Sample Paper

General Instructions

(i) The question paper comprises four sections A, B, C, and D. There are 36 questions in the question paper. All questions are compulsory.

(ii) (Section–A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple-choice questions (MCQs), very short answer questions, and assertion - reason type questions. Answers to these should be given in one word or one sentence.

(iii) Section–B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.

(iv) Section–C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.

(v) Section–D – question no. - 34 to 36 are long answer type questions carrying 5 marks each. Answers to these questions should be in the range of 80 to 120 words.

(vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(vii) Wherever necessary, neat, and properly labelled diagrams should be drawn.

Section A

1. The heterogeneous mixture in which the solute particles do not dissolve and remain suspended throughout the solvent and the solute particles can be seen with the naked eye is known as:

OR

Which subatomic particle is absent in an ordinary hydrogen atom?

2. In what respect does a true solution differ from a colloidal solution?
3. What is the name of the metal which exists in the liquid state at room temperature?

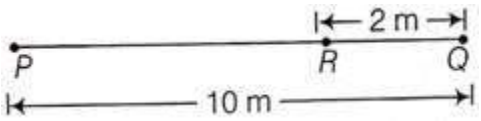
   A. Mercury

   B. Bromine

   C. Sodium

   D. Potassium

4. After studying the motion of a ball rolling on a straight line as shown in the figure.



   Find its distance and displacement covered.

   (i) when it rolls from P to Q and then to R (i.e., P to Q to R)

   (ii) Finally comes back to P (i.e., P to P)(take, P as reference point).

5. If the distance-time graph of a particle is parallel to the time axis, then how much is the velocity of the particle?
6. When a force of 40 N is applied on a body it moves with an acceleration of 5 m s^{-2}. Calculate the mass of the body.

OR

It is required to increase the velocity of a scooter of mass 80 kg from 5 to 25 m s^{-1} in 2 second. Calculate the force required.

7. A man is at rest in the middle of a pond on perfectly smooth ice. He can get himself to the shore by making use of:

   A. Newton's First law

   B. Newton's Second Law

   C. Newton's Third law

   D. None of the above

8. Under what conditions a body becomes weightless?
9. Give reason for the following:

The potential energy of a freely falling object decreases progressively. Does this violate the law of conservation of energy? Why?

OR

Give reason for the following:

Pardeep says that the acceleration in an object could be zero even when several forces are acting on it. Do you agree with him? Why?

10. A cool breeze after a hot day brings all of us considerable relief. This breeze is actually the moving air. What is the basic process that causes this movement of air?

    A. Pressure difference between the air of two regions
    B. Moving leaves of the plants
    C. Temperature difference between the two regions
    D. Striking of air with the mountains

11. Why is plasma membrane called a selectively permeable membrane?
12. Name the living elements of xylem and phloem.
13. What is an epidemic disease?
14. DIRECTION: In the following questions, a statement of assertion (A) is followed by a statement of the reason (R).

    Assertion: The atoms of different elements having the same mass number but different atomic numbers are known as isobars.

    Reason: The sum of protons and neutrons in isobars is always different.

    A. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of the assertion
    B. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)
    C. Assertion (A) is true but reason (R) is false.
    D. Assertion (A) is false but reason (R) is true

15. Assertion: Use of fertilizers and pesticides is good for soil.

    Reason: It improves the quality of soil

    Choose the correct alternative

    A. Both A and R are true, and R is the correct explanation of A.
    B. Both A and R are true, R is not the correct explanation of A
    C. A is true but R is false.
    D. A is false but R is true

16. The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R".

    Assertion (A): If a light body and a heavy body possess the same momentum, the lighter body will possess more kinetic energy.

    Reason (R): The kinetic energy of a body varies as the square of its velocity.

    Choose the most appropriate answer from the options given below:

    A. Both Assertion and reason are true and the Reason is the correct explanation of the Assertion.
    B. Both Assertion and Reason are true but Reason is not the correct explanation of the Assertion.
    C. Assertion is true but Reason is false.
    D. Both Assertion and Reason are false.

17. Read the following and answer any **four** questions from (a) to (e):

    Health means a state of physical, mental and social well-being, it cannot be something that each one of us can achieve entirely on our own. The health of all organisms will depend on their surroundings or their environment. The environment includes the physical environment. So for example, health is at risk in a cyclone in many ways. Human beings live in societies. Our social environment, therefore, is an important factor in our individual health. We live in villages, towns or cities. In such places, even our physical environment is decided by our social environment.

    (a) In the given passage, it is stated that we alone cannot achieve good health. What does this mean?

    (b) How is our physical environment decided by our social environment?

    (c) Is economy and health inter-related somehow?

    (d) Is good health for you the same as that as your grandmother?

    (e) What is health?

18. Read the following and answer any **four** questions from (a) to (e)

    Fill in the following blanks with suitable words

    (a) The particle which is formed by the gain of electrons by an atom is called …….

(b) The particle which is formed by the loss of electrons by an atom is called …….

(c) The particle which is formed by the loss or gain of electrons by an atom is called …….

(d) A potassium ion has a positive charge because it contains less ……. than …….

(e) A sulphide ion has a negative charge because it contains less …… than

19. Read the following and answer any **four** questions from (a) to (e)

Write the cations and anions present, if any, in the following:

(a) CH_3COONa

(b) NaCl

(c) H_2

(d) NH_4NO_3

(e) O_2

20. Read the following and answer any **four** questions from (a) to (e)

Consider a ball moving on a horizontal table with some speed. Suppose we do not do anything to the ball, and just watch. We find that its speed decreases and it stops after some distance. It may appear that the ball is slowing down although no force is acting on it. However, this is not true. Although we have not applied any force on the ball, there are other agencies applying forces on it. The table exerts a force of friction on the ball, and it is this unbalanced force that is responsible for the slowing down of the ball. If the table is made smoother, the force of friction is reduced and the ball moves through a larger distance. Imagine a situation in which we get rid of friction completely. Then the ball will continue to move without slowing down till it reaches the edge of the table and drops off.

(a) Which of Newton's Laws explain the above phenomena?

A. Newton's First Law
B. Newton's Second Law
C. Newton's Third Law

D. None of the above

(b) Why does the ball go on indefinitely without friction?

A. The ball is unable to change its state of motion
B. The ball has infinite energy
C. The ball has high speed
D. All of the above

(c) What is the name given to the ball's inability to change its state of motion?

A. Energy
B. Momentum
C. Inertia
D. Mass

(d) Which of these quantities is a measure of the inertia of a body?

A. Mass
B. Gravitational Constant
C. Acceleration
D. None of these

(e) An object is moving at a speed of 5 m/s on a frictionless horizontal surface. What will be its speed after 5 s if there is no obstruction in its path?

A. 5 m/s
B. 2 m/s
C. 1 m/s
D. 2.5 m/s

Section B

21. How does the cell wall help the cells to survive in a hypotonic solution?

OR

State in brief three roles of the epidermis in the plant.

22. Do you agree "A cell is a building unit of an organism". If yes, explain why.
23. Distinguish between elements and compounds with one example of each

OR

Rainwater stored in a tank contains sand grains, clay particles, calcium carbonate, salt, pieces of paper and some air bubbles. Select from amongst these one example each of a solvent, a solute, a colloid and a suspension.

24. (a) Define 'atomic mass unit'. How is it linked with relative atomic mass?

    (b) How do you know the presence of atoms if they do not exist independently for most of the elements?

25. A body starts to slide over a horizontal surface with an initial velocity of 0.5 m/s. Due to friction, its velocity decreases at the rate 0.105 m/s^2. How much time will it take for the body to stop?
26. A body of mass 500 g is at rest on a frictionless surface. Calculate the distance travelled by it in 10 second when acted upon by a force of 10^{-2} N

Section C

27. Which cycle is known as the perfect cycle in the biosphere? Why?

OR

If you go to the hospital to meet your friend suffering from malaria, what are the chances of malaria spreading to you and your friends?

28. What are the effects of air pollution on human beings?
29. Write the differences between diffusion and osmosis.
30. (a) A stone thrown vertically upwards takes 3 seconds to attain maximum height, calculate

    (i) initial velocity of stone

    (ii) maximum height attained by the stone

    (b) Why is the weight of a body zero at the centre of earth?

    (b) When you're at the centre of the earth, you'd have equal amounts of gravitational force pulling you in all directions from the mass of the earth evenly distributed around you. Thus, the net gravitational force would be zero. This is also known as your weight. Additionally,

31. A solution contains 60 g of sugar in 480 g of water. Calculate the concentration of the solution in terms of mass by mass percentage of the solution.

32. An element 'Z' forms the following compound when it reacts with hydrogen, chlorine, oxygen and phosphorus.

ZH_3, ZCl_3, Z_2O_3 and ZP

(a) What is the valency of element 'Z'?

(b) Element 'Z' is metal or non-metal?

33. (a) What will be the effect of temperature on speed of sound?

(b) A man standing in front of a vertical cliff fires a gun. He hears the echo after 4 seconds. On moving closer to the cliff by 84 m, he hears the echo after 3.5 seconds. Calculate the distance of the cliff from the initial position of the man.

Section D

34. Distinguish between compounds and mixtures. Give at least five points.

OR

(i) You are provided with a mixture containing sand, iron filings, ammonium chloride and sodium chloride. Describe the procedures you would use to separate these constituents from the mixture.

(ii) On heating, calcium carbonate gets converted into calcium oxide and carbon dioxide. (a) Is this a physical or a chemical change?(b) Can you prepare one acidic and one basic solution by using the products formed in the above process? If so, write the chemical equation involved.

35. (a)If you are provided with some vegetables to cook, you generally add salt into the vegetables. After adding salt, vegetables release water. Why?

(b) State two types of plastids. Write one function of each.

(c) What is endocytosis? Give one example.

36. (a) A boy, who weighs 40 Kg, ate a wholesome meal that gave him an energy of 21 KJ. He then decides to climb a tree. If the efficiency of the boy is 28 % then the height climbed by him is equal to?

(b) Three different objects of masses m_1 , m_2, and m_3 are made to fall from rest along three frictionless paths, from the same height. What is the ratio of their speeds to reach the ground?

(c) Give reason for the following :

Can a body have momentum without having energy? Explain

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Hints & Solutions

Section A

1. Answer: Suspension

   OR

   Answer: Neutron

2. Solution: A true solution is homogeneous whereas a colloidal solution is a heterogeneous mixture.

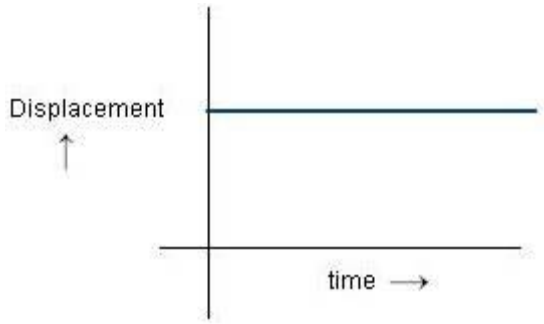
3. Solution: A, Mercury

4. Solution:

   (i) Distance would be PQ+QR = 12m whereas displacement is path PR= 8m as displacement is the shortest distance between two points.

   (ii) In this case displacement is zero as the initial and final point is the same but distance would be PQ+QP= 20m.

5. Solution:



   The velocity of the particle will be zero because the distance is constant and the time is increasing and this will happen only when the particle is stationary.

6. Solution: We have, for the body:

   Force = 40 N

   Acceleration = 5 m s^{-2}

   From Second law of motion

   Force = mass × acceleration

$$mass = \frac{Force}{Acceleration}$$

$$mass = \frac{40}{5} = 8\ kg$$

   OR

   Here we have been given, for the body:

Mass = 80 kg

Initial velocity, u = 5 m s^{-1}

final velocity, v = 25 m s^{-1}

Time, t = 2 sec

From the second law of motion, we know that the rate of change of momentum is equal to force applied. Therefore

$$F = \frac{m(v-u)}{t} = \frac{80(25-5)}{2} = 800\ N$$

7. Answer: C

   Solution: When the man pushes the ice backward the ice will give an equal reaction in the forward direction and thus helps him to reach the shore. This action reaction law is explained in third law. First law is also known as law of inertia & second law is known as law of force and acceleration.

8. Solution: Weight of a body is nothing but the force with which it is attracted towards the centre of earth.

   Force = Mass × Acceleration

   W = m × g

   Since, we have Force = Weight = W and acceleration is acceleration due to gravity or g.

   A body becomes weightless when g becomes zero and this happens when acceleration due to gravity becomes zero and thus body becomes weightless.

   Example:

   At centre of earth, far away from earth's surface, freely falling body

9. Solution: According to the law of conservation of energy, Energy can neither be created nor be destroyed. It can only be transformed from one form to another. Total energy before and after transformation remains the same.

   So, if the potential energy of a freely falling object decreases progressively then it is transformed into an equal amount of kinetic energy and the sum of both energies remains constant all the time.

   OR

   Yes, I agree with Pardeep. According to newton's law of motion for a body

   Net force = mass × acceleration

Every object on the Earth possesses some mass. So, if the resultant or net force due to several forces acting on the object is zero then acceleration of the body will be zero by the above mentioned formula.

10. Answer: C
11. Solution- The plasma membrane is called a selectively permeable membrane because it allows the entry and exit of certain substances while restricts the passage of other substances.
12. Solution- Living element of xylem: Xylem parenchyma. Living elements of phloem: Sieve tubes, companion cells, and phloem parenchyma.
13. Solution- An epidemic disease is a disease which spreads rapidly and extensively to many individuals simultaneously in a particular area. It is generally an infectious disease.
14. Answer: C
15. Answer - d) A is false but R is true

    Solution:

    Excessive chemicals kill the microbes and earthworms in soil.Hence it deteriorates the soil quality because these microbes and earthworms are not present which would otherwise add humus to the soil.

16. Answer: B

    Solution: $E=p^2/2m$

    For two bodies with the same momentum, KE is inversely proportional to m. Hence, the assertion is correct

    Also, $KE = 0.5 \times mv^2$

    Thus, the reason is also correct

    Although, the reason is not the correct explanation of the assertion.

    Hence, option B is the correct answer.

17. Solution

    (a) This means that our health is dependent on our physical environment, good mental state and social harmony.

(b) According to our social environment, which may be clean, well kept, pollution free, green etc., our physical environment will be conducive to good health. If there are people in our neighborhood who do not care about their own surroundings, then even our health will be affected.

(c) Yes, they both are interrelated as an economically sound person with a good job will be normally happy, well nourished and satisfied and this helps in his mental well-being.

(d) For me, good health means being physically fit to be able to play outdoor sports, study, help around the house etc., while for my grandmother it means that she should be able to interact with people around her, talk to neighbors, go to the nearby park or market on her own, do her own chores herself etc. So good health for different age groups, different professions would be different.

(e)Health is not merely the absence of diseases. It is a state of complete physical, mental and social well being. Health of a person depends upon one's personal habits as well as physical and social environment.

18. Solution:

(a) Anion is formed by the acceptance/gain of electrons by an atom.

(b) Cation is formed by donating/loss of electrons by an atom.

(c) ion

(d) electrons; protons

(e) protons; electrons

19. Solution

(a) Cation: N^{+}; Anion: $CH3COO^{-}$

(b) Cation: Na+; Anion Cl^{-}

(c) H_2 is a covalent molecule. It has no cation and anion

(d) Cation: NH_4^+ ; Anion: NO_3^-

(e) O_2 is a covalent molecule. It has no cation and anion

20. Answer: A

Solution: According to Newton's First Law, a body cannot change its state of motion unless acted upon by an external force.

(b) Answer: A

Solution: According to Newton's First Law, a body cannot change its state of motion unless acted upon by an external force.

(c) Answer: C

Solution: Inertia is the inability of an object to change its state of motion.

(d) Answer: B

Solution: The mass of a body is a direct measure of its inertia.

(e) Answer: A

Solution: The speed of the body will remain constant and be 5 m/s because no external force is acting on the object.

Section B

21. Solution - When surrounded by a hypotonic solution, the cell takes up water by endocytosis. The cell swells, building up pressure against the cell wall. The cell wall exerts equal pressure against the swollen cell. Because of the wall, the cell can withstand the hypotonic solution to a great extent.

OR

Solution –

Role of the epidermis in plants:

(i) Protection (ii) Exchange of gases (iii) Absorption (iv) Water resistance (v) Formation of cork

22. Solution - An organism is made up of various organ systems like digestive system, nervous system, etc. These organ systems in turn are made up of various organs which are made up of tissues. Also tissues are a group of cells performing the same function. Hence, a cell is the building unit of an organism. Cell → tissue → organ → organ system → organism.
23. Solution: An element cannot be broken into simpler or smaller constituents but a compound can be broken as a result of a chemical reaction or bypassing electric current (electrochemical reaction). For example, sodium (element), sodium chloride (compound).

OR

Solution: Solvent – water, Solute – salt

Colloid – air bubbles in rainwater and Suspension – clay particles in rainwater.

24. Solution: (a) Atomic mass unit (amu) is 1/12 of the mass of one atom of C-12. The relative atomic mass of the atom of an element is the average mass of the atom as compared to 1/12th of the mass of the C-12 atom.

$$\text{Relative atomic mass of an element} = \frac{\text{Average mass of 1 atom of the element}}{\text{1/12th of mass of 1 atom of C-12}}$$

(b) Atoms of most of the elements do not exist independently. However, they combine in specific numbers to form molecules or ions which we can feel and know about their presence.

For example,

A molecule of H_2SO_4 consists of 2 atoms of H + 1 atom of S + 4 atoms of O

A molecule of $C_{12}H_{22}O_{11}$ consists of 12 atoms of C + 22 atoms of H + 11 atoms of O

Ammonium ion (NH_4^+) consists of 1 atom of N + 4 atoms of H

25. Solution: Using the first equation of motion

$$v = u + at$$

Where v = 0 m/s, u = 0.5 m/s and a =0 - 0.105 m/s^2

Substituting the values

$$0 = 0.5 - 0.105t$$

$$t = 4.76\ s$$

26. Solution: From second law of motion

$$F = ma$$

Therefore,

$$a = F/m = 0.01/0.5 = 0.02\ m/s^2$$

Using the equation

$$S = ut + \frac{1}{2}at^2$$

$$s = 0 \times 10 + \frac{1}{2} \times 0.02 \times 100 = 1\ m$$

Section C

27. Solution - Nitrogen cycle is called a perfect cycle in the biosphere because it keeps or maintains the overall amount of nitrogen constant in the atmosphere, soil and water decay causes, Nitrogen cycle depends upon different kinds of bacteria, the nitrifiers, the denitrifiers, and the nitrogen fixers. There is a regular circulation of nitrogen through the air, soil, plants and animals through nitrogen cycle.

OR

Solution - Malaria is caused by Plasmodium which is carried by the bite of female Anopheles mosquito. So, it is not spread by the diseased patient.

28. Solution- Effects of air pollution are: i. Air pollution can have serious consequences on the health of human beings. Human beings may suffer from respiratory problems, high blood pressure, renal problems, eye irritation, problems in the nervous system, etc. ii. Air pollution causes falling of leaves, reduced growth of plants, degeneration of chlorophyll, etc. iii. Air pollution leads to acid rain which further damages soil, plants and buildings, etc.
29. Solution - Differences between diffusion and osmosis

diffusion	osmosis
It occurs in any medium	It occurs only in liquid medium
This process does not require a semipermeable membrane.	This process requires a semi-permeable membrane.
It involves the movement of solid, liquid or gaseous molecules.	It involves the movement of solvent (usually water) molecules only.

30. Solution: (a) (i)From first equation of motion

$$v = u + at$$

Here, we have at maximum height , final velocity, v = 0 and a = -g, and time taken = 3 s

$$0 = u - 3g$$

$$u = 3 \times 9.8 = 29.4\, m/s$$

(ii) From second equation of motion

$$S = ut + \frac{1}{2}at^2$$

$$H = 29.4 \times 3 + \frac{1}{2} \times 9.8 \times 9$$

$$H = 88.2 + 44.1$$

$$H = 132.3\, m$$

(b) When you're at the centre of the earth, you'd have equal amounts of gravitational force pulling you in all directions from the mass of the earth evenly distributed around you. Thus, the net gravitational force would be zero. This is also known as your weight. Additionally,

31. Solution:

$$\text{Mass of sugar (solute)} = 60\ \text{g}$$
$$\text{Mass of solvent (water)} = 480\ \text{g}$$
$$\text{Mass of solution} = (60 + 480) = 540\ \text{g}$$
$$\text{Concentration in term of mass percentage} = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100 = \frac{(60\text{g})}{(540\text{g})} \times 100 = 11{\cdot}1\%$$

32. Solution: (a) The valency of 'Z' is 3.

(b) Element 'Z' is metal because it is electropositive and is reacting with non-metals.

33. Solution: (a) The speed of sound increases with the increase of temperature of the medium. The speed of sound in air increases by 0.61 m/s when the temperature is increased by 1° C. Hence, option D is the correct answer.

(b) Let the speed of sound be v

Distance of the man from the cliff is d

Time taken to hear the echo is 4 s

Velocity of the sound wave to reach the person before he moved closer

$$v = \frac{2d}{4}$$

Now, after moving closer the distance of man is (d – 84) m

Time elapsed before the man hear the echo again after moving closer to the cliff is 3.5 s

$$v = \frac{2(d-84)}{3.5}$$

The speed of the sound remains the same in either case. Thus,

$$\frac{2d}{4} = \frac{2(d-84)}{3.5}$$

$$3.5d = 4d - 336$$

$$0.5d = 336$$

$$d = 672\ m$$

Section D

34. Solution:

Compounds	Mixture
1. Compounds are formed as a result of chemical reaction between the two element or compounds. 2. The components are present in definite proportions by mass. 3. The property of compounds are totally different from their constituents. 4. Compounds are homogeneous in nature. 5. Melting and boiling point of pure compounds are generally sharp and defined. 6. The constituents cannot be separated by any physical methods.	1. There is no chemical reaction involved in the formation of a mixture. 2. The components have variable proportions by mass. 3. The property of compounds is same as their constituents. 4. Mixtures could be homogeneous (true solutions) or heterogeneous in nature. 5. Melting and boiling points of the mixtures are not sharp. 6. The constituents generally could be separated by physical methods.

OR

Solution: (i) Removing iron filings from the mixture by magnetic separation: Take the mixture in a petri dish and roll a bar magnet over it. Iron filings will get attached to the magnet and thus separate from the mixture.

Removing ammonium chloride by sublimation: Transfer the remaining mixture into a China dish and heat it. On heating, ammonium chloride

sublimes and solidifies on cooling. The mixture contains a sand and sodium chloride left behind in the China dish.

Removing sand by filtration: Make a solution of sand and sodium chloride in water. Filter the solution. Sodium chloride will dissolve in water and sand is left as residue on the filter paper.

Evaporate the filtrate to dryness to get sodium chloride or by crystallisation.

(ii) (a) Chemical change.

(b) Acidic and basic solutions can be prepared by dissolving the products of the above process in water.

$CaO + H_2O \rightarrow Ca(OH)_2$ (basic solution)

$CO_2 + H_2O \rightarrow H_2CO_3$ (acidic solution)

35. Solution- (a) When salt is added, a hypotonic medium is created, i.e., the concentration of salt molecules is more outside the vegetables than inside. Hence, due to osmosis, water from the vegetables comes out.

(b) Chloroplasts and chromoplasts are two types of plastids. (i)Chloroplasts contain chlorophyll and are important for photosynthesis. (ii)Chromoplasts are coloured plastids which impart colour to fruits and vegetables.

(c) The flexibility of the cell membrane enables the cell to engulf food and other materials from its external environment. This process is called endocytosis. Example: Amoeba engulfs its food by endocytosis.

36. Solution: (a) Mass of the boy = 40 Kg

The efficiency of the boy is 28 %.

Therefore, the total energy utilized by him is 28 % of 21 KJ

0.28 × 21 KJ = 5.88 KJ

Now, according to the conservation of energy,

Loss in energy due to climbing = Gain in potential energy

$$5.88\ kJ = mgh$$

$$h = \frac{5.88 \times 1000}{40 \times 10} = 14.7\ m$$

(b) If the balls fall through the same height along a frictionless path, their velocity on reaching the ground will be equal. This is according to the law of conservation of energy.

If they fall from a point at a height 'h' from the ground, the potential energy at the point is, PE = mgh

The kinetic energy on reaching the ground is, KE = ½ mv2

Since, PE = KE

$$mgh = \frac{1}{2}mv^2$$

$$v = \sqrt{2gh}$$

The equation is independent of mass.

Then the ratio of speeds would 1:1:1

(a) We know that - momentum = mass × velocity

A body can only possess velocity if it has kinetic energy and if does not have that energy than velocity = 0, using this value in above mentioned formula

Momentum = mass × 0

Momentum = 0

So, a body cannot have momentum without having energy.

Sometimes even if a body has energy, its momentum can be zero. For example: a brick lying on the roof of a building possesses potential energy but no velocity so momentum will be zero.

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