# *Science for Class IX*

# *Motion*

**In this topic Questions are divided in three parts:**

1. Multiple Choice Questions      (Total Questions-14)
2. Definition & Theoretical Questions   (17 Questions)
3. Numerical Questions           (Total Questions-21)

## *Multiple Choice Questions*

1. A train starting from rest attains the velocity of 72 km h$^{-1}$. If the train has taken 5 minutes, it would have traveled a distance of
   (A) 15 km     (B) 3 km     (C) 6 km     (D) None of these

2. An object has traveled 20 km in 10 minutes, its displacement will be
   (A) 10 km   (B) Can be zero   (C) more than 10 km (D) Cannot be predicted

3. A jeep starts from rest and attains a speed of 40 km h-1 in 10 minutes. The uniform acceleration will be
   (A) 4 km h$^{-1}$     (B) 4 km m$^{-1}$     (C) 66.7 m s$^{-2}$     (D) 66.7 m s$^{-1}$

4. Velocity is the speed of an object moving
   (A) In a definite direction         (B) In any direction
   (C) In circular direction          (D) Reverse direction

5. Negative value of acceleration signifies
   (A) The velocity is increasing      (B) The velocity is decreasing
   (C) The velocity remains the same   (D) The object comes to rest

6. In the velocity-time graphs, the distance is given by
   (A) The area enclosed by the velocity-time graph and x-axis
   (B) The length of the graph line
   (C) The slope of the line
   (D) None of these

7. The equations of motion can be represented as
   (A) v = u + at             (B) s = ut + ½ at2

(C) 2as = v2 – u2                    (D) All of these

8.  Motion of a satellite in circular orbit is an example of
    (A) Uniform circular motion            (B) Accelerated circular motion
    (C) Non-uniform circular motion    (D) Linear motion

9.  Which physical quantity varies in a uniform circular motion?
   (A) Speed                    (B) Velocity
    (C) Acceleration           (D) Both velocity and acceleration

10. Area under velocity time graph indicates
    (A) Magnitude of displacement          (B) Magnitude of acceleration
    (C) Both magnitude and direction of displacement
    (D) Both magnitude and direction of acceleration

11. In distance-time graphs
    (A) Distance is taken along the X- axis
    (B) Time is taken along the Y-axis
    (C) Straight line indicates uniform motion
    (D) Straight line indicates non-uniform motion.

12. This time-displacement graph shows
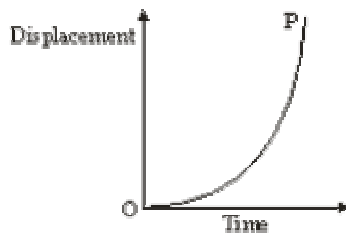


    (A) An object moving with a uniform velocity
    (B) An object moving with a non-uniform speed
    (C) A uniformly accelerated motion
    (D) No information

13. In the velocity-time graph
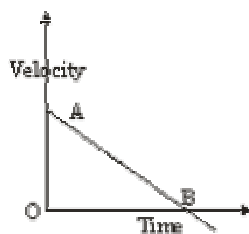


    (A) Velocity is decreasing with time     (B) Deceleration is uniform
    (C) The object has a negative velocity beyond the point B
    (D) All are correct

14. In the given velocity-time graph AB shows that the body has
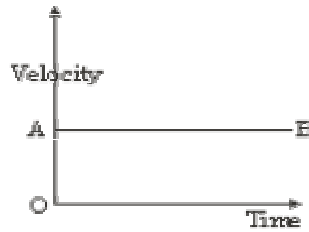


    (A) Uniform acceleration
    (B) Uniform deceleration
    (C) Uniform velocity throughout the motion
    (D) None of these


# *Definition & Theoretical Questions*


1. Define vector. Write four physical quantities which are vector?     [1]
2. What is a scalar quantity? Give two examples of scalar quantities?     [1]
3. Under what condition is the magnitude of average velocity of an object equal to its average speed?     [1]
4. What is meant by the displacement?     [1]
5. What is the nature of the distance-time graphs for uniform motion of an object?     [1]
6. What is an acceleration of body which is moving uniform velocity (constant velocity)?     [1]
7. Distinguish between speed and velocity.
8. Define acceleration?     [1]
9. What is positive acceleration and negative acceleration?     [1]
10. What is meant by non-uniform acceleration?     [1]
11. What is the nature of the distance-time graphs for non-uniform motion of an Object?     [1]
12. Which of the following is true or false for displacement?     [2]
    (a) It cannot be zero.
    (b) Its magnitude is greater than the distance travelled by the object.
    (c) Its value may not be negative.
    (d) It is the shortest distance between two points
13. An object has moved through a distance. Can it have zero displacement? If yes, Support your answer with an example.     [2]
14. Write the mathematical expression & S.I. units of the following?     [3]
    a. Speed   b. Velocity   c. Acceleration   d. Average Velocity
15. Define the following     [3]
    a. Speed   b. Velocity   c. Acceleration   d. Average Velocity

16. A particle is moving in a circle of radius 2m. Show the following position of the particle:
     a. 2m. from the centre,$30^0$ North-East.
     b. 2m. from the centre, $30^0$ West-North.
     c 2m. from the center towards South.
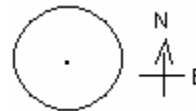
17. Explain using distance – time graphs:
    a.     When the body is moving with a uniform speed
    b.     When the body is at rest.
    c.     When the body is moving with a non-uniform speed
    d.     When the body is moving with increasing speed.
    e.     When the body is moving with decreasing speed.


# *Numerical Questions*


1) An object travels 16 m in 4 s and then another 16 m in 2 s. What is the average speed of the object?                     [2]
2) Usha swims in a 90 m long pool. She covers 180 m in one minute by swimming from one end to the other and back along the same straight path. Find the average speed and average velocity of Usha.        [2]
3) A farmer moves along the boundary of a square field of side 10 m in 40 s. What will be the magnitude of displacement of the farmer at the end of 2 minutes 20 seconds?               [2]
4) A bus decreases its speed from 80 km h–1 to 60 km h–1 in 5 s. Find the acceleration of the bus.              [2]
5) An object travels 16 m in 4 s and then another 16 m in 2 s. What is the average speed of the object?          [2]
6) A car travels a distance of 200 km from Delhi to Ambala towards North in 5 hours. Calculate

      (i) Speed & (ii) Velocity of car for this journey?        [3]
7) Abdul, while driving to school, computes the average speed for his trip to be 20 km h-1. On his return trip along the same route, there is less traffic and the average speed is 40 km h-1. What is the average speed for Abdul's trip?       [3]
8) A train is traveling at a speed of 90 km h–1. Brakes are applied so as to produce a uniform acceleration of – 0.5 m s-2. Find how far the train will go before it is brought to rest.                [3]

9) A bus covers a distance of 250 km from Delhi to Jaipur towards West in 5 hours in the morning and returns to Delhi in the evening covering the same distance of 250km in the same time of 5 hours. Find (a) average speed & (b) average velocity of the bus for the whole journey. [3]

10) A train starting from a railway station and moving with uniform acceleration attains speed 40 km h–1 in 10 minutes. Find its acceleration. [3]

11) Starting from a stationary position, Rahul paddles his bicycle to attain a velocity of 6 m s-1 in 30 s. Then he applies brakes such that the velocity of the bicycle comes down to 4 m s-1 in the next 5 s. Calculate the acceleration of the bicycle in both the cases. [3]

12) A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 m s-2, with what velocity will it strike the ground? After what time will it strike the ground?

13) State which of the following situations are possible and give an example for each of these:
- an object with a constant acceleration but with zero velocity.
- an object moving in a certain direction with an acceleration in the perpendicular direction.

14) An artificial satellite is moving in a circular orbit of radius 42250 km. Calculate its speed if it takes 24 hours to revolve around the earth.

15) A man moved 6 m in south and then turned towards east to move 8 m. What is the distance travelled by the man and the displacement of the man?

16) A train starting from rest attains a velocity of 72km h-1in 5 min. Assuming that the acceleration is uniform; find
(i) the acceleration.
(ii) The distance traveled by the train for attaining this velocity.

17) A scooter moving at a speed of 10m/s is stopped by applying brakes which produce a uniform acceleration of –1 ms-2 .How much distance will be covered by the scooter before it stops?

18) The brakes applied to a car produced an acceleration of 6 ms-2 in the opposite direction of the motion. If the car takes 2s to stop after the application of brakes, calculate the distance it travels during this time.

19) A scooter acquires a velocity of 36km per hour in 10 seconds just after the start. Calculate the acceleration of the scooter

20) A car covers 30km at a uniform speed of 60km/h and the next 30 km/h at a uniform speeds of 40 km/h. find the total time taken.

21) A man travels a distance of 1.5m towards East, then 2.0m towards south and finally 4.5m towards East.
a. What is the total distance traveled?
b. What is his total displacement?

# MATTER IN OUR SURROUNDINGS

## In this topic Questions are divided in two parts:

1. Multiple Choice Questions                 (20 Questions)
2. Definition & Theoretical Questions        (26 Questions)

*Multiple Choice Questions:*

1. Which of the following is not a solid?
   (A) Honey     (B) Cotton wool     (C) Flour     (D) Plasticine

2. Which of the following uses compressed air?
   (A) Car tyres   (B) Aerosol cans  (C)  Air guns   (D) All of these

3. Which is more effective in cooling?
   (A) Water at 0°C  (B)  Water at 100°C  (C)  Ice at 0°C  (D) All of the

4. What type of clothes are comfortable for us in summer?
   (A) Silk clothes  (B) Cotton clothes   (C) Leather clothes    (D) Rayon clothes

5. Which of the following can X represent?



   (A) Water  (B) Ice  (C) Oxygen   (D)  Steam
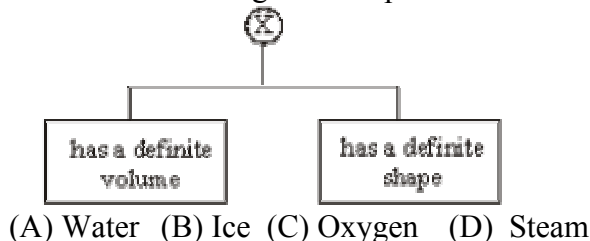
6. 250 ml milk + 770 cubic meter milk =
   (A) 1020 ml   (B) 1020 cubic meters (C) 250.00077 ml   (D) 770.00025 cubic meters

7. Which of the following will diffuse faster?
   (A) A drop of ink in water.          (B) Oxygen in nitrogen.
   (C) Milk in water.                   (D) Sugar in salt.

8. Anne filled 1L of air in jar of capacity 750 ml. Volume of air in jar is
   (A) 1000 mL        (B) 750 mL     (C) 250 mL   (D) 875 mL

9. On heating temperature of the system does not change
   (A) After the melting point is reached, till the entire solid melts.
   (B) Before the melting point is reached, till all of the solid melts.

(C) Till solid completely changes into vapour.

(D) When thermometer is faulty.

10. Which of the following sublimes on heating?

(A) Ice  (B) Dry ice     (C) Both (1) and (2)   (D) None of these

11. Melting points of four solids A, B, C & D are 500°C, 600°C, 900K and 1238°C respectively. Which of these has strongest force of attraction between its particles?

(A) A                    (B) B                    (C) C            (D) D

13. Rate of evaporation is highest in

(A) An open vessel of diameter 25 cm.     (B) An open vessel of diameter 30 cm.

(C) An open vessel of diameter 27.5 cm.  (D) An open vessel of radius 25 cm.

14. Corresponding temperature in fahrenheit scale for 36°C is

(A) 96.8°F    (B) 97.4°F      (C) 32.8°F     (D) 46.4°F

15. Which of the following state of matter consists of super energetic and super excited particles in the form of ionized gases?

(A) Solid  (B) Liquid  (C) Plasma   (D) Bose Einstein Condensate

16. Which of the following statements is false?

(A) The states of matter are inter-convertible.

(B) Evaporation is a surface phenomenon.

(C) Kinetic energy of the particles is minimum in case of solids.

(D) The arrangement of particles is most ordered in the case of liquids.

17. Match the following and choose the correct:

|   | Column-I |     | Column-II |
|---|----------|-----|-----------|
| A. | Solid | i | Super energetic particles. |
| B. | Liquid | ii | Neither shape nor fixed volume at a given pressure. |
| C. | Gas | iii | Has definite shape. |
| D. | Plasma | iv | No definite shape with less molecular forces than that in solids. |

(A) A - i, B - ii, C - iii, D - iv          (B) A - iii, B - iv, C - ii, D - i

(C) A - iii, B - iv, C - i, D - ii          (D) A - i, B - iv, C - ii, D – iii

18. On heating, kinetic energy of the molecules

(A) Decreases                    (B) Increases

(C) Either decreases or increases    (D) Remains same

19. Which of following statement is true?
> (A) Energy of particles in steam at 373 K > Energy of particles in water at 373K
> (B) Energy of particles in steam at 373 K < Energy of particles in water at 373 K
> (C) Energy of particles in steam at 373 K = Energy of particles in water at 373 K
> (D) None of these

20. The temperature at which Celsius and Fahrenheit scales shows the same reading is:
> (A) 40° K  (B) 100° F  (C) – 40° C  (D) – 100° C

## *Definition & Theoretical Questions*

1) What are the characteristics of the particles of matter?
2) Which of the following are matters?
   Chair, air, love, smell, hate, almonds, thought, cold, cold drink, smell of perfume.
3) Liquids generally have lower density as compared to solids. But you must have observed that ice floats on water. Find out why.
4) Define the following terms
   ( a) humidity ( b) melting point (c)  humidity  (d) diffusion.
5) Write the full form of L.P.G. & C.N.G.
6) What are volatile liquids?
7) A certain substance 'A' cannot be compressed but takes up the shape of any container in which it is placed. What is the physical state of "A"?
8) What produces more severe burns, boiling water or steam?
9) Arrange the following substances in increasing order of force of attraction between the particles - water, sugar, and oxygen.
10) A diver is able to cut through   water in a swimming pool. Which property of matter does this observation show?
11) Give reasons for the following observation:
    The smell of hot sizzling food reaches you several metres away, but to get the smell from cold food you have to go close.
12) For any substance, why does the temperature remain constant during the change of state?
13) What type of clothes should we wear in summer?
14) Why does our palm feel cold when we put some acetone or petrol or perfume on it?
15) Why does a desert cooler cool better on a hot dry day?
16) How will you demonstrate that air contains water vapours?
17) Can matter change its state? State the conditions under which it changes

18) We use the terms gas and vapours both to represent the gaseous state of a substance. Are the two terms same or there is some difference in them

19) Why do we see water droplets on the outer surface of a glass containing ice-cold water?

20) What is dry ice? Why it is known so?

21) Explain why there is no rise in temperature of a substance when it undergoes a change of state although it is still being heated.

22) Why is ice at 273 K more effective in cooling than water at the same temperature?

23) Give reason for the following observations.
(a) Naphthalene balls disappear with time without leaving and solid

24) Give two reasons to justify—
(a) water at room temperature is a liquid.
(b) an iron almirah is a solid at room temperature

25) What is the physical state of water at—?
(a) 25°C     (b) 0°C     (c) 100°C?

26) Differentiate between evaporation & boiling**?**