CBSE

Class IX Science

Sample Paper - 8

Time: 3 hrs. **Total Marks: 80**

General Instructions:

- The question paper comprises five sections – A, B, C, D and E. You are to attempt all the sections.
- All questions are compulsory.
- Internal choice is given in sections B, C, D and E.
- Question numbers 1 and 2 in Section A are one mark questions. They are to be answered in one word or in one sentence.
- Question numbers 3 to 5 in Section B are two marks questions. These are to be answered in about 30 words each.
- Question numbers 6 to 15 in Section C are three marks questions. These are to be answered in about 50 words each.
- Question numbers 16 to 21 in Section D are five marks questions. These are to be answered in about 70 words each.
- Question numbers 22 to 27 in Section E are based on practical skills. Each question is a two marks question. These are to be answered in brief.

Section A

1. What is the objective of mixed cropping? (1)

2. Name two processes which play an important role in the oxygen cycle. (1)

Section B

3. What is the significance of the ozone layer? (2)

4. A racing car moving with a velocity of 20 m/s is stopped by applying brakes and producing a uniform acceleration of 1 m/s^2. What is the distance travelled by the car before it comes to rest? (2)

OR

A body starts to slide over a horizontal surface with an initial velocity of 0.6 m/s. Due to friction, its velocity decreases at the rate of 0.05 m/s^2. How much time will it take for the body to stop?

5. Define an ion. In case of sodium chloride, name the cation and anion and give symbols for each of them. (2)

Section C

6. State the limitations of J.J. Thomson's model of an atom. (3)

7. Mention any three advantages of irrigation. (3)

8. Give reasons: (3)

(a) Naphthalene balls disappear with time without leaving any solid residue.

(b) We can get the smell of perfume even while sitting several metres away.

(c) After a hot sunny day, people sprinkle water on the roof or open ground.

9. Define uniform velocity. Give two ways by which the change of velocity can be achieved. (3)

10. Define balanced and unbalanced force.

An object weighing 20 N is kept on the floor. A child tries to push the object by applying a force of 20 N. Does the object move along the direction of force applied by the child? Which force was applied to the object? (3)

11. A wooden block has a mass of 5 kg. The length, breadth and height of this wooden block are 75 cm, 50 cm and 25 cm, respectively. Find the pressure on the floor on which it is kept when (3)

i) Sides measuring 50 cm and 25 cm are in contact with the floor.

ii) Sides measuring 75 cm and 50 cm are in contact with the floor.

OR

Calculate the force of gravitation between two boxes of mass 15 kg and 25 kg separated by a distance of 20 cm from one another when placed on the floor.

($G = 6.7 \times 10^{-11}\ Nm^2/kg^2$).

12. Which of the following has more number of atoms? (3)

(i) 10 g nitrogen (N_2) gas

(ii) 10 g ammonia (NH_3) gas

OR

What is atomicity? State the atomicity of the following elements:

(i) Neon

(ii) Nitrogen

(iii) Phosphorus

(iv)Sulphur

13. The number of dengue cases increased in Seema's village in the last one year. She had read in her textbook that diseases like dengue spread through mosquitoes which breed in stagnant water. She immediately discussed this with her friends and decided to get rid of the mosquitoes in the water bodies in their locality. They also took help of the nearest municipal office. Answer the following questions based on the above information: (3)

(a) Suggest any two measures for the prevention of diseases caused by mosquitoes.

(b) Which values are displayed by Seema in taking the initiative?

(c) Suggest one school activity to promote such values in school students.

14. How does the cell wall help the cell to survive in a hypotonic solution? (3)

OR

What would happen if all the cells of our body were of the same shape and size?

15. Near the coastal areas, wind blows from the sea towards the land during the day and from the land towards the sea during the night. Explain giving reason. (3)

Section D

16. Name the five classes of vertebrates. Compare any two classes on the basis of (5)

(a) Habitat

(b) Covering of skin

(c) Respiratory organs

(d) Chambers of the heart

(e) Reproduction

17. (5)

(a) A car weighing 900 kg and travelling with a velocity of 25 m/s stops at a distance of 100 m while decelerating uniformly. What is the force exerted on the car when the brakes are applied?

(b) What is the work done by the brakes?

OR

a) Write an expression for kinetic energy of the body.

b) Define potential energy. What is the SI unit of potential energy?

c) What is the equation for work done in raising the object to a certain height? To which expression of energy is it similar?

d) Calculate the kinetic energy of a body of mass 4 kg moving with a velocity of 0.1 m/s.

18. (a)Differentiate between the three states of matter on the basis of the following properties: (5)

(i) Intermolecular forces (ii) Arrangement of molecules

(b) Liquids generally have lower density compared to solids, but ice floats on water. Give reason.

OR

What is electrovalency? Explain the formation of an electrovalent bond with the help of an example.

19. (a) What are the effects of force? (5)

(b) Give the full form of SONAR.

What are the other applications of ultrasonic sound? (Any two)

20. Give reasons: (5)

a. Majority of children in many parts of India are already immune to Hepatitis A.

b. Chronic diseases cause more harm to the body than acute diseases.

c. A balanced diet is necessary for maintaining a healthy body.

d. Social harmony and good economic conditions are necessary for good health.

e. Infectious diseases are called communicable diseases.

OR

(a) Give reasons for the following:

(i) Bryophytes are called amphibians of the plant kingdom.

(ii)From Phylum Platyhelminthes onwards, animals are categorised as 'triploblastic'.

(iii) The presence of a coelom in an animal's body is considered advantageous.

(b) What are oviparous animals?

(c) Name the phylum in which pharyngeal gill slits are present.

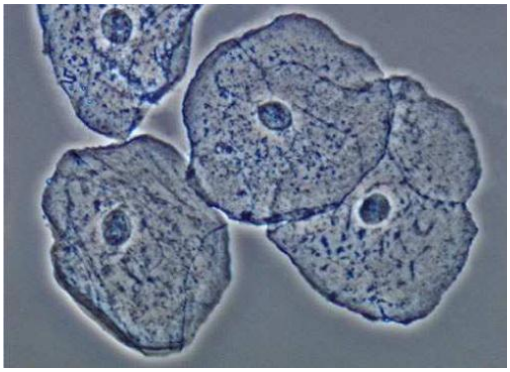
21. (5)

(a) Differentiate between evaporation and boiling.

(b)How does evaporation cause cooling?

Section E

22. A teacher studied the slide given below under a compound microscope. Which of the following students identified it correctly? Why? (2)



A. Sheela - Cheek cells
B. Madhu - Squamous epithelium
C. Balaji - Parenchyma
D. Shanti - Onion peel

23. Aditi observed the following while looking at a permanent slide. (2)

- Cells are long and cylindrical.
- Light and dark bands are present.

(a) Which cell/tissue did Aditi observe on the slide?
(b) What are the functions of this cell/tissue?

OR

You can bite fruits like guava, grapes, banana etc. but not a piece of wood. Why?

24. How will you separate the following:

(i) Oxygen from air
(ii) Iron filings from sugar
(iii) Crystals of alum from impure samples
(iv) Common salt from ammonium chloride

OR

While separating the components of a mixture of sand, camphor and common salt, Raman added water to the mixture in a beaker and stirred it well. He observed that a component is dissolved. Identify the dissolved component and suggest a method of separation for the other two components.

25. Why is digestion classified as a chemical change? (2)

26. Why is it easier to swim in seawater rather than in the fresh water of a swimming pool? (2)

27. How can two whales which are hundred kilometres away communicate with each other? (2)

OR

The middle ear consists of how many bones? Name them.

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Class IX Science
Sample Paper – 8 Solution

Section A

1. The main objective of mixed cropping is to reduce the risk of crop failure due to adverse weather.

2. Processes which play an important role in the oxygen cycle:
(a) Photosynthesis
(b) Respiration

Section B

3. The ozone layer absorbs harmful ultraviolet radiations emitted by the Sun and prevents them from reaching the surface of the Earth, as these radiations cause harmful effects to human beings, plants and animals.

4. A car is moving with a velocity of 20 m/s.

$\therefore u = 20$ m/s

The body comes to rest after applying the brakes

$\therefore v = 0$

acceleration = -1m/s^2

Distance covered (s)= ?

by using the 3^{rd} kinematical equation we get,

$v^2 = u^2 + 2as$

$\rightarrow 0 = 20^2 + 2 \times (-1) \times s$

$\rightarrow 0 = 400 - 2s$

$\rightarrow 2s = 400$

$\therefore s = \frac{400}{2} = 200$ metres.

OR

u = 0.6 m/s

a= – 0.05 m/s^2 (deceleration)

t = ?

v = u + at

0 = 0.6 + (–0.05) x t

Thus, t = –0.6/(0.05) = 12 s

Thus, it takes the body 12 s to come to rest.

5. An ion is a charged particle which can be negatively or positively charged.
In NaCl:

	Cation	Anion
Name	Sodium	Chloride
Symbol	Na^+	Cl^-

Section C

6. <u>Limitations of Thomson's atomic model:</u>

- Although Thomson's atomic model explained why an atom is electrically neutral, it could not explain the distribution of electrons in the atom.
- If we accept that electrons are embedded in the positive charge, then the opposite electric charges should cancel each other out and the charged sphere would become chargeless.
- Thomson's model could not explain why different elements have different chemical properties.

7. <u>Advantages of irrigation:</u>

(a) Fresh water supplies hydrogen and oxygen to plants.
(b) It provides enough moisture to the soil for the germination of seeds.
(c) Irrigated soil is soft and new roots can penetrate and grow very well.
(d) It causes an increase in the number of tillers in crop plants, as they cannot grow in dry soil.
(e) It helps in the absorption of minerals and salts by roots which are necessary for the growth and development of plants.

8.

(a) Naphthalene easily undergoes sublimation, i.e. change of state of naphthalene from solid to gas without the intervening liquid state. Thus, naphthalene balls form naphthalene vapour which disappears into the air with time without leaving any solid residue.

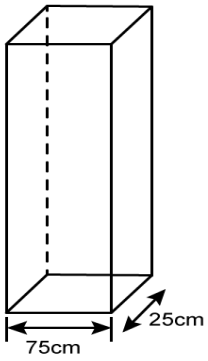
(b) Gaseous particles possess high speed and move very rapidly in all directions. When perfume is sprayed, its particles diffuse into the particles of air at a very fast rate and reach our nostrils. This enables us to smell the perfume from a distance.
(c) After a hot sunny day, people sprinkle water on the roof or open ground because the large latent heat of vaporisation of water helps to cool the hot surface.

9. The body experiences uniform velocity if it travels in a specified direction in a straight line and moves over equal distances in equal intervals of time.
Two ways to change the velocity of a body:

i) Change the speed of the body
ii) Keep the speed constant and change the direction

10. **Balanced force** is a force where the resultant of all the forces acting on a body is zero.
Unbalanced force is a force where the resultant of all the forces acting on a body is not zero.
A child applies a force of 20 N and the force applied by the object on the ground is 20 N; thus, the net force applied on the body will be zero.
As the total net force on the object is zero. The force applied on it was a balanced force.

11. Pressure is the ratio of force (F) exerted by a body to the area (A) upon which the body is exerting the force. Also, weight (W) is the force exerted by a body due to the Earth's gravitational pull, i.e. F = W.



$W = mg$

Acceleration due to gravity $(g) = 10\ m/s^2$

$\therefore W = 5 \times 10 = 50\ N$

Pressure (P) $= \dfrac{\text{Force (F)}}{\text{Area (A)}}$

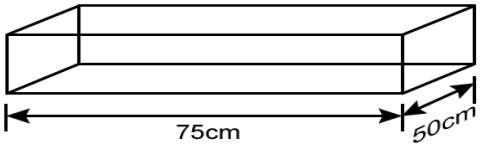
i) for the surface of 50×25 cm to be in contact with the floor.

Area of the surface that is in contact with the floor (A)= $\ell \times b = 50 \times 25$

$A = 50 \times 25 = 1250\ cm^2 = 0.125\ m^2$

$\therefore P = \dfrac{50}{0.125} = 400\ Pa$

Pressure exerted by the block on the floor is 400 Pascal.



ii) for the surface of 75×50 cm to be in contact with the floor.

Area of the surface that is in contact with the floor (A)= $\ell \times b = 75 \times 50$

$A = 75 \times 50 = 3750\ cm^2 = 0.375\ m^2$

$\therefore P = \dfrac{50}{0.375} = 133.3\ Pa$

Pressure exerted by the block on the floor is 133.3 Pascal.

OR

The force of gravitation is calculated by using the equation

$F = G \times \frac{m_1 m_2}{r^2}$

Gravitation constant $G = 6.7 \times 10^{-11}\ Nm^2/kg^2$

Mass of 1st box $(m_1) = 15$ kg

Mass of 2nd box(m_2) = 25 kg

the boxes are lying on the floor at the distance of 20cm

from one another.

$\therefore r = 20$ cm

Substituting all the relevant values in the above equation

$F = 6.7 \times 10^{-11} \times \frac{15 \times 25}{(20)^2}$

$\therefore F = 6.28 \times 10^{-11}$ N

12.

(i) Number of molecules in 10 g of N_2 gas, $N = n \times N_0$

$= \frac{m}{M} \times N_0$

$= \frac{10}{14} \times 6.022 \times 10^{23}$

$= 4.30 \times 10^{23}$ molecules

(ii) Number of molecules in 10 g of NH_3 gas, $N = \frac{m}{M} \times N_0$

$= \frac{10}{17} \times 6.022 \times 10^{23}$

$= 3.542 \times 10^{23}$ molecules

So, 10 g of ammonia has more molecules.

OR

Atomicity: Number of atoms in a single molecule of an element is called atomicity.

Name of element	Atomicity
Neon	Monoatomic
Nitrogen	Diatomic
Phosphorus	Tetra-atomic
Sulphur	Poly-atomic

13.

(a) Measures for the prevention of diseases caused by mosquitoes:

- Avoid water logging
- Ensure proper and regular disinfection
- Promote the use of mosquito nets and repellents

(b) Values displayed by Seema in taking the initiative: (any two)

- Community service
- Social responsibility
- Environmental protection
- Awareness about healthy living conditions

(c) School activities to promote values in school students:

- Organising campaigns for creating awareness among the masses
- Organising debates
- Arranging similar community services
- Group discussion

14.

(a) When surrounded by a hypotonic solution, the cell takes up water by osmosis.

(b) The cell swells, building up pressure against the cell wall.

(c) The cell wall exerts an equal pressure against the swollen cell.

(d) Because of the cell wall, such cells can withstand hypotonic solutions to a great extent.

OR

Different cells of our body assume different sizes and shapes to perform certain specific functions. Our complex body carries out a wide range of functions. If all the cells of our body were of the same size, shape and volume, then they would all perform the same function and the other important functions would not be carried out, making human life impossible.

15.

(a) During the day, the air above the land gets heated up faster and starts rising.

(b) As this air rises, a region of low pressure is created and the air above the sea moves into this area of low pressure. The direction of the wind would be from the sea to the land.

(c) During the night, both land and sea begin to cool. Since water cools down slower than the land, the air above the sea would be warmer than the air above the land. As a result, the wind current is from the land to the sea.

Section D

16. Pisces, Amphibia, Reptilia, Aves and Mammalia are the five classes of vertebrates.
(You can pick up any two of the five classes of vertebrates for comparison)

Sr.No.	Characteristics	Pisces	Amphibia	Reptilia	Aves	Mammalia
(a)	Habitat	Aquatic	Aquatic and terrestrial	Aquatic and terrestrial	Terrestrial and aerial	Mainly terrestrial
(b)	Skin cover	Scales	Mucous glands in skin	Scales	Feathers	Hair
(c)	Respiratory organs	Gills	Gills and lungs	Lungs	Lungs	Lungs
(d)	Chambers of the heart	Two	Three	Three	Four	Four
(e)	Reproduction	Lay eggs in water	Lay eggs in water	Lay eggs	Lay eggs	Give birth to young ones

17.

(a)

We have to find the deceleration in order to calculate force

initial speed (u)=25 m/s

final speed (v)= 0

displacement (s)= 100 m

by substituting the above values in equation

$v^2 = u^2 + 2as$

we get

$0 = 25^2 + 2 \times a \times 100$

$200a = -625$

$a = \frac{-625}{200} = -3.12 \text{ m/s}^2$

The force exerted by the brakes can be calculated by using formula:

$F = m \times a$

m=900 kg

$a = -3.12 \text{ m/s}^2$

$F = 900 \times (-3.12)$

$\therefore F = -2808 \text{ N}$

The negative sign indicates that it is retarding force.

(b)

Work (W) = Force (F) $\times$ Displacement (s) ...(1)

Force (F)= 2808 N

$\therefore$ Displacement (s) = 100 m

Substituting the above value of displacement and force in equation (1)

Work done ,W= 2808×100

$\therefore W = 2.8 \times 10^5$ Joule

Therefore, work done by the car to reach the river side is 2.8×10^5 Joule .

OR

a) Expression for kinetic energy is

KE = ½ mv^2

b) The energy possessed by a body due to its position or change in shape is called potential energy. The SI unit of potential energy is joule.

c) The work done in raising an object to a height h is given as

W = mgh

This is similar to the equation of potential energy of an object.

d) m = 4 kg

v = 0.1 m/s

KE = ½ mv^2

KE = ½ × 4 × $(0.1)^2$

KE = 0.02 J

Thus, the kinetic energy of the body is 0.02 J.

18.

(a)

Solids: (i) Have maximum intermolecular forces of attraction

(ii) Have closely packed molecules

Liquids: (i) Have lesser intermolecular forces of attraction

(ii) Have less closely packed molecules

Gases: (i) Have least intermolecular forces of attraction

(ii) Have molecules which are far away from each other

(b)When water freezes to form ice, its volume increases, and hence, its density decreases. As ice has lower density than water, it floats on water.

OR

Electrovalency

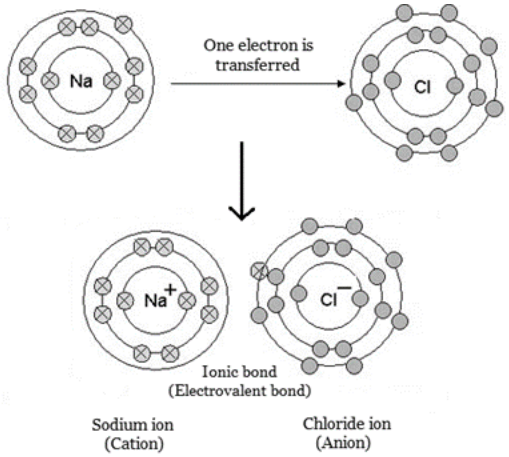
- When one atom transfers one or more electrons to another atom, the bond formed between them is known as an electrovalent bond or electrovalency.
- The compounds thus formed are known as electrovalent compounds.

Formation of Electrovalent Bond

- When one atom loses electrons, it acquires a positive charge. Conversely, when an atom accepts electrons, it acquires a negative charge.
- An atom possessing an electrical charge is known as an ion.
- A positively charged ion is known as a cation, while a negatively charged ion is known as an anion.
- Being oppositely charged, the cation and anion are attracted towards each other and form a bond held together by electrostatic attraction.

Consider the example of formation of the compound sodium chloride to understand this better.

- When a sodium atom and a chlorine atom combine, the sodium atom loses an electron and forms a sodium ion.
- The sodium ion is a cation, i.e. it carries a positive charge.
- The chlorine atom which already has 7 electrons in its outermost orbit accepts the electron lost by the sodium atom and gets converted to a chloride ion.
- The chloride ion is an anion, i.e. it carries a negative charge.
- The sodium and chloride ions being oppositely charged are attracted towards each other. The linkage or bond formed between these ions will be the electrovalent or ionic bond.
- The compound thus formed is NaCl or sodium chloride.



Formation of sodium chloride molecule

- Formation of electrovalent bonds is mainly observed between metals and non-metals.
- Metals generally have up to 3 electrons in their valence orbit, while non-metals generally have 5–7 electrons in their valence shell.

19. (a)Effects of force: A force can

i) Move a stationary body

ii) Stop a moving body

iii) Change the speed of a body

iv) Change the direction of motion

v) Change the size and shape of a body

(b) SONAR: Sound Navigation and Ranging

Applications:

i) For detecting flaws in metal blocks

ii) For investigating the internal organs of the human body such as liver, gall bladder etc.

20.

a. Majority of children in India are exposed to Hepatitis A virus through water and thereby the body develops immunity against the virus.

b. Chronic diseases last for a long time, even as long as a lifetime, and hence cause more harm to the body.

c. A balanced diet of carbohydrates, proteins and fats provides energy in the appropriate amount and is essential for the proper growth and functioning of the body.

d. Human beings live in societies and localities like villages or cities which determine the social and physical environment. Hence, both are to be kept in harmony. Public cleanliness is important for individual health. We need good food for a healthy body and for the natural treatment of diseases.

e. Infectious diseases are caused by microbes. Microbes can spread in the community and thereby spread the disease. Infectious diseases are hence called communicable diseases.

OR

(a)

(i) Just like amphibians, bryophytes require water for fertilisation as their gametes require aqueous medium for movement.

(ii) There are three layers of cells from which differentiated tissues can be made. This allows inside and outside body linings as well as the basic structural formation of some organs. There is thus some degree of tissue formation.

(iii)Coelom is a true internal body cavity in which well-developed organs can be accommodated.

(b) The animals which lay eggs are known as oviparous animals.

(c) Chordata

21.

(a) Differences between Evaporation and Boiling:

Evaporation	Boiling
It is a surface phenomenon.	It is a bulk phenomenon.
It is a slow process.	It is a rapid process.
It takes place at all temperatures but below the boiling point.	It takes place at a definite and constant temperature.

(b)

When evaporation occurs, the particles of the liquid absorb heat from the surroundings to regain the energy lost during evaporation. This absorption of energy from the surroundings makes it cool.

Section E

22. Sheela identified the cells correctly as human cheek cells. The human cheek cell is an animal cell. When mounted on a slide, it clearly shows the presence of a plasma membrane, cytoplasm and nucleus.

23.

(a) Based on the observations, the slide describes striated muscle fibres which have long and cylindrical cells with striations, i.e. light and dark bands.

(b) Striated muscles provide the force for locomotion and all other voluntary movements of the body.

OR

Wood is hard due to thickenings present in the cells, mainly dead cells. It comprises thickened secondary xylem.

24.

(i) Oxygen from air: Fractional distillation of liquid air

(ii) Iron filings from sugar: Magnetic separation

(ii) Crystals of alum from impure samples: Crystallisation

(iii) Common salt from ammonium chloride: Sublimation

OR

Common salt will dissolve in water.

Camphor and sand are separated by sublimation. If we heat the mixture in a china dish, camphor will sublime. The vapours of camphor can be collected and sand will remain behind.

25. Digestion is a process where food nutrients such as carbohydrates, proteins, fats, vitamins and other materials are broken down into simpler substances with the release of energy.

New substances are formed during the process of digestion. Thus, digestion is a chemical change.

26. It is easier to swim in seawater than in fresh water because the density of seawater is higher than that of fresh water. As density increases, the buoyant force exerted by it also increases.

27. Speed of sound is 5 times faster in water than in air. Hence, whales can communicate even when a hundred kilometres away. The speed of sound in water is 1500 m/s.

OR

The middle ear consists of three delicate bones. They are hammer, anvil and stirrup.