Sample Paper 1 Solutions

Class IX 2022-23

Science (086)

Time: 3 Hours **Max. Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 Objective Type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION-A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20.

1. People sometimes add salt to the water in which eggs are to be boiled. What is the main reason for this?

(a) Adding salt to the water before the egg is cooked makes the egg tastier.

(b) Adding salt to the water increases its boiling point and cooks the egg better.

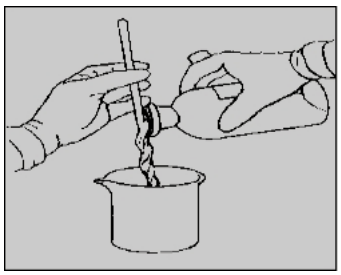
(c) Adding salt to the water reduces the water temperature cooking the egg faster.

(d) Adding salt to the water kills micro organisms making the egg safer to eat.

Ans : (b) Adding salt to the water increases its boiling point and cooks the egg better.

Salt is added to the water when boiling eggs as the addition of salt or other non-volatile solid help in reducing the vapour pressure of the liquid. Which in turn increases, the boiling point i.e the temperature at which the vapour pressure equals the atmospheric pressure. Hence, this helps the water to attain a temperature higher than before starting to boil. This phenomenon helps cook and hard boil the egg quicker as the addition of salt has increased the boiling point of water.

2. Glass rod are generally used to stir liquid chemicals because :



(a) It provides controlled agitation to the reaction.

(b) It does not react with chemicals in the solution.

(c) It has a rounded ends to support proper stirring.

(d) All of the above

Ans : (d) All of the above

A glass rod, stirring rod or stir rod is a piece of laboratory equipment used to mix chemicals and

liquids for laboratory purposes. They are usually made of solid glass, about the thickness and slightly longer than a drinking straw, with rounded ends.
Since glass is a non-crystalline amorphous solid and is silica-based it does not react with chemicals in solution. Also, we can control the agitation as we ourselves stir the solution using glass rod.

3. The carbon atom forms a part of all the major molecules found in living things. Which of the following does not contain carbon?

(a) DNA
(b) HCl
(c) Plastics
(d) Diesel

Ans : (b) HCl

Hydrogen chloride is a diatomic molecule, consisting of a hydrogen atom H and a chlorine atom Cl connected by a polar covalent bond. The chlorine atom is much more electronegative than the hydrogen atom, which makes this bond polar.
Hence, it is not contain carbon compound.

4. In 1911, the physicist Ernest Rutherford discovered that atoms have tiny, dense nuclei by shooting positively charged particles at a very thin gold foil, Which physical property of gold was used by Rutherford in his gold leaf experiment?
(a) non corrosive
(b) highly malleable
(c) highly ductile
(d) non reactive

Ans : (b) highly malleable

Rutherford used gold for his scattering experiment because gold is the most malleable metal and he wanted the thinnest layer possible. The gold-sheet used was around 1000 atoms thick. Therefore Rutherford selected gold foil in his alpha scattering experiment.

5. Food is converted to energy in-
(a) Chloroplast (b) Nucleus
(c) Mitochondria (d) Vacuole

Ans : (c) Mitochondria

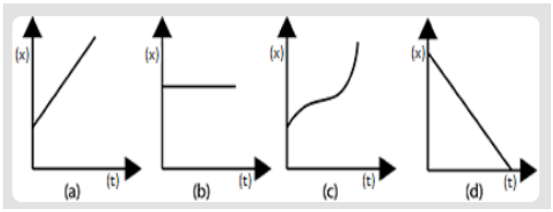
Mitochondria are the sites of cellular respiration. They bring about the stepwise oxidation of food to release energy. The released energy is used for various energy-requiring activities inside the cell. Thus, they are also known as the powerhouses of a cell.
Chloroplasts are present in plant cells. The pigment chlorophyll present inside the chloroplast helps in the synthesis of food, by the process called photosynthesis.
The nucleus is the main control centre of the cell, which regulates the activities of the cell. It contains genes which are the units of inheritance.
Therefore the option (c) correct.

6. Cell theory states that all organisms are made up of one or more similar units of organization called cells. Which of the following organisms do not strictly adhere to this theory?
(a) protozoa
(b) bacteria
(c) viruses
(d) algae

Ans : (c) viruses

Even though viruses are considered to be living organisms, they are not made up of cells and lack cell organelles present in cells. Therefore, viruses form the exception to the cell theory.

7. The figure shows four graphs of displacement (x) versus time (t),the graph that shows a constant ,positive and non-zero velocity is



(a) A
(b) B
(c) C
(d) D

Ans : (a)

When an object travels equal distances in equal intervals of time, it moves with uniform speed. This shows that the distance travelled by the object is directly proportional to the time taken. Thus, for uniform speed, a graph of distance travelled against time is a straight line.
Graph (a)- The graph is a straight line and displacement is increasing with increasing time. Therefore, velocity is uniform (constant), increasing (positive), and non-zero.
Graph (b)- The graph is a straight line but displacement is constant with increasing time. Therefore, velocity is zero.
Graph (c)- The graph is a not straight line. Therefore, velocity is non-uniform and non-zero.
Graph (d)- The graph is a straight line and displacement is decreasing with increasing time. Therefore, velocity is uniform (constant), decreasing (negative), and non-zero.

8. A force of 12N gives an object an acceleration of $4\,\text{m/s}^2$.The force required to give it an acceleration of $10\,\text{m/s}^2$ is
(a) 15N
(b) 20N
(c) 25N
(d) 30N

Ans : (b) 30N

As we know that,

$$F = ma$$
$$m = \frac{F}{a}$$
$$= \frac{12}{4} = 3\,\text{m/s}^2$$

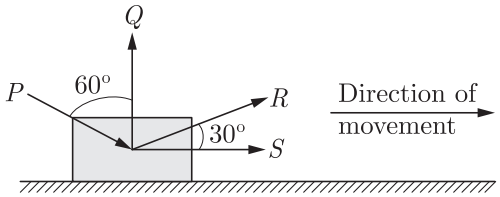
Again, $F = ma = 10 \times 3 = 30\,\text{m/s}^2$

9. When an object is thrown upward, the force of gravity is
(a) opposite to the direction of motion
(b) in the same direction as the direction of motion
(c) becomes zero at the highest point
(d) increases as it rises up

Ans : (a) opposite to the direction of motion

When an object is thrown upwards, the force of gravity acts in the direction opposite to that of motion.

10. Four forces of equal magnitude are acting on an object as shown in figure. Which of the following forces does the least work?

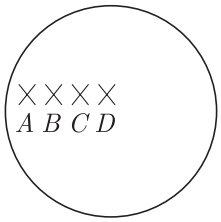


(a) P (b) Q
(c) R (d) S

Ans : (b) Q

There is no work done when the force and the displacement are perpendicular to each other.
The maximum work is done when the force applied is parallel to the direction of movement.

11. A man sings in a circular room. At which position will he hear himself the loudest?

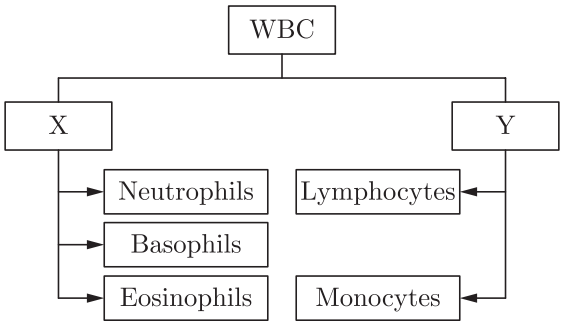


(a) A (b) B
(c) C (d) D

Ans : (d) D

When the man makes a sound at the centre of the circular room, the sound will travel in all directions and reflect back to the centre after striking the wall. The man at the centre of the room will receive strong echoes concurrently.

12. Identify X and Y in the given flow chart.



(a) X-Erythrocytes, Y-Leucocytes
(b) X-Granulocytes, Y-Granulophils
(c) X-Granulocytes, Y-Agranulocytes
(d) X-Agranulophils, Y-Granulocytes

Ans : (c) X-Granulocytes, Y-Agranulocytes

Granulocytes are a type of white blood cell that has small granules. These granules contain proteins. The specific types of granulocytes are neutrophils, eosinophils, and basophils.
Agranulocytes are white blood cells that hove no distinct granules in their cytoplasm. The two types of white blood cells found in blood are granulocytes and agranulocytes.

13. A student mixed a small amount of iron filings and sulphur powder in a dish. He could not affect the separation by simple hand-picking. Which liquid will you suggest to affect the separation?
(a) Carbon disulphide (b) Cold water
(c) Boiling water (d) Kerosene

Ans : (a) Carbon disulphide

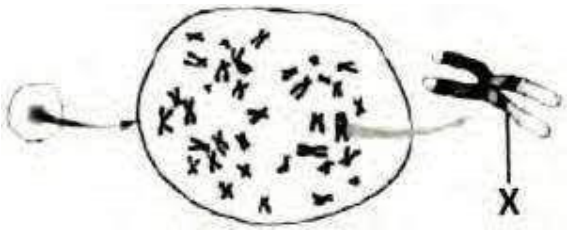
Sulphur is soluble in carbon disulphide while iron filings remain insoluble. Hence, the sulphur will go into solution leaving behind iron filings.

14. A sample of pure water, irrespective of its source contains 11.1% hydrogen and 88.9% oxygen. The data supports
(a) law of constant proportions
(b) law of conservation of mass
(c) law of reciprocal proportions
(d) law of multiple proportions

Ans : (a) law of constant proportions

Water obtained from any source contains hydrogen and oxygen in the same proportion by mass. Hence, the data supports the law of constant proportions.

15. The diagram below shows a magnified view of a particular part of a human cell. Name the part labelled X.



(a) Ribosome (b) Chromosome
(c) Nucleoplasm (d) Mitochondrion

Ans : (b) Chromosome

The part labelled as X in the diagram is chromosome. Chromosomes are thread-like structures located inside the nucleus of animal and plant cells.

16. Which of the following helps in increasing the width and the girth of the plants?
(a) Apical meristem (b) Lateral meristem
(c) Intercalary (d) Permanent tissue

Ans : (b) Lateral meristem

Lateral meristem brings about the outward growth of plant by increasing its width and girth. Outward growth result in thickness of the plant.

Question no. 17 to 20 are Assertion-Reasoning based questions.

17. **Assertion :** An object may have acceleration even if it is moving with uniform velocity.
Reason : An object may be moving with uniform velocity but it may be changing its direction of motion.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.

The uniform motion only means that the object is moving at a constant speed but its direction of motion may be changing at in the case of uniform circular motion. Hence, acceleration is produced in uniform motion due to changes in velocity.

18. **Assertion :** A rocket works on the principle of conservation of linear momentum.
Reason : For two bodies system when there is a change in momentum of one body, the same change occurs in the momentum of the second body but in the opposite direction.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.

As the fuel in rocket undergoes combustion, the gases so produced leave the body of the rocket with large velocity and give upthrust to the rocket. If we assume that the fuel is burnt at a constant rate, then the rate of change of momentum of the rocket will be constant. As more and more fuel gets burnt, the mass of the rocket goes on decreasing and it leads to increase of the velocity of rocket more and more rapidly.

19. **Assertion :** An object floats if it displaces an amount of liquid whose weight is greater than the actual weight of the object.
Reason : During floatation an object experiences no net force in the downward direction.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true.

Ans : (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

Net force = real weight − upthrust (weight of the liquid displaced).
The object rises above the liquid surface to an extent that the weight of the liquid displaced by the part of the object. Thus, an object will float when upward thrust is greater than its actual weight. (The density of the object must be less than the density of the liquid).

20. **Assertion :** A light body and heavy body have same momentum. Then they also have same kinetic energy.
Reason : Kinetic energy depends on mass of the body.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true.

Ans : (d) Assertion is false but reason is true.

Kinetic energy of a body of mass m_1,

$$k_1 = \frac{1}{2}mv_1^2 = \frac{p_1^2}{2m_1}$$

Again, kinetic energy of a body of mass m_2,

$$k_2 = \frac{1}{2}m_2v_2^2 = \frac{p_2^2}{2m_2}$$

If $p_1 = p_2$, $\frac{K_1}{K_2} = \frac{m_2}{m_1}$

As given $m_2 > m_1$
Therefore, $K_1 > K_2$ i.e. the kinetic energy of light body will be more than the kinetic energy of heavy body when both have same momentum.

SECTION-B

Question no. 21 to 26 are very short answer questions.

21. How will you separate a mixture of common salt, camphor and iron filings. Describe the process.

Ans :

Mixture of common salt, camphor and iron filings :
(i) Magnet is passed over the mixture several times. Iron filings get attached to the magnet and are separated.
(ii) Camphor is separated from the salt by sublimation. Camphor is collected as sublimate and common salt is separated as residue.

or

How can you test the purity of a given substance ?

Ans :

A pure substance always has the same taste, colour or texture at particular temperature and pressure and fixed melting or boiling point. For example : Pure water boils at 100°C but if it has some impurities then water boils at a temperature above 100°C.

22. Write the postulate given by the Indian philosopher Maharishi Kanad.

Ans :

Indian philosopher Maharishi Kanad postulated if we divide matter we will get smaller and smaller particles. He said that a time will come when we come across smallest particles beyond which further division will not be possible.

23. What is lacking in a virus which makes it dependant on a living cell to multiply?

Ans :

Viruses look selectively permeable process membrane and cell organelles. Thus, they lack a basic structural organization to perform various life processes effectively and in their own way. After entering in a living cell, a virus utilizes its own genetic material and machinery of host cell to multiply.

24. How can a person lie on a bed of nails without getting hurt as shown in the figure?

Ans :

Weight is spread out over them all making the pressure on each individual nail just about equal to a pinch if there are many nails. The greater the number of nails the lesser will be the pressure per square inch. If there are a large number of nails, it will be almost like lying on a solid surface.

25. Give two practical applications of the reflection of sound waves.

Ans :

(i) In stethoscope the sound of patient's heartbeat reaches the doctor's ears by multiple reflections in the tubes.
(ii) Megaphones are designed to send sound waves in particular direction are based on the reflection of sound.

or

What is a stethoscope? Name the principle on which a stethoscope works.

Ans :

Stethoscope is a medical instrument used for listening sounds produced within the body, chiefly in the heart or lungs. Stethoscope works on the principle of multiple reflection of sound.

26. What are the major group of activities involved for improving of crop yields?

Ans :

(i) Crop variety improvement
(ii) Crop production improvement
(iii) Crop protection improvement

SECTION-C

Question no. 27 to 33 are short answer questions.

27. Is it not proper to regard the gaseous state of ammonia as vapours ? Explain.

Ans :

The gaseous state of a substance can be regarded as vapours only in case it is a liquid at room temperature. Since ammonia is a gas at room temperature, its gaseous state cannot be regarded as vapours.
Naphthalene is volatile solid and has a tendency to sublime. So, it changes into vapours completely, thus disappear into the air and no solid is left.

28. Give some examples where the property : malleability and ductility of metals are used in our life.

Ans :

Malleability means that metals can be hammered into sheets and foils. For example : Aluminium foils are used for wrapping food stuffs, silver foils are used for decorative purposes for sweets and fruits.
Ductility means that metals can be drawn into wires. Example : Gold and silver wires are used in ornaments, aluminium and copper wires are used for conduction of electric current.

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


Ans :

The cell wall present in fungi and bacteria permits these cells to resist very dilute external medium without bursting. Water is taken up by osmosis. Hence, cells swell and build 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 resist much greater changes in the surrounding medium than animal cells.

or

Describe the role played by the lysosomes. Why are these termed as suicidal bags?

Ans :

Functions of lysosomes :

1. Extracellular digestion. Sometimes lysosome enzymes are released outside the cell to break down extracellular material.
2. Digestion of foreign material. Lysosome also destroys any foreign material which enters inside the cell such as bacteria.
3. Cellular digestion. In damaged cells, ageing cells or dead cells lysosomes get ruptured and enzymes are released. These enzymes digest their own cell.

Lysosomes contain about 40 hydrolytic enzymes. When the cell gets damaged, lysosomes burst and their enzymes digest their own cell. So, lysosomes are called 'suicide bags'.

30. What are characteristic structural features of meristematic cells?

Ans :

Meristematic cells have :

1. Thin cell walls.
2. Abundant or dense cytoplasm and single large nucleus.
3. Spherical, oval, polygonal or rectangular shape.
4. No intercellular spaces between them.
5. Either no vacuoles at all or few vacuoles.

31. Why is the motion in a circle at constant speed called accelerated motion?

Ans :

When a body moves along a circular path with a constant speed, its direction of motion at any point is along the tangent to the circle at that point, this motion called accelerated motion. The direction of motion changes as the body moves in a circle and causes a change in the velocity. Therefore, the motion of an object along a circular path is an accelerated motion.

32. Distinguish between work, energy and power. State the SI units for each of these quantities.

Ans :

Work : It is defined as the product of force applied and the distance moved by the body on the application of the force. In SI unit it is measured in joule.
Energy : It is defined as the capacity of a body to do work. In SI unit it is measured in joule.
Power : It is defined as the rate of doing work. It measures how fast or slow the work is done. In SI unit it is measured in watt unit.

or

(i) What is a closed system?
(ii) State the law of conservation of energy.

Ans :

(i) A system that does not interact with another is a closed system. Energy in a closed system is neither taken out of it nor taken in from outside. However, energy transformation may occur inside a closed system.
(ii) The law of conservation of energy states that "the energy can neither be created nor destroyed, but can be transformed from one form to another. In other words, the total energy of a closed system remains constant. Therefore, whenever one from of energy disappear, an equivalent amount of another form appears.

33. How moths of certain families are able to escape captures from bats? What is the range of frequencies associated with :
(a) infrasound?
(b) ultrasound?

Ans :

They have very sensitive hearing equipment, that can hear the squeaks (ultrasound) of bat and know when a bat is flying nearby.
(a) Less than 20 Hz.
(b) More than 20,000 Hz.

SECTION-D

Question no. 34 to 36 are Long answer questions.

34. Write down the difference between isotopes and isobars.

Ans :

The difference between isotopes and isobars are following :

	Isotopes	**Isobars**
1.	They are atoms of same element.	They are atoms of different elements.
2.	Have same atomic number.	Have different atomic number.
3.	Have different mass number.	Have same mass number.
4.	Have similar chemical properties.	Have different chemical properties.

or

An element $_{12}X^{24}$ loses two electrons to form a cation which combines with the anion of element $_{17}Y^{35}$ formed by gaining an electron.

(i) Write the electronic configuration of element X.

(ii) Write the electronic configuration of the anion of element Y.

(iii) Write the formula for the compound formed by combination of X and Y.

Ans :

(i) X = 2, 8, 2

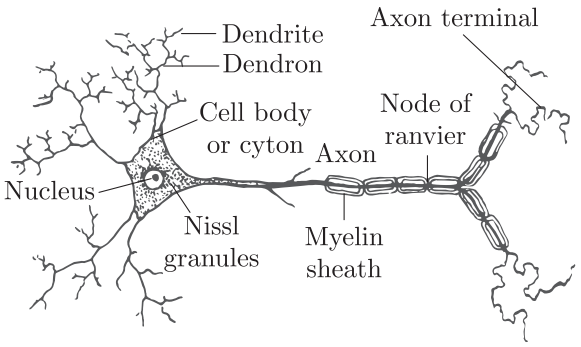
(ii) Y = 2, 8, 8

(iii) XY_2

35. Explain the structure of a nervous tissue with details about its location and function.

Ans :

Structure : It consists of nerve cells joined end to end. A nerve cell has a cell body with cytoplasm and nucleus. From that, long and thin hair like structure arise. Every neuron has one long part known as the axon, and many short and small branched structures known as dendrite. A single nerve cell is known as a neuron and sometimes may even be a metre long.



Location : Nervous tissue is found in spinal cord, brain and nerves.

Function : Nervous tissues are a specialized cell that does the function of exchanging information. Nervous tissues transmit and receive stimuli from one organ to another organ in the body and allow moving muscles and react to stimuli.

or

Explain plant tissue in detail.

Ans :

Plant tissue is mainly divided into two categories :

(i) Meristematic tissue

(ii) Permanent tissue

Meristematic tissue : The cells divide very fast. It helps in the growth of the plants. The shape of the cell is oval, round and polygonal. There is no intercellular space. There are three types of meristematic tissues :

(i) Apical meristem : Growth in length

(ii) Lateral meristem : Growth in breadth or thickness

(iii) Intercalary meristem : Growth in inter-nodes

Permanent tissue : When meristematic tissue stops dividing and gets mature, then it forms permanent tissue. There are two types of permanent tissues :

(a) Simple tissue

(b) Complex tissue

(i) **Simple Tissue :** Simple tissues are same in structure and perform the same functions. There are three types of simple tissues :

(a) Parenchyma : It is present in soft parts.

(b) Collenchyma : It provides mechanical strength to plants and is found in stalks.

(c) Sclerenchyma : It provides support as well as flexibility to plants.

(ii) **Complex Tissue :** They are different in structure but perform the same function in group. There are two types of complex tissues :

(a) Xylem : It transports water from roots to shoot in plants.

(b) Phloem : Transports foods to all parts of the plant.

36. Write a paragraph in your own words on each of the following.
(a) Preparation of soil,
(b) Sowing,
(c) Weeding,
(d) Threshing

Ans :

(a) **Preparation of soil :** Preparation of soil is the first step of farming. Soil is loosened and turned over. This helps in making the soil more airy so that roots can breathe in air. Moreover, loosening of soil also facilitates better penetration of roots into the soil. Seeds can be easily sown in loosened soil.

(b) **Sowing :** The method of putting the seeds into soil is called sowing. Traditionally, seed is sown manually by spreading the seeds by hands. This process is called broadcasting. Seed drills are used when sowing needs to be done on a large scale.

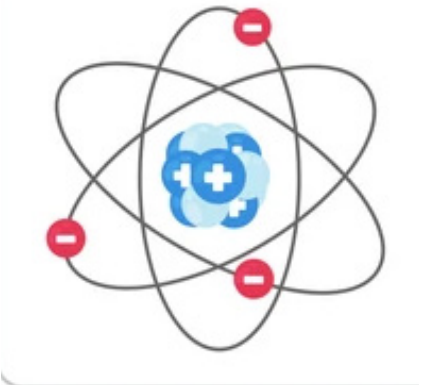
(c) **Weeding :** Removal of weeds is called weeding. Unwanted plants which grow along with the crop are called weeds. They compete for resources; like sunlight, water and air; with the main crop. So, it is necessary to remove weeds for proper growth of crops. Weeding is usually done manually by using hands and sickles. Sometimes weedicides are also sprayed.

(d) **Threshing :** Separation of grains from harvested stems is called threshing. For smaller quantity, threshing is done by hands. For somewhat bigger quantity, threshing is done using animal; especially bullocks. Animals are made to trample over the harvested stock which helps in separation of grains. Threshing machines are used for bigger quantities

SECTION-E

Question no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. The theory proposed in the year 1803 considered the atom to be the smallest indivisible constituent of all matter. The Dalton's theory could explain the law of conservation of mass, law of constant composition and law of multiple proportions known at that time. However, towards the end of nineteenth century, certain experiments showed that an atom is neither the smallest nor indivisible particle of matter as stated by Dalton. It was shown to be made up of even smaller particles. These particles were called electrons, protons and neutrons. The electrons are negatively charged whereas the protons are positively charged. The neutrons on the other hand are uncharged in nature. You will now learn about the discovery of the charged subatomic particles.



(i) Who discovered electron ?
(ii) Which of the partial has a charge of +1 and a mass of 1 amu ?
(iii) Is the mass of electron and proton equal?
(iv) Who discovered protons?

or

(v) Which subatomic particle is present in the nucleus of an atom?

Ans :

(i) J. J. Thomson
(ii) The mass of a proton is taken as one unit and its charge as plus one.
(iii) No,Mass of an electron is approximately 1/1837 times that of mass of proton.
(iv) E. Goldstein discovered the presence of new radiations in a gas discharge and called them canal rays. These rays were positively charged radiations which ultimately led to the discovery of sub-atomic particle proton.

or

(v) Protons, neutrons and electrons are known as sub-atomic particles. The nucleus of an atom contains protons and neutrons. A proton has a relative charge of +1. A neutron has a relative charge of 0.

38. It is necessary for both plants and animals to perform the necessary life processes for their survival. Division of labour with their body has helped to reduce the workload from a single cell. It increases the cell efficiency and ensures greater organization within the body of an organism. Hence organism can easily survive in the given or changing surrounding conditions.
However, the structure of plant and animal tissues is quite different. This is largely because of the functions they perform and type of external environment they are subjected to. For example, plants are not as mobile as animals. They are fixed at a place. So they require less energy than animals. But they do require supportive tissues which provide mechanical strength to the body of the plant and require less or no energy (i.e., they are made of dead cells). Animals, on the other hand, have more complex structural organization as compared to plants.
Plants grow indefinitely for their whole life while animals grow upto a given period of time. Growth of plants occurs due to the presence of meristematic tissues in root and shoot apex. However, in animals, growth of body is quite uniform and proportionate to all body parts. Hence animals don't possess any growing and non growing regions in their body.
(i) Which meristem helps in increasing the girth??
(ii) Which tissues provides flexibility and mechanical support to the plant organs?
(iii) When parenchyma containing air cavities are called?
(iv) What is the wall of sclerenchyma cells made up of?

or

(v) Which types of cells is most likely to divide?

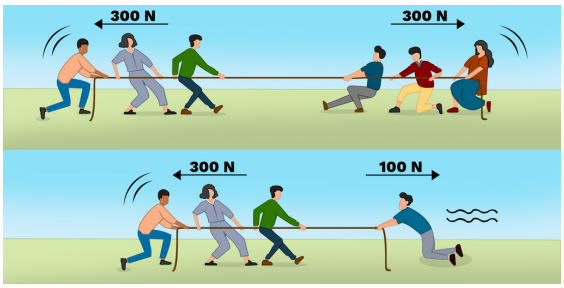
Ans :

(i) Lateral meristem consists of initials which divide mainly in one plane and cause the organ to increase in diameter and girth. The lateral meristem usually occurs on the sides both in stem and root.
(ii) Collenchyma is a living tissue of primary body. The cells are thin-walled but possess thickenings of cellulose and pectic substances at the corners where number of cells join together. The tissue provides flexibility to soft aerial parts (e.g., leaves, young stems) of plant so that they can bend without breaking. The cells are compact and the intercellular spaces are absent.
(iii) In aquatic plants (hydrophytes) large air cavities are present in the parenchymatous tissue. These cavities store gases and provide buoyancy to aquatic plants to help them float. Such parenchyma are called aerenchyma.
(iv) Sclerenchyma consists of thick-walled dead cells. These cells have hard and extremely thick secondary walls due to uniform deposition of lignin.

or

(v) Meristems are the sites or regions within the plant body where formation of new meristematic cells takes place. For example, root and shoot tips.

39. When two or more forces act simultaneously on a body in same or different direction then the overall effect of these forces on the body is known as resultant force. In other words, resultant force is that force which would produce the same effect on the body as that produced by a number of forces acting simultaneously on the same body.
When the resultant of a number of forces acting simultaneously on an object is non-zero, then the forces are said to be unbalanced forces.



Unbalanced forces can change the state of rest, state of uniform motion, speed or direction of a body. When the resultant of a number of forces acting simultaneously on an object is zero, then the forces are said to be balanced forces. For example, in the game of tug of war, when both the teams exert equal force on the rope in opposite direction, the rope does not move at all. This is because, forces of equal magnitude, acting in opposite direction, cancel each other's effect. Hence the forces are balanced forces. The balanced forces do not cause any effect on the body, except change in shape and size of the body. You can compress a balloon or stretch a rubber band by exerting equal and opposite forces by both your hands. In case of rolling of a chapati, reaction force exerted by the surface on which chapati is rolled, is equal and opposite to that exerted by rolling pin, so that shape and size of chapati can be varied.
(i) Can balanced forces deform a body?
(ii) Can balanced forces accelerate a body?
(iii) What are the effects of unbalanced force?

or

(iv) Can balanced forces have any effect on a body?

Ans :

(i) Balanced force is a set of forces acting on a body produce no acceleration on it, but they can deform it.

(ii) An object having balanced forces definitely cannot be accelerating. This means that it could be at rest and staying at rest (one option) or could be in motion at constant velocity

(iii) An unbalanced force causes the object on which it is acting to accelerate, changing its position, speed, or direction due to unequal forces on the same side.

or

(iv) Balanced forces can only cause a change in the shape of a body.

□□□□□□□