CBSE Class 09

Science

Sample Paper 8 (2019-20)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises three sections - A, B and C. Attempt all the sections.
ii. All questions are compulsory. Internal choice is given in each section.
iii. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
iv. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
v. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
vi. This question paper consists of a total of 30 questions.

Section A

1. What is relative mass and charge of an electron?

2. Define atomic mass unit

3. **Crop Production Improvement**
   It involves different practices carried out by the farmer to achieve higher standards of crop production. Main practices involved in crop production management are Nutrient Management, Irrigation, and Cropping Patterns.
   Nutrient Management
   Like other organisms, plants also require some elements for their growth. These elements are called Nutrients. There are sixteen nutrients which are essential for plants. These nutrients are divided into the following two categories:

- **Macronutrients:** The essential elements, which are utilized by plants relatively in large quantities, are called macronutrients.
- **Micronutrients:** The essential elements, which are used by plants in small quantities, are called micronutrients.

These nutrients are supplied to plants by air, water and soil.

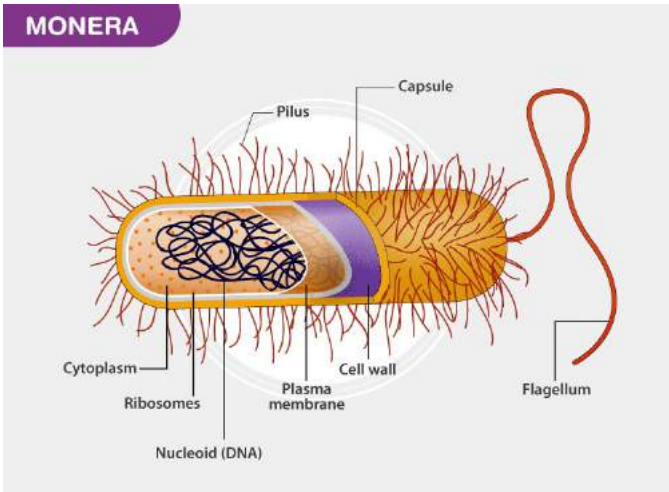
Sources	Nutrients
Air	Carbon, Oxygen
Water	Hydrogen, Oxygen
Soil	**Macronutrients:** Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Sulphur.
	Micronutrients: Iron, Manganese, Boron, Zinc, Copper, Molybdenum, Chlorine.

Answer the following questions:

i. Differentiate between macronutrients and micronutrients.
ii. List all macronutrients.
iii. List all micronutrients.
iv. _____ is the main source of Carbon and Oxygen.

4. Kingdom Monera belongs to the prokaryote family. The organisms belonging to this kingdom do not contain a true nucleus. These are the oldest known microorganisms on earth. Their DNA is not enclosed within the nucleus.

   They are unicellular organisms found mostly in a moist environment. They are found in hot springs, snow, deep oceans or as parasites in other organisms. The monerans do not possess any membrane-bound organelles.



Answer the following questions:

i. Why does the DNA of Monerans is not enclosed within the nucleus?
ii. Why are they regarded as primitive organisms?
iii. Where are they found commonly?
iv. Give the unique characteristics of Monerans.

5. Match the following with correct response.

(1) Inertia
(2) Friction
(3) Momentum
(4) Force

(A) Product of mass and velocity
(B) Mass of the object
(C) Rate of change of momentum
(D) Necessary evil

a. 1-C, 2-B, 3-D, 4-A
b. 1-B, 2-D, 3-A, 4-C
c. 1-D, 2-A, 3-C, 4-B
d. 1-A, 2-C, 3-B, 4-D

OR

Statement A: Rocket can propel its self in vacuum.
Statement B: Newton's laws are universal.

Which of the two statements is true?

a. statement B
b. both A and B
c. none of these
d. statement A

6. What is the work done in lifting a body of mass 5 Kg vertically through 9 m? (g= 10 m/s^2)

   a. 45 J
   b. 350 J
   c. 450 J
   d. 540 J

7. A machine does 2000 joule of work in 400 seconds. What is the power of machine?
   a. 0.5w
   b. 6w
   c. 20w
   d. 5w

8. Crests and troughs are formed in:-

   a. Neither transverse nor longitudinal wave
   b. Both transverse and longitudinal wave
   c. Transverse wave
   d. Longitudinal wave

OR

If the moon attracts the earth, why does the earth not move towards the moon?

9. The science of growing vegetables, fruits & ornamental plants is called -

   a. Horticulture
   b. Animal Husbandry.

c. Floriculture

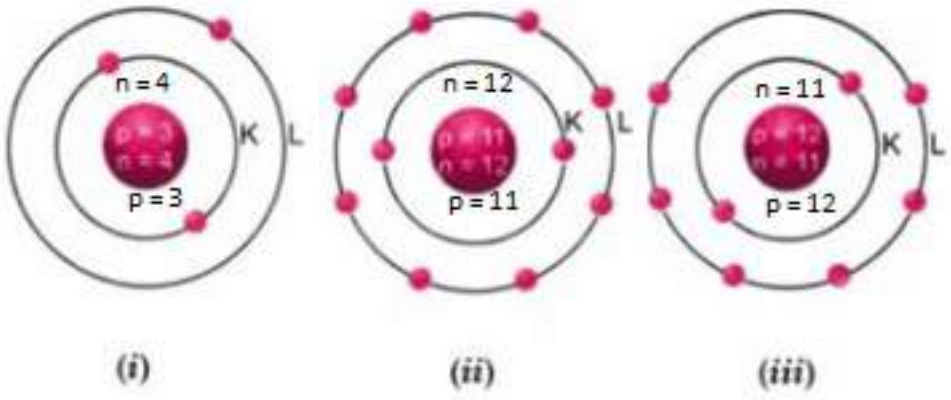
d. Agriculture

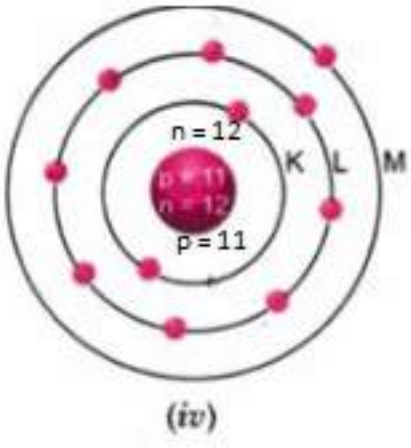
10. What is the density of ice at its melting point?
    a. Exactly equal to $1kg\ /\ m^3$.
    b. Equal to the density of water
    c. Less than the density of water
    d. Greater than the density of water

11. Obtaining fish from natural water resources is known as

    a. fresh water fishery
    b. capture fishing
    c. culture fishery
    d. fish farming

12. Which of the following is Na^+ ion?





    a. (ii)

b. (iv)

c. (i)

d. (iii)

OR

Match the following with the correct response:-

(1) Physical state of water at 300 K	(A) Solid
(2) Water at 273 K	(B) Latent heat
(3) Water at 373 K	(C) Vapour
(4) Energy required to change the state	(D) Liquid

a. 1-A, 2-C, 3-B, 4-D

b. 1-D, 2-A, 3-C, 4-B

c. 1-C, 2-B, 3-D, 4-A

d. 1-B, 2-D, 3-A, 4-C

13. **Assertion:** A glass of cold water appear wet from the outside.

    Reason: Evaporation of water vapour.

    a. Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

    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.

14. **Assertion:** The speed of a body can be negative.
    Reason: If the body is moving in the opposite direction of positive motion, then its

speed is negative.

a. Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

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) reason (R) both are false.

15. Group the following and tabulate them as energy-yielding, protein yielding, oil yielding and fodder crop.
Wheat, rice, berseem, maize, gram, oat, pigeon gram, sudan grass, lentill, soyabean, groundnut, castor and mustard

16. Calculate the molecular Mass of

a. Ammonium sulphate [$(NH_4)_2SO_4$]

b. Penicillin [$C_{16}H_{18}N_2SO_4$]

c. Paracetamol [C_8H_9NO]

OR

How can one conclude that electrons are fundamental particles?

17. An 1800 Kg car is moving at 30 m/s when brakes are applied. If the average force exerted by the brakes is 6000 N, find the distance travelled by car before it comes to rest?

18. i. The temperature inside a glass enclosure is higher than that of the surrounding. Given reason.
ii. How is the above phenomenon utilised by the cold countries to their advantage?
iii. Name two greenhouse gases.

OR

Raj is a farmer residing on the outskirts of Delhi. Upon a visit to a fertilizer shop, the salesman inquired of Raj of the crop he anticipated to cultivate in the coming season. During the conversation, the crop concerned was conveyed. The salesman suggested that urea and other nitrogenous fertilizer be used. Mukesh, quietly but keenly listening the conversation intervened and told Raj that for the concerned crop nitrogenous fertilizers shall not be required. Respond to the following questions using the information provided above:

i. What values are shown by Mukesh?
ii. What can be the concerned crop possibly?
iii. What can be the reason for Mukesh's suggestion?

19. How does fungi and bacteria can withstand much greater changes in the surrounding medium than animal cells?

20. How do cardiac muscles differ from both voluntary and involuntary muscles in both structure and function?

21. A freezing mixture is normally prepared by mixing some common salt with ice. Give reason.

22. Shashank placed an iron cuboid of dimensions 4 cm $\times$ 7 cm $\times$ 10 cm on a tray containing fine sand. He placed the cuboid in such a way that it was made to lie on the sand with its faces of dimensions

    i. 4 cm $\times$ 7 cm,
    ii. 7cm $\times$ 10cm,
    iii. 4 cm $\times$ 10 cm.

    If the density of iron is nearly 8 g cm^{-3} and g =10 ms^{-2}, find the minimum and maximum pressure as calculated by Shashank.

23. Which of the following has more inertia:

    a. a rubber ball and a stone of the same size?
    b. a bicycle and a train?
    c. a five-rupee coin and a one-rupee coin?

24. i. State and define SI unit of power.
    ii. A person carrying 10 bricks each of mass 2.5 kg on his head moves to a height 20 m in 50 s. Calculate power spent in carrying bricks of the person. (Given, g = 10 ms^{-2}).

OR

If an atom of an element 'Z', where 5 electrons are present in the outermost shell, achieves noble gas configuration by accepting requisite the number of electrons, then what would be the charge on the ion so formed? Write the formula of the compound which will be formed when 'Z' reacts with Na atom.

25. Which separation techniques will you apply for the separation of the following?

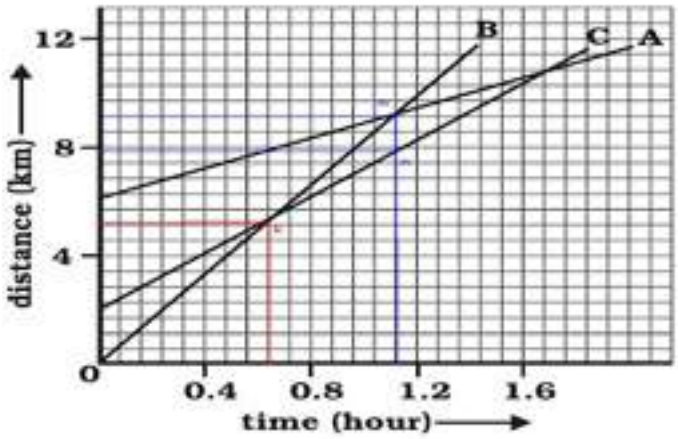
    i. Sodium chloride from its solution in water.
    ii. Ammonium chloride from a mixture containing sodium chloride and ammonium chloride.
    iii. Small pieces of metal in the engine oil of a car.
    iv. Different pigments from an extract of flower petals.
    v. Butter from curd.
    vi. Oil from water.
    vii. Tea leaves from tea.
    viii. Iron pins from sand.
    ix. Wheat grains from husk.
    x. Fine mud particles suspended in water.

OR

Classify each of the following as a physical or a chemical change. Give reasons.

    i. Drying of a shirt in the sun.
    ii. Rising of hot air over a radiator.
    iii. Burning of kerosene in a lantern.
    iv. Change in the colour of black tea on adding lemon juice to it.
    v. Churning of milk cream to get butter.

26. Fig shows the distance-time graph of three objects A, B and C. Study the graph and answer the following questions:



a. Which of the three is travelling the fastest?
b. Are all three ever at the same point on the road?
c. How far has C travelled when B passes A?
d. How far has B travelled by the time it passes C?

27. Give reasons:

(a) Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.

(b) Intercellular spaces are absent in sclerenchymatous tissues.

(c) We get a crunchy and granular feeling when we chew pear fruit.

(d) Branches of a tree move and bend freely in high wind velocity.

(e) It is difficult to pull out the husk of a coconut tree.

28. Students of class IX had to present a seminar on 'Dengue fever'. They wanted to introduce the disease by starting with

i. the immediate causes of the diseases.
ii. definition of infectious diseases.
iii. the pathogen causing dengue fever.
iv. vector responsible for dengue microbe.

Can you help them to explain the above points? Give details.

OR

Distinguish between the five classes of vertebrates on the basis of characters like habitat, kind of exoskeleton, respiratory organs and other distinct features.

29. The volume of a 500 g sealed tin is 350 cm^{-3}.

    i. What is the density of the packed tin?

    ii. Will the packet float or sink in water if it has a density 1 g cm^{-3}?

    iii. What will be the mass of water displaced by this tin?

    iv. What will be the relative density of the packed tin?

30. i. An element X has an atomic number = 12 and mass number = 26. Draw a diagram showing the distribution of electrons in the orbits and the nuclear composition of the neutral atom of the element. What is the valency of the element and why?

    ii. If this element X combines with another element Y whose electronic configuration is 2, 8, 7. What will be the formula of the compound thus formed? State how did you arrive at this formula.

OR

'SO_2 is an air pollutant released during the burning of fossil fuels and from automobile exhaust'.

i. Write the names of elements present in this gas.

ii. What are the valencies of sulphur in SO_2 and SO_3?

iii. Find out the number of molecules in 5 moles of SO_2.

iv. Calculate the number of moles in 320 g of SO_2 gas.

v. Calculate the molar mass of 10 moles of sodium sulphite.
[Given, atomic masses of S = 32 u,
O = 16 u, Na = 23 u and $N_A = 6.022 \times 10^{23}$ per mol]

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Science

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Solution

Section A

1. The mass of electron is about $\frac{1}{1840}$ of the mass of hydrogen. The absolute mass of an electron is 9×10^{-28} gram. The absolute charge on an electron is coulomb of negative charge which is smallest, carried by any particle. Thus, it is taken as unit of negative charge.

2. Atomic mass unit may be defined as:
   The mass of one twelfth (1/12) of the mass of one atom of carbon taken as 12u. It is represented as 1u.

3. i. **Macronutrients:** The essential elements, which are utilized by plants relatively in large quantities, are called macronutrients.
   Micronutrients: The essential elements, which are used by plants in small quantities, are called micronutrients.
   ii. **Macronutrients:** Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Sulphur along with Carbon, Hydrogen and Oxygen.
   iii. **Micronutrients:** Iron, Manganese, Boron, Zinc, Copper, Molybdenum, Chlorine.
   iv. Air.

4. i. The DNA of Monerans is not enclosed within the nucleus because they do not have a true nucleus.
   ii. They are regarded as primitive organisms due to the absence of a true nucleus.
   iii. They are found in hot springs, snow, deep oceans, or as a parasite in other organisms.
   iv. The unique characteristics of Moneransis as follows:
      a. Absence of true nucleus,
      b. Found in a moist environment,
      c. Do not possess any membrane-bound organelles.

5. (b) 1-B, 2-D, 3-A, 4-C **Explanation:**

   1. Inertia depends on mass of object.

2. Friction is a necessary evil because neither movement of bodies not holding any body would have been possible without friction.

3. Momentum can be given as the product of mass and velocity.

4. Force can be defined as the rate of change of momentum

OR

(b) both A and B **Explanation:** Rocket moves forward according to newton's third law of motion. The gas and other substance coming out from the tail push the rocket in forward direction. Newton's laws are universal.

6. (c) 450 J **Explanation:**

M = 5 kg, h = 9 m
W = F x S = m x g x h

= 5 x 10 x 9

= 450 J

7. (d) 5w **Explanation:**

Power = $\frac{work\ done}{time}$
work done = 2000 joule, time = 400 s.
power = $\frac{2000}{400}$ = 5 j/s or 5w.

8. (c) Transverse wave **Explanation:**

In a transverse wave, the medium has particles that vibrate in a direction perpendicular to the direction of the propagation of wave. Here the formation of crest and trough takes place. The polarization of transverse wave is possible. The upward movement from mean position is called crest and downward movement is called trough.

OR

The Earth and the Moon experience equal gravitational forces from each other.However the mass of the Earth is much larger than the mass of the moon.Hence

it accelerates at a rate lesser than the acceleration rate of the moon towards the Earth.For this reason Earth does not move towards the moon.

9. (a) Horticulture
   Explanation: as horticulture is the branch that deals with art, science, technology and business of growing plants
10. (c) Less than the density of water **Explanation:** The density of ice is 0.9167 g/cm^3 at 0 °C, whereas water has a density of 0.9998 g/cm^3 at the same temperature. The density of ice at its melting point is less than density of water. Ice has less density than water, that is why ice floats on water.
11. (b) capture fishing **Explanation:** Capture fishing: It is the process of obtaining fish from natural resources.
12. (a) (ii)

    Explanation: Figure number (ii) is correct because sodium ion (Na^+) is formed when one electron is lost.

    $Na \rightarrow Na^+ + 1e^-$

    (2,8,1) (2,8)

    OR

    (b) 1-D, 2-A, 3-C, 4-B
    Explanation:

    (1) Physical state of water at 300 K (27^oC) is liquid.

    (2) At 273 K (0^oC) which is the melting point of water, water is in solid state.

    (3) At 373 K (100^oC) which is the boiling point of water, water is in vapour state.

    (4) Energy required to change the state of matter is known as latent (hidden) heat.

13. (c) Assertion (A) is true but reason (R) is false.
    Explanation: The water vapour in the air condenses on the cold surface of the glass.
14. (d) Assertion (A) reason (R) both are false.
    Explanation: Speed can never be negative because it is a scalar quantity.
15. i. Energy yielding- wheat, rice, maize

ii. Protein yielding-gram, pigeon gram, lentil, soyabean
iii. Oil yielding- groundnut, castor, mustard, soyabean
iv. Fodder crops- berseem, oat, sudan grass

16. **a) Molecular Mass of Ammonium Sulphate [$(NH_4)_2SO_4$]**

=[(1 × mass of N atom +4 × Mass of hydrogen atom) × 2 + (1 × Mass of sulphur atom) + (4 × Mass of oxygen atom)].
=[(1 × 14 + 4 × 1)× 2 + (1 × 32) + (4 × 16)].
=18 × 2 + 32 + 64
=36 + 32 + 64

= 132g/mol.

b) Molecular Mass of Penicillin [$C_{16}H_{18}N_2SO_4$]

=[(16 × mass of carbon atom) + (18 × Mass of hydrogen atom)+ (2 × Mass of Nitrogen atom) + (1 × mass of sulphur atom) +(4 × Mass of oxygen atom)]
= [(16 × 12) + (18 × 1)+ (2 × 14) + (1 × 32) + (4 × 16)]
= 192 + 18 + 28 + 32 + 64

= 334 g /mol.

c) Molecular Mass of Paracetamol [$(NH_4)_2SO_4$]

= **[(**8 × Mass of carbon atom) + (9 × Mass of hydrogen atom) + (1 × mass of Nitrogen atom) + (1 × mass of oxygen atom)**]**
=**[**(8 × 12) + (9 × 1) + (1 × 14) + (1 ×16)**]**
= 96 + 9 + 14 + 16
= 135 g /mol

OR

Electrons are considered as fundamental particles because the $\frac{e}{m}$ ratio of an electron remains the same irrespective of the nature of the gas and the material of the electrodes that are used inside the discharge tube. They are present in all atoms and provide the chemical properties to the atoms.

17. M = Mass of car = 1800 Kg

V = velocity of car = 30 m/s

F = Force = 6000 N

K.E. = $\frac{1}{2}mv^2$

$= \frac{1}{2}1800 \times 900$

K E = 810000 J

K. E. = Work Done

Work Done = Force $\times$ Displacement

W=F*S

$810000 = 6000 \times S$

$\frac{810000}{6000} = S$

135m=S

Distance travelled by car before stopping is 135m.

18. i. Heat is trapped by glass which leads to rising in temperature.
    ii. The above phenomenon is utilised to create enclosures for keeping tropical plant warm in cold countries.
    iii. Carbon dioxide (CO_2) and methane (CH_4).

OR

i. Mukesh is aware how unusual use of nitrogenous fertilisers is dangerous for environment thus he showed his concern towards environment.
ii. The concerned crop possibly will be a leguminous plant.
iii. According to Mukesh, the nitrogenous fertiliser is not required as leguminous crop was grown due to which atmospheric nitrogen is already present in the soil.

19. The cell wall present in fungi and bacteria permits these cells to withstand very dilute external medium without bursting.
    The cells take up water by osmosis, swells, and builds the pressure against the cell wall. The wall exerts an equal pressure against the swollen cell. It is because of the cell wall, such cells can withstand much greater changes in the surrounding medium than animal cells.

20. 1) Cardiac muscles are involuntary muscles.
    2) They are cylindrical and branched; composed of branching network of fibres.

3) They are uninucleate; the fibres have one or two nuclei which are centrally located.
4) Intercalated discs are present at intervals in the fibres.
5) They function (i.e. show rhythmic contraction and relaxation) throughout life.

21. The freezing point of water (solid-state) is 0^{o} C (or 273 K). In many cases, the freezing point has to be lowered. It is generally achieved by mixing some common salt or some other salt with ice. This is known as a freezing mixture. Actually, in ice, sodium chloride acts as the impurity. It is a fact that impurities always lower the freezing point temperature of a liquid.

22. ∴ Mass of cuboid = Volume × Density = (4 cm × 7 cm × 10 cm) × 8 g cm^{-3} [∵ Volume of cuboid= l × b × h]
= 2240 g = 2.24 kg
Force applied by the cuboid on the sand = mg = 2.24 × 10 = 22.4N [∵ g = 10 ms^{-2}]
Pressure will be minimum when area of the face of cuboid kept on sand is maximum, i.e. in the case of face with 7 cm × 10 cm.
Area of the race = 7 cm × 10 cm = $\frac{7}{100}\mathrm{m} \times \frac{10}{100}\mathrm{m}$
= 0.07 m × 0.1 m = 0.007 m^2
Minimum pressure = $\frac{\text{Force}}{\text{Area}} = \frac{22.4}{0.007} = 3200\mathrm{Nm}^{-2}$
Pressure will be maximum when area of face of cuboid kept on the sand is minimum, i.e. in the case of face with 4 cm × 7cm.
Area of the face = 4 cm × 7 cm = $\frac{4}{100}\mathrm{m} \times \frac{7}{100}\mathrm{m} = 0.0028\mathrm{m}^2$
Maximum pressure = $\frac{22.4}{\text{Area}} = \frac{22.4}{0.0028} = 8000\mathrm{Nm}^{-2}$

23. As we know mass of body is the measure of its inertia, that is more the mass of a body, more is its inertia. So,

    a. Stone has more inertia than a rubber ball of the same size.
    b. Train has more inertia than a bicycle, and
    c. A five-rupee, coin has more inertia than a one-rupee coin.

24. i. The SI unit of power is watt.
    1 watt is the power of a body which does work at the rate of 1 joule per second.
    i.e. 1 watt = $\frac{1joule}{1second}$
    ii. Given, mass of one brick = 2.5 kg

Mass of 10 bricks = 2.5 $\times$ 10 = 25 kg

Height, h = 20 m, time, t = 50 s, power, P = ?

$\therefore$ Power, P = $\frac{mgh}{t}$ = $\frac{25\times10\times20}{50}$ = 100 Js^{-1}

OR

Number of valence electrons = Number of electrons in the outermost shell = 5

Number of electrons required to achieve noble gas configuration = 8 – 5 = 3

Therefore, valency of 'Z' = 3.

When 3 electrons are accepted by 'Z', Z^{3-} ion formed; the charge on the ion so formed = 0 + $3e^-$ = 3-

The chemical formula of the compound when 'Z' reacts with Na atom (valency +1) is as follows:-

The chemical formula of the compound when 'Z' reacts with Na atom is Na_3Z.

25. i. Evaporation and crystallization
    ii. Sublimation
    iii. Filteration
    iv. Chromatography
    v. Centrifugation
    vi. By using separating funnel
    vii. Filteration
    viii. Magnetic separation
    ix. Winnowing
    x. Loading and decantation

OR

i. It is a physical change because moisture in the shirt is converted from its liquid state to gaseous state because of the heat of the Sun.
ii. It is a physical change because water in the radiator is converted from a liquid

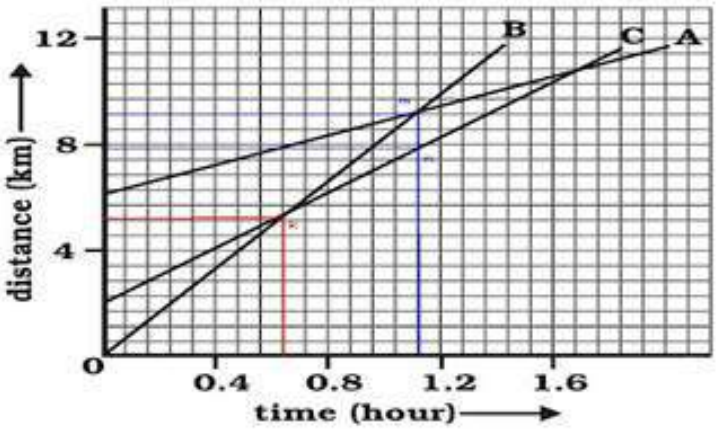
state to gaseous state.

iii. It is a chemical change because combustion of kerosene occurs and new products are formed.

iv. It is a chemical change because there is a reaction between citric acid present in lemon and the compounds of the tea resulting in the formation of new products.

v. It is a physical change because the cream suspended in milk is separated by churning (centrifugation).

26.



a. It is clear from graph that B covers more distance in less time. Therefore, B is the fastest.

b. All of them never come at the same point at the same time.

c. According to graph; each small division shows about 0.57 km.
A is passing B at point S which is in line with point P (on the distance axis) and shows about 9.14 km
Thus, at this point, C travels about
9.14 - (0.57x3.75)km
= 9.14 km - 2.1375 km = 7.0025 km $\approx$ 7 km
Thus, when A passes B, C travels about 7 km.

d. B passes C at point Q at the distance axis which is
$\approx 4km + 0.57\text{km} \times 2.25 = 5.28\text{km}$
Therefore, B travelled about 5.28 km when passes to C.

27. (a) Meristematic cells are active and continuously dividing cells so they have a prominent nucleus and dense cytoplasm. But since meristematic cells do not store food material or waste materials, they lack vacuole.

(b) Sclerenchyma cells have lignified cell walls. Lignin makes the cell walls thick, the cell compact and leaves no intercellular spaces.
(c) We get a crunchy and granular feeling while eating a pear due to the presence of sclereids. Sclereids are a reduced form of sclerenchyma cells with highly thickened, lignified cellular walls. The presence of numerous sclereids forms the gritty texture of pears.
(d) The branches of a tree have collenchyma cells which give tensile strength to plant parts. Hence, plants move and bend freely in high wind velocity. Collenchyma provides flexibility to the parts of a plant and allows easy bending of leaves and stem without breaking.
(e) The husk of a coconut tree is made up of sclerenchymatous cells which have lignified cell walls. Hence, it is difficult to pull out the husk of a coconut tree.

28. i. Immediate cause is the main cause of disease through which virus disease has accumulated in the body. Dengue is the immediate cause of Dengue fever.
ii. Infectious diseases are those diseases in which microbes are immediate cause and spread from one person to another through various means like air, water etc., e.g., chickenpox, cholera, etc.
iii. Pathogens causing dengue fever are microbes causing dengue fever, i.e., dengue virus.
iv. Vector responsible for dengue microbe is the female mosquito known as Anopheles. Female mosquitoes require blood as meal as it is necessary for meeting their high protein requirement for laying eggs. When female mosquito stings a person for taking blood during this act, virus is introduced into the blood of healthy person.

OR

Character	Pisces	Amphibia	Reptilia	Aves	Mammals
1. Habitat	Aquatic	Terrestrial and aquatic	Terrestrial	Arboreal	Terrestrial, aquatic and arboreal
2. Exoskeleton	Slimy scales	Absent	Dry and scaly	Feathers, claws	Hair, nails, etc.

3. Respiratory organs	Gills	Gills, lungs and skin	Lungs	Lungs	Lungs
4. Body temperature	Cold-blooded	Cold-blooded	Cold-blooded	Warm-blooded	Warm-blooded
5. Heart	2-chambered	3-chambered	3-chambered	4-chambered	4-chambered
6. Locomotive organs	Fins	Limbs	Limbs; but absent in snakes.	Wings and Limbs	Limbs
7. Other	Body is streamlined. They are oviparous.	They have webbed feet. Eggs are laid in water and larvae are aquatic.	They are oviparous and some are viviparous, e.g., lizard and snake. Development is external	Body is covered by feathers and forelimbs are modified into wings. Their bones are hollow.	Presence of mammary glands. There are hairs on the body and external pinna is also present. They are viviparous.

29. Given: Mass of packed tin (m) = 500 g

Volume of tin (V) = 350 cm^{-3}

i) Therefore density of the tin

$density = \frac{mass}{volume} = \frac{500}{350}$ = 1.429 gcm^{-3}

ii) As the density of the tin is more than the density of water therefore it will sink in water.

iii) Volume of water displaced by packed tin = volume of packed tin = 350 cm^{-3}

Therefore mass of water displaced by tin

M = V × d = 350 × 1 = 350 g

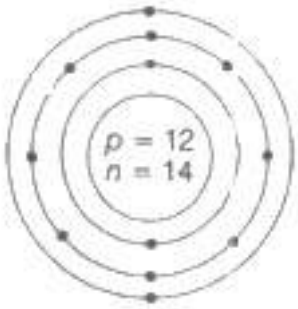
iv) Relative density of packed tin,

R D = $\frac{density\ of\ tin}{density\ of\ water} = \frac{1.429}{1}$ = 1.429

30. i. Given: Atomic number = 12, Mass number = 26

Thus, its electronic configuration = 2, 8, 2

Atomic structure of X:



Nuclear composition:

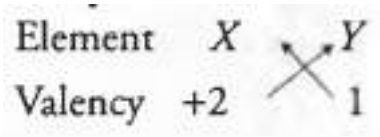
Number of protons = 12

Number of neutrons = 26 - 12 = 14

The valency is 2 because it can donate 2 electrons easily to complete its octet and become stable.

ii. Valency of the element Y would be 1, i.e. it can gain 1 electron to become stable.

When it compounds formed will be XY_2.



The formula of the compound would be XY_2.

OR

i. Sulphur and oxygen.

ii. Valency of sulphur in SO_2 = 4

Valency of sulphur in SO_3 = 6

iii. 5 $\times$ Avogadros number = 5 $\times$ 6.022 $\times$ 10^{23}

= 3.011 $\times$ 10^{23} molecules

iv. m = 320 g, Molar mass (m) of

SO_2 = 32 + 2 $\times$ 16 = 64 g/mol

$\Rightarrow n = \frac{m}{M} = \frac{320}{64}$ = 5 moles

v. Molar mass of 10 moles of Na_2SO_3

= 10 [23 $\times$ 2 + 32 +16 $\times$ 3] = 1260 g