0 m/s^2 c) 3.33 m/s^2 d) 8.5 m/s^2
7. A particle moves in a straight line with uniform acceleration. If its velocity after 5 s is 20 m/s and after 10 s is 40 m/s, its acceleration is:
a) 0 m/s^2 b) 5 m/s^2 c) 4 m/s^2 d) 6 m/s^2
8. A ball is thrown vertically upwards with a velocity of 25 m/s. How high will it rise before coming to rest? (Take $g = 10 \text{ m/s}^2$)
a) 31.25 m b) 25 m c) 62.5 m d) 12.5 m
9. A cricket player lowers his hands while catching a fast-moving ball to:
a) Increase the momentum b) Decrease the area
c) Increase the time of impact d) increase the velocity
10. A pendulum makes 20 oscillations in 60 seconds. Its time period is:
a) 1 s b) 2 s c) 0.5 s d) 3 s
11. The area under a velocity-time graph gives:
a) Acceleration b) Speed c) Displacement d) Force
12. According to Newton's third law of motion:
a) Action and reaction always act on the same body
b) Action and reaction are equal and opposite but may not act simultaneously
c) Action and reaction are equal, opposite, and act on different bodies
d) Action causes reaction after a time gap
13. A liquid of density $1.2 \times 10^3 \text{ kg/m}^3$ is filled in a tank to a depth of 2 m. The pressure at the bottom of the tank is: ($g = 10 \text{ m/s}^2$)
a) $2.4 \times 10^3 \text{ Pa}$ b) $1.2 \times 10^3 \text{ Pa}$ c) $2.4 \times 10^4 \text{ Pa}$ d) $1.2 \times 10^4 \text{ Pa}$
14. In a hydraulic press, the area of the small piston is 10 cm^2 and the area of the large piston is 100 cm^2 . If a force of 50 N is applied on the small piston, the force on the large piston is:
a) 50 N b) 500 N c) 1000 N d) 250 N
15. A balloon filled with helium rises in air because:
a) Weight of balloon is more than weight of air displaced
b) Density of helium is less than density of air
c) Helium molecules move upward
d) Atmospheric pressure pushes it up
16. Hydraulic brakes in automobiles work on the principle of:
a) Archimedes' principle b) Newton's third law c) Pascal's law d) Law of inertia
17. A solid weighs 50 N in air and 40 N when completely immersed in water. The upthrust on the solid is:
a) 10 N b) 40 N c) 50 N d) 90 N
18. A body will sink in a liquid if:
a) Weight of the body = Upthrust
b) Weight of the body < Upthrust
c) Weight of the body > Upthrust
d) Volume of the body > Volume of displaced liquid



19. Archimedes' principle helps in determination of:

- a) Relative density of solids and liquids
- c) Force of friction

- b) Atmospheric pressure
- d) Surface tension of liquids

20. A barometer reading falls from 76 cm to 74 cm of mercury. This indicates:

- a) Increase in atmospheric pressure
- c) No change in pressure

- b) Decrease in atmospheric pressure
- d) Increase in temperature

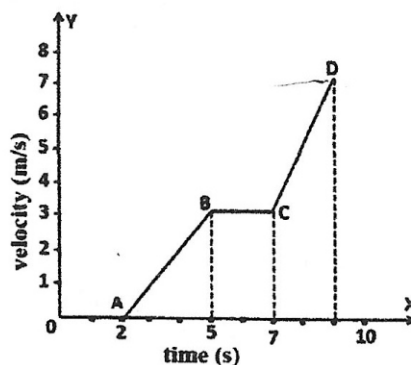
2. Short answer questions.

[20]

1. A screw gauge has a pitch of 2 mm and 100 divisions on the circular scale. Find its least count.
2. Differentiate between uniform motion and non-uniform motion with 1 example each.
3. A car moves with an initial velocity of 10 m/s and uniform acceleration of 2 m/s² for 5 s. Calculate the distance travelled.
4. What does the slope of a distance-time graph represent? Draw its shape for uniform motion.
5. State Newton's second law of motion and give its mathematical form.
6. A body of mass 4 kg is acted upon by a force of 12 N. Find the acceleration produced.
7. A solid body weighs 80 N in air and 60 N when fully immersed in water. Calculate the upthrust on the body. Also find the weight of water displaced by the body.
8. Name the instrument used to measure atmospheric pressure. Why does its reading decrease before it rains?
9. What is metacenter?
10. Define relative density and mention the formula to calculate the same for a liquid using Archimedes' principle.

SECTION – B [40 Marks]

3. a) A car travels 120 km in 2 hours and then 150 km in 3 hours. Find its average speed and average velocity if the car returns to its starting point during this journey. [2]
b) A train starts from rest and attains a velocity of 72 km/h in 5 minutes with uniform acceleration. It then runs at this velocity for 15 minutes and is finally brought to rest in 10 minutes with uniform retardation. Find: [3]
 - (i) the acceleration it reaches.
 - (ii) the retardation towards the end.
 - (iii) the total distance covered by the train.c) A stone is thrown vertically upwards with a velocity of 20 m/s. [3]
 - (i) How high will it rise?
 - (ii) How long will it take to reach the maximum height?
 - (iii) What will be its velocity when it returns to the point of projection?(Take $g=10 \text{ m/s}^2$).
4. a) What is meant by balanced and unbalanced forces? Explain with examples. [2]
b) A man of mass 60 kg jumps out of a boat of mass 120 kg with a velocity of 5 m/s. Calculate the velocity of the boat immediately after the jump. Name the law applied in this situation. [3]
c) The motion of a body is shown in the graph alongside. Find: [3]
 - i) total displacement of the body.
 - ii) Average velocity between AC.
 - iii) When did the body accelerated more, in AB or CD ?



5. a) Why do deep-sea divers wear specially designed suits? [2]



- b) State two limitations of using a mercury barometer. What will happen to the mercury level in the tube if the barometer is taken to the top of a mountain? [3]
- c) A diver is at a depth of 15 m in sea water. If the density of sea water is 1050 kg/m^3 , find the pressure on the diver, considering the atmospheric pressure to be 10^5 Pa at sea level. ($g = 10 \text{ m/s}^2$) [3]
6. a) A body weighs 120 gf in air, 100 gf in water, and 110 gf in a liquid X. Find the relative density of the liquid X. [2]
- b) Explain the conditions of floatation. A wooden block of volume 0.01 m^3 floats in water with 20% of its volume above the surface. Find: [3]
- (i) the volume of water displaced,
- (ii) the density of wood.
- c) Give 3 reasons for using mercury as a barometric liquid. [3]
7. a) Give 2 conditions of choosing a standard unit for a physical quantity. [2]
- b) Why is it necessary to take the average of repeated measurements in experiments? A student measures the time for 30 oscillations of a pendulum twice times and gets 60 s and 62 s. Find the average time period of the pendulum. [3]
- c) State the formula for the time period of a simple pendulum. What happens to the time period if the effective length of the pendulum is made 4 times. [3]