# CLASS IX (2019-20)
# SCIENCE (CODE 086)
# SAMPLE PAPER-8

**Time : 3 Hours**                                                                 **Maximum Marks : 80**

**General Instructions :**
(i)   The question paper comprises of three sections-A, B and C. Attempt all the sections.
(ii)  All questions are compulsory.
(iii) Internal choice is given in each sections.
(iv)  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.
(v)   All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
(vi)  All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
(vii) This question paper consists of a total of 30 questions.

# Section -A

**1.** If a body starts from rest, what can be said about the acceleration of the body ? [1]
(a) Positively accelerated
(b) Negatively accelerated
(c) Uniformly accelerated
(d) None of the above

**Ans :** (a) Positively accelerated

**2.** Which of the following represents the correct increasing order of the densities of given substances? [1]
(a) Cotton < Exhaust from chimneys > Honey < Iron < Air.
(b) Air < Exhaust from chimneys < Cotton < Honey < Iron.
(c) Air < Cotton < Exhaust from chimneys < Iron < Honey.
(d) Cotton < Air < Exhaust from chimneys < Iron < Honey.

**Ans :** (b) Air < Exhaust from chimneys < Cotton < Honey < Iron.

**or**

Which of the following is incorrect about plasma ? [1]
(a) Fluorescent tube and neon sign bulbs consist of plasma.
(b) The gas gets ionised when electrical energy flows through it.
(c) It consists of super energetic and super excited particles.
(d) The plasma glows with colour which does not depend upon nature of gas.

**Ans :** (d) The plasma glows with colour which does not depend upon nature of gas

**3.** The white fibre of connective tissue is made up of which one of the following ? [1]
(a) Lignin          (b) Keratin
(c) Collagen       (d) Elastin

**Ans :** (c) Collagen

**or**

Active division takes place in which one of the following cells?
(a) Cambium       (b) Phleom
(c) Parenchyma    (d) Xylem

**Ans :** (a) Cambium

**4.** A motorcycle and a car are moving on a horizontal road with the same velocity. If they are brought to rest by the application of brakes which provided equal retardation, then : [1]
(a) Motorcycle will stop at shorter distance.
(b) Car will stop at a shorter distance.
(c) Both will stop at the same distance.
(d) Nothing can be predicted.

**Ans :** (c) Both will stop at the same distance.

**5.** Nanometer is an : [1]
(a) Instrument used for measuring micro distance.
(b) Instrument used for measuring macro distance.
(c) Unit for measuring micro distance.
(d) Unit for measuring macro distance.

**Ans :** (c) Unit for measuring micro distance.

**or**

Heating of iron fillings and sulphur powder for formation of iron sulphide should be done in a
(a) Petri dish
(b) Watch glass
(c) Copper dish
(d) China dish

**Ans :** (d) China dish

**6.** Which body part is not composed of nervous tissue ? [1]
(a) Brain
(b) Muscles which connect eyes to brain
(c) Spinal cord
(d) Nerves

**Ans :** (b) Muscles which connect eyes to brain

**DIRECTION :** For question numbers 7 and 8, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

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

(b) Both A and R are true but R is not the correct explanation of the A.

(c) A is true but R is false.

(d) Both A and R are false.

7. **Assertion (A) :** Nucleus of an atom is Positively charged.
   **Reason (R) :** Nucleus of atom consists of protons and neutrons. [1]
   **Ans :** (b) Both A and R are true but R is not the correct explanation of the A.

8. **Assertion (A) :** Atom is not the smallest particle in the universe.
   **Reason (R) :** An atom consists of proton, neutron and electron. [1]
   **Ans :** (a) Both A and R are true and R is correct explanation of the A.

9. The distance between two bodies becomes 6 times more than the usual distance, so the $F$ becomes .......... [1]
   (a) 36 times      (b) 6 times
   (c) 12 times      (d) 1/36 times
   **Ans :** (d) 1/36 times

10. A student carries a bag weighing 5 kg from the ground floor to his class on the first floor that is 2 m high. The work done by the boy is .......... [1]
    **Ans :** 100 Joules.

11. Name the bio-indicator which is highly sensitive to $SO_2$ pollutions ? [1]
    **Ans :** Lichens.

12. What is the alternate name for Apis cerana indica? [1]
    (a) Indian bee      (b) Indian buffalo
    (c) Indian cow      (d) None of these
    **Ans :** (a) Indian bee.

13. Answer question numbers 13.1–13.4 on the basis of your understanding of the following paragraph and the related studied concepts.



Bharat went to Kerala with his parents for a nature trip. The family landed in Kochi in the morning from where they had plans for going to Alapuzzha at night. Bharat knew that Kochi is famous for its Bharat Petroleum Oil Refinery and coerced his father to take him there. Bharat had studied separation techniques at his school and wanted to see the same in the refinery in reality.

13.1 What separation technique did Bharat expect to see at the oil refinery ? [1]
**Ans :** Fractional distillation.

13.2 What is the most important condition for this particular technique to be implemented ? [1]
**Ans :** To separate a mixture of two or more miscible liquids for which the difference in boiling points is less than 25 K, fractional distillation process is used.

13.3 Give two examples of components that are separated in an oil refinery. [1]
**Ans :** Crude oil is subjected to fractional distillation to obtain components like Diesel, Petrol, etc.

13.4 What is the ideal location of an oil refinery in a city ? [1]
**Ans :** An oil refinery should be situated at the outskirts of a city, because it generates a lot of polluting gases and acquires large space to layout plant.

14. Questions 14.1 to 14.4 are based on the Table A. Study this table and answer the following questions.

| Days | Jar 1 (cm) | Jar 2 (cm) |
|---|---|---|
| Day 1 | 1 | 1 |
| Day 2 | 1.3 | 1.4 |
| Day 3 | 1.7 | 0.8 |
| Day 4 | 2.1 | 0.8 |
| Day 5 | 2.5 | 0.8 |

Two glass jars filled with water are taken. Two onion bulbs are taken and placed in each of the jars. Observe the growth of roots in both the jars. Measure the length of the roots daily. On Day 3 cut the root tips of the onion in Jar 2 by 1 cm and measure their lengths each day for 2 to 3 more days. By this activity, the Table A was constructed.

14.1 Does the root of onion in Jar 2 continue growing even after its tip is removed ? [1]
**Ans :** No it doesn't, as observed from the readings in the table.

14.2 Why does it stop growing after the root tip is removed ? [1]
**Ans :** The growth of plants occurs only in certain regions. A root tip when cut cannot grow back because its apical meristem is lost.

14.3 What is apical meristem ? [1]
**Ans :** Apical meristem is present at the growing tips of stems and roots and increases the length of the stem and the root.

14.4 What happens to the cells formed by meristematic tissue ? [1]

**Ans :** Meristematic tissues take up a specific role and lose the ability to divide.

# Section - B

**15.** Derive the first equation of motion mathematically. [3]

**Ans :**

Acceleration is defined the rate of change of velocity.
Let $v$ = final velocity and $u$ = initial velocity
$t$ = time and $a$ = acceleration
So by definition of acceleration,

$$a = \frac{v - u}{t}$$
$$at = v - u$$
$$v = u + at \qquad \text{Hence derived.}$$

**16.** (a) Camphor disappears without leaving any residue. Explain.
(b) Why do we feel cool when we touch a piece of ice ? [3]

**Ans :**

(a) Camphor disappears after some time as its surface gains kinetic energy and directly gets converted into gas. The process of converting directly into gaseous form and not in a liquid state is termed as sublimation. Hence, when camphor is given fire, it gets converted into gas and disappears without leaving any residue.
(b) Ice is the solid state of water. When we touch a piece of ice, we fool cool for the following reasons:
   (i) When we touch a piece of ice, first transfer of heat takes place from our body to ice as there is temperature difference.
   (ii) Ice will start melting that is solid state of ice will be converted to liquid state of ice by absorbing heat energy from our body.
   (iii) Latent heat of fusion of ice = 80 cal/gm.
   (iv) For 1 gm of ice to get converted 80 cal of heat is absorbed.
   (v) As heat energy is absorbed from our body we feel cool.

**17.** (a) How are simple tissues different from complex tissues ?
(b) What happens to the plants if their tips are removed ? [3]

**Ans :**

(a) Simple tissues are made up of only one type of cells which look like each other. On the other hand, complex tissues are made up of more than one type of cells. Parenchyma, collenchyma and schlerenchyma are the examples of simple plant tissue whereas xylem and phloem are complex tissue.
(b) Xylem is a water conducting tissue in plants. It transports water from the roots to the different parts of the plant. If the xylem of the plant is removed, upward movement of water will stop leading to wilting of leaves and ultimately causes the death of a plant. In the absence of water, the plant will not be able to prepare food and also perform other essential activities.

**18.** Why is the weight of an object on moon 1/6th its weight on earth? [3]

**Ans :**

We know that weight of a body = mg. Now the mass of a body is constant irrespective of whether it is on earth or moon. But the acceleration due to gravity on moon is 1/6th the value of acceleration due to gravity on earth. Because of this, the weight of an object on moon is 1/6th its weight on earth.

*or*

Why will a sheet of paper fall slowly in comparison to one that is crumpled into a ball ?

**Ans :**

A greater surface area offers greater resistance and buoyancy. Same is true in the case of a sheet of paper that has a larger surface area as compared to a crumpled ball of paper. So a sheet of paper falls slower.

**19.** What are the advantages of composite fish culture ? [3]

**Ans :**

Composite fish culture has the following advantages :
(a) Both local and imported fish species can be used in such systems.
(b) Due to non—competitive nature of selected fishes, food is available in all the parts of the reservoir.
(c) It also results in increase in the fish yield from the water reservoir.

**20.** Write the postulates of Bohr's theory. [3]

**Ans :**

Postulates of Bohr's theory are :
(a) Electrons move around the nucleus in definite circular path called orbits.
(b) Each orbit is associated with a fixed amount of energy.
(c) The larger the radius of the orbit, the greater is the energy of the electrons in them.
(d) Electrons can move from one orbit to another by gaining or losing a fixed amount of energy.

*or*

Why is atomic number more important than atomic weight in predicting the chemical properties of elements ?

**Ans :**

Atomic number is the number of protons in an atom and during a chemical reaction, the no. of protons remains unchanged. Atomic no. also gives number of electrons. Electrons are present in shell which participate in chemical reactions and decides chemical properties. Whereas atomic weight is the sum of no. of protons and no. of neutrons, so atomic number is more important than atomic weight in predicting the chemical properties of elements.

**21.** (a) The mass of the body on earth is 60 kg, what is its weight on the earth and on moon ?
(b) How is the weight of an object related to its mass ? [3]

**Ans :**

(a) Given,     Mass = 60 kg gravitational

Acceleration in earth $= 10 \text{ m/s}^2$

So, weight of the object in earth,

$$w = mg = 60 \times 10 = 600 \text{ N}$$

Weight of the object in moon,

$$w_m = \frac{w}{6} = \frac{1}{6} \times 600 = 100 \text{ N}$$

(b) Mass defines amount of particles or matter present in an object. The mass remains constant at all the places. Weight defines force of gravity acting on the object. The weight changes from one to another place. The object's weight is calculated by product of the object's mass and acceleration due to gravity at that place. The unit of mass is fundamental unit which is kilogram whereas weight is a derived unit which is Newton.

**22.** Write the main characteristics of mammalia.        [3]

**Ans :**

Characteristics of mamalia :

(a) Mostly terrestrial but found in all types of habitats.

(b) Body is of varied shape divisible into head, neck, trunk and tail.

(c) Skin covered with hair and has sweat glands.

(d) They possess mammary glands that produce milk to nourish the young ones.

(e) Respiratory organs are lungs only.

(f) The heart is four chambered.

**or**

Write some characteristics of angiosperms.

**Ans :**

Characteristics of angiospems :

(a) The angiosperms are the dominant group among the land plants. These are the most common flowering plants.

(b) The angiosperms are seed bearing plants and the seeds are enclosed inside the fruit formed from ovary.

(c) Carpel is similar to as megasporophyll is to gymnosperms, but it differentiated ovary, style and stigma.

(d) The pollen grain is received by the stigma causing pollination.

(e) Ovary develops into fruits and ovules into seeds after the act of fertilisation

**23.** Explain the following :

(a) An object increases its energy when raised through a height.

(b) Why is the work done by a body said to be negative ?

(c) When we push the wall, the wall does not move and no work is done.        [3]

**Ans :**

(a) The potential energy of body increases with height. As potential energy = mgh. As m (mass) and g (gravity) are constant we can say that potential energy is directly proportional to height Hence with increase in height it also increases.

(b) Work done is said to be negative when the displacement produced in the body is in opposite direction to the force applied.

(c) Doing work is a path function and is always done

if the body travels some distance. Expanding energy is different term. You should not get confused between work and energy. Work and heat both are forms of energy. If there is no work in a process but still there is energy expanding, then obviously there must be heat output. This is in fact an in depth topic of thermodynamics. While pushing the wall there is no work done as displacement is zero, but there will be heat output. And tiredness comes because of the internal stress created causing the muscles to react to the action of pushing and fatigue.

**24.** (a) In brief state what happens when

(i) Dry apricot are left for sometimes in pure water and later transferred to sugar solution.

(ii) Rheo leaves are boiled in water first and then a drop of sugar syrup is put on it.

(iii) Golgi apparatus removed from the cell.

(b) Draw a neat and well labelled diagram of a typical prokaryotic cell.        [3]

**Ans :**

(a) (i) Dry apricot will swell up due to endosmosis and when it transferred to sugar solution, they shrink due to exosmosis.

(ii) Cells of Rheo leaves are killed due to boiling so they do not undergo plasmolysis.

(iii) Formation of lysosome, secretory vesicles will stop and biosynthesis of proteins and lipids does not occur.

(b)
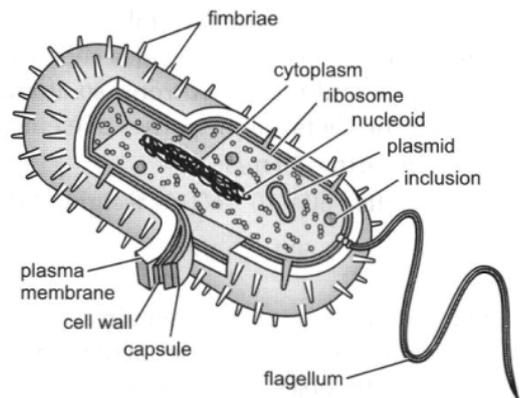


# Section -C

**25.** Sound waves of wavelength A travel from a medium in which its velocity is $v$ m/s into another medium in which velocity is $3v$ m/s. What is the wavelength of the sound in the second medium ?        [5]

**Ans :**

Since,          Velocity = Wavelength $\times$ Frequency

$$v = \lambda \times f$$

$$f = \frac{v}{\lambda}$$

Now, when waves moves from one medium to another, the frequency remains the same.

Now, when velocity in first medium $= v \, \text{m/s}$

And velocity in the second medium $= 3v \, \text{m/s}$

$$\frac{v}{\lambda_1} = \frac{3v}{\lambda_2}$$

$$\lambda_2 = 3\lambda_1$$

The wavelength of the sound in the second medium is three times of the wavelength in the first medium.

**or**

What are wavelength, frequency, time period and amplitude of a wave ?

**Ans :**

**Wavelength :** For a sound wave, the combined length of a compression and an adjacent rarefaction is called its wavelength. Even the distance between centres of two consecutive compressions or two consecutive rarefactions is also equal to wavelength.

**Frequency :** The number of vibrations or oscillations per second is called frequency, i.e. it is the number of complete waves or cycles produced in one second.

**Time period :** The time taken to complete one vibration/oscillation/complete wave is called time period. It is measured in seconds.

**Amplitude :** It is the maximum displacement of the particles of the medium from their mean/ original position at rest.

**26.** Describe an activity to determine the boiling point of water and melting point of ice. [5]

**Ans :**

**Determination of boiling point of water :**
In a beaker take some water and insert a thermometer in it with the help of a clamp. Put the beaker on a tripod stand and heat the apparatus with the help of kerosene burner slowly. Observe what happens to water. You will observe a steady stream of bubbles. This temperature is the boiling point of water.

**Determination of melting point of ice :**
Take crushed ice in a beaker and insert a thermometer in the beaker by hanging it from the clamp of the stand in such a way that the bulb of the thermometer is completely inside the ice. Wait for some time and keep recording the temperature after small intervals of time. Note down the temperature when ice just starts melting. Let the bulb of the thermometer remain in mixture of ice and water for some more time and keep recording the temperature. This temperature is the melting point of ice.
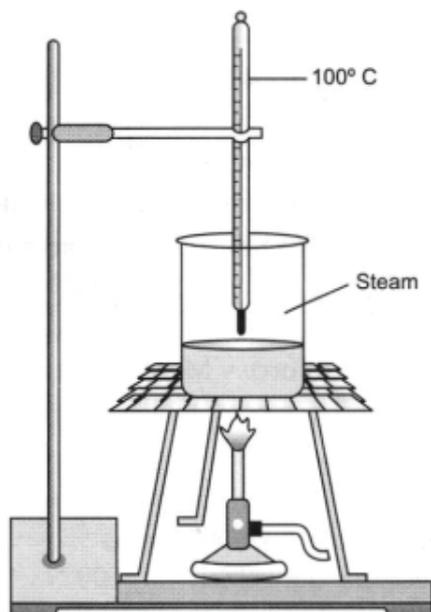


**27.** (a) Mention the role of atmosphere in climate control.
(b) How does the air move to become a wind ? [5]

**Ans :**

(a) The atmosphere covers the earth like a blanket. Since air is a bad conductor of heat, and atmosphere mostly consists of air, it prevents the heat from escaping into the space. The atmosphere keeps the average temperature of the Earth fairly steady during the day and even during the course of the whole year. The atmosphere prevents the sudden increase in temperature during the daylight hours. During the night, it slows down the escape of heat into outer space.

(b) Water vapour is formed due to the heating of water bodies and the activities of living organisms. The atmosphere can be heated by the radiation that is reflected back or re-radiated by the land or water bodies. On being heated, convection currents are set up in the air. The air over land gets heated faster than the air over water bodies. During the day, the air above land gets heated and starts rising. As this air rises, a pressure of low region is formed over the land, and the air over the sea moves to this region of low pressure. This movement of air from one region to the other is the creation of wind.

**or**

Differentiate between acute and chronic diseases and outline their effects on our health.

**Ans :**

(a) **Acute diseases :** Diseases that last for only a short period of time are called acute diseases. For example, we know that common cold lasts for only few days.
**Effects on our health :**
Any disease that causes poor functioning of some part of the body will affect our health. This is because all functions of the body are necessary for being healthy. An acute disease won't have time to have any major effect on our organs. For example, cough or common cold lasts for a week and doesn't have any major effect on our health.

(b) **Chronic diseases :** Diseases that last for a very long time and sometimes even for the complete lifetime are called chronic diseases. For example, an infection causing elephantiasis.
**Effects on our health :**
A chronic disease has a very major effect on the organ or organs that it has been infected upon. Tuberculosis affects the lungs and makes the body weak, which results in weight loss and other kinds of weaknesses.

**28.** A motorcar of mass 1200 kg is moving along a straight line with a uniform velocity of 90 km/h. Its velocity is slowed down to 18 km/h in 4 s by an unbalanced external force. Calculate the acceleration and change in momentum. Also calculate the magnitude of the force required. [5]

**Ans :**

Given, Mass of the motor,

$$m = 1200 \, \text{kg}$$

Initial velocity of the motor car,

$$u = 90 \, \text{km/h} = 25 \, \text{m/s}$$

Final velocity of the motor car,

$$v = 18 \, \text{km/h} = 5 \, \text{m/s}$$

Time takes, $\quad t = 4 \, \text{s}$

According to first equation of motion

$$v = u + at$$
$$5 = 25 + a(4)$$
$$a = -5 \, \text{m/s}^2$$

Negative sign indicates that it's a retarding motion, i.e., velocity is decreasing.

Change in momentum

$$= mv - mu = m(v - u)$$
$$1200\,(5 - 25) = -24000 \frac{\text{kgm}}{\text{s}}$$

Since, $\quad$ Force $=$ Mass $\times$ Acceleration

$$= 1200 \times (-5) = -6000 \, \text{N}$$

Acceleration of the motor

$$= -5 \frac{m}{s^2}$$

Change in momentum of the motor car $= -24000$ kg ms$^{-1}$

Hence, the force required to decrease the velocity is 6000 N.

(Negative sign indicates retardation, decrease in momentum and retarding force)

**29.** What is the relationship between mole, avogadro number and mass ? [5]

**Ans :**

The mole allows scientists to calculate the number of elementary entities (usually atoms or molecules) in a certain mass of a given substance. Avogadro's number is an absolute number: there are 6.022x1023 elementary entities in 1 mole. This can also be written as 6.022x1023 mo1-1. The mass of one mole of a substance is equal to that substance's molecular weight. For example, the mean molecular weight of water is 18.015 atomic mass units (amu), so one mole of water weight 18.015 grams. The chemical changes observed in any reaction involve the rearrangement of billions of atoms. It is impractical to try to count or visualize all these atoms, but scientists need some way to refer to the entire quantity. They also need a way to compare these numbers and relate them to the weights of the substances, which they can measure and observe. The solution is the concept of the mole, which is very important in quantitative chemistry.

**or**

(a) Define the term valency. What is the valency for magnesium and copper ?

(b) What is atomicity? What is the atomicity of phosphorus and nitrogen ?

(c) Calculate the number of molecules of sulphur ($S_8$) present in 16 g of solid sulphur.

**Ans :**

(a) The combining capacity of an element is called it

valency. Valency of magnesium is 2. Valency of copper is 1.

(b) The number of atoms in a molecule of a single element is known as the atomicity. Atomicity of Phosphorous is 4 as it exists as $P_4$ and that of nitrogen is 2 as it is $N_2$.

(c) The molecules formula of sulphur is given to be $S_8$ (it Contains 8 atoms of sulphur). So, the molecular mass of sulphur molecule is $32 \times 8 = 256$ u. This means that 1 mole of sulphur molecules is equal to 256 grams.

Now, 256 g of sulphur $= 1$ mole of sulphur molecules

So, 16 g of sulphur $= \frac{1}{256} \times 16$ mole of sulphur molecules

$= 0.0625$ mole of sulphur molecules

Also, 1 mole of sulphur molecules

$= 6.023 \times 10^{23}$ molecules

So 0.0625 mole of sulphur molecules

$= 6.025 \times 10^{23} \times 0.0625$ molecules

$= 3.76 \times 10^{22}$ molecules.

**30.** Differentiate between vertebrates and invertebrates. [5]

**Ans :**

| S. No | Vertebrates | Invertebrates |
|---|---|---|
| 1. | Internal skeleton is present. | Internal skeleton is absent. |
| 2. | Vertebral column (backbone) is present. | Vertebral column (backbone) is absent. |
| 3. | Two pairs of limbs are present. | Three or more pairs of limbs are present. |
| 4. | A tail is usually present. | A tail is absent. |
| 5. | Body is covered by hair. | Hair is not present. |
| 6. | Nerve cord is dorsally located. | Nerve cord is ventrally located. |