

# 3

# Sample Paper Solved

विज्ञान

SCIENCE

Time allowed 3 hours

Maximum Marks: 80

**General Instructions:** Same instruction as given in the Sample Paper 1.

## SECTION - A

20 Marks

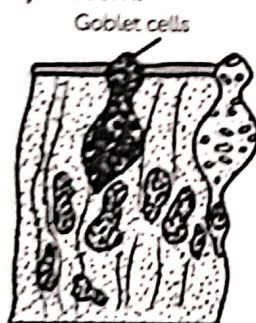
(Select and write the most appropriate option out of the four options given for each of the questions 1 – 20. There is no negative mark for incorrect response.)

1. A few substances are arranged in the increasing order of 'forces of attraction' between their particles. Which one of the following represents a correct arrangement?

(a) Water < Air < Wind  
(b) Air < Sugar < Oil  
(c) Oxygen < Water < Sugar  
(d) Salt < Juice < Air

1

2. The image shows the structure of a specialised epithelium.



What will be the likely function of this epithelium?

(a) Secretion of substances  
(b) Protection from wear and tear  
(c) Restrict movement of the tissue  
(d) Transport of substances across permeable surface

1

3. Four trucks having weight 2000 kg, 1100 kg, 800 kg and 700 kg running on the same speed of 80 kilometre per hour are under the same identical condition on the highway. If due to fog all the trucks are hit

from behind with the same force and they continued to move forward, the maximum acceleration will be produced in:

(a) 2000 kg (b) 1100 kg  
(c) 800 kg (d) 700 kg

1

4. An object weighing 5 N in air, weighs 4.5 N in a liquid. The buoyant force experienced by the object is:

(a) 1.5 N (b) 4.5 N  
(c) 0.5 N (d) 1.5 N

1

5. A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years, the nail will:

(a) move downwards  
(b) move upwards  
(c) remain at the same position  
(d) move sideways

1

6. Crests and troughs are not formed in which type of waves:

(I) Transverse waves  
(II) Longitudinal waves  
(III) Electromagnetic waves  
(IV) Sound waves

Options:

(a) (I) and (II) (b) (I) and (III)  
(c) (II) and (IV) (d) All of these

1





7. A batsman hits a cricket ball which then rolls on a level ground. After covering a short distance, the ball comes to rest. The ball slows to a stop because:

- (a) the batsman did not hit the ball hard enough.
- (b) velocity is proportional to the force exerted on the ball.
- (c) there is a force on the ball opposing the motion.
- (d) there is no unbalanced force on the ball, so the ball would want to come to rest. 1

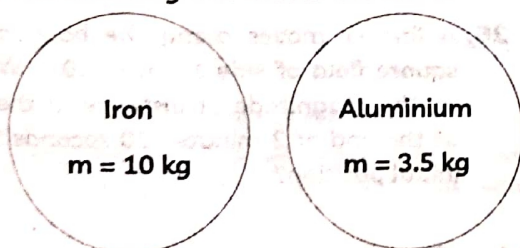
8. What is found in the fluid part of blood after removal of corpuscles?

- (a) Plasma (b) Lymph
- (c) Platelets (d) WBC 1

9. Electrons, protons, and neutrons are sub-atomic particles of an atom. An element's isotopes have similar chemical properties but different atomic weights. As a result, they are more than likely to get the:

- (a) same number of electrons, protons, and neutrons
- (b) electrons and neutrons have the same number; protons have a different number
- (c) protons and neutrons have the same number; electrons have a different number
- (d) electrons and protons have the same number; neutrons have a different number 1

10. Given below are two spheres. Both spheres are dropped simultaneously from a tower. When they are 10 m above the ground, which of the following will remain the same?



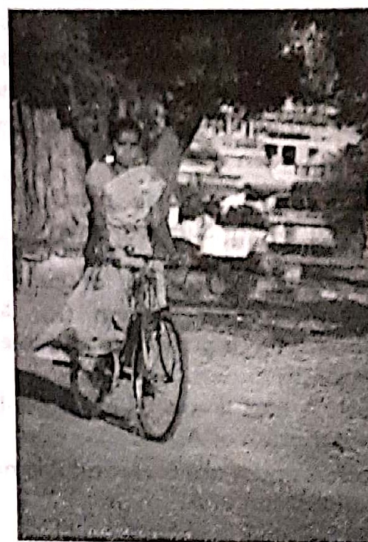
(Both has same diameter)

- (a) Acceleration (b) Momenta
- (c) Potential energy (d) Kinetic energy 1

11. Calcium has atomic mass 40 and atomic number 20. Argon has atomic mass 40 and atomic number 18. Calcium and argon are examples of:

- (a) Isobars (b) Isotopes
- (c) Isotone (d) None of these 1

12. Kajal was cycling. The cycle stops after sometime when she stops pedalling.



She got confused as the situation does not follow Newton's first law of motion. What makes the cycle stop?

- (I) Frictional force
- (II) Gravitational force
- (III) Inertia
- (IV) Heat
- (V) Air resistance

Select the correct option:

- (a) (I) and (III) (b) (I) and (V)
- (c) (I), (II) and (III) (d) (I), (III) and (V) 1

13. A body is falling from a height of  $h$ . After it has fallen a height,  $h/2$  it will possess:

- (a) only potential energy
- (b) only kinetic energy
- (c) half potential and half kinetic energy
- (d) more kinetic and less potential energy 1

14. The mass of a molecule is defined as:

- (a) when comparing the mass of one molecule of any material to the mass of one atom of C-12.
- (b) one atom's mass in comparison to a hydrogen atom's mass.
- (c) mass of a molecule compared to mass of an atom.
- (d) all of the above 1

15. When a ship floats in sea water:

- (a) the weight of water displaced is larger to the ship's weight
- (b) the weight of water displaced is less than the ship's weight
- (c) the weight of water displaced is equal to the ship's weight
- (d) it displaces no water. 1





16. Choose the wrong statement.

- (a) The nature of the matrix differs according to the function of the tissue.
- (b) Fats are stored below the skin and in between the internal organs.
- (c) Epithelial tissues have intercellular spaces between them.
- (d) Cells of striated muscles are multinucleated and unbranched. 1

Q. No 17 to 20 consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, and R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

17. Assertion (A): When a few drops of dettol are poured in water, it dissolves

fully in water changing the colour and smell of the entire solution.

Reason (R): Particles of dettol diffuse into water when added. 1

18. Assertion (A): Chromoplasts are green coloured plastids.

Reason (R): Chromoplasts provide colour to flowers and fruits that attract pollinators and disseminators. 1

19. Assertion (A): Fungicides and pesticides increase crop output.

Reason (R): Manure and fertilizers produce chemicals that improve soil fertility. 1

20. Assertion (A): It is impossible to transfer protons from one atom to another.

Reason (R): Protons are found deep within the nucleus of the atom. 1

## SECTION - B

12 Marks

(Q. no. 21 to 26 are very short answer questions.)

21. (A) Salt can be recovered from its solution by evaporation. Suggest some other technique for the same.

(B) Calculate the concentration of solution which contains 5.5 g of sugar dissolved in 55 g of water. 2

22. (A) A person takes a concentrated solution of salt, after sometime, he starts vomiting. What is the phenomenon responsible for such a situation? Explain.

(B) How are chromatin, chromatid and chromosomes related to each other? 2

23. In terms of cattle feed, how do roughage and concentrates differ from one another?

OR

What is a GM crop? Name any one crop which is grown in India. 2

24. Why is it advised to tie any luggage kept on the roof of a bus with a rope?

OR

While taking a baby to the park, the mother ties the ball to the rod of the child's pram. She moves the pram towards the left. In which direction the ball will try to move? 2

25. Why did Rutherford select a gold foil in his alpha-ray scattering experiment? 2

26. A farmer moves along the boundary of a square field of side 10 m in 40 s. What will be the magnitude of distance of the farmer at the end of 2 minutes 20 seconds from his initial position? 2

## SECTION - C

21 Marks

(Q. no. 27 to 33 are short answer questions.)

27. On heating, calcium carbonate breaks down into calcium oxide and carbon dioxide.

(A) Is this a physical or a chemical change?

(B) Can you prepare one acidic and one basic solution by using the products formed in the above process? If so, write the chemical equation involved. 3

28. Differentiate between meristematic and permanent tissue. 3

29. (A) Why should preventive methods and biological control methods be preferred for protecting crops?





(B) Name the farming system in which only such above mentioned methods are followed.

(C) How does manure improve the soil structure of sandy and clayey soil? 3

30. (A) If an object covers 12 m in 6 seconds, 6 m in 4 seconds, 4 m in 4 seconds and 14 m in 6 seconds. Find the average speed of the object.

(B) A body is thrown vertically upwards such that it reaches a maximum height  $h$ . Then it returns to its original position on the ground. Calculate:

(i) distance (ii) displacement. 3

31. (A) What is the significance of pores present on the nuclear membrane?

(B) In biology practical class, the teacher asked Renuka and Sahil to keep onion peel and RBC in two different beakers of hypotonic solution. What would be observed by both the students? 3

32. In a small house, there are six bulbs of 100 W and two fans of 60-watt. Two ACs of 2 kW which are operated for 4 hours every day.

Calculate the following:

(A) total power consumed every day

(B) total power utilised in 30 days

(C) total electrical energy consumed in 30 days. 3

33. (A) As we know protons are positively charged particles and positively charged particles repel each other. But in atoms they stay together. Justify your answer by giving a suitable reason.

(B) How to make an atom charged?

(C) The isotopes of oxygen given as  $O^{16}$ ,  $O^{17}$ ,  $O^{18}$  are present in the ratio 15%, 50%, 35% respectively. What will be the average atomic mass of oxygen?

OR

(A) The valency of magnesium is 2, not 6. Explain.

(B) On the basis of Thomson's model of an atom, explain how the atom is neutral as a whole.

(C) Write the name and symbol of the particle chosen by Rutherford for the bombardment against the gold foil in his experiment. 3

## SECTION - D

15 Marks

(Q. no. 34 to 36 are long answer questions.)

34.

Element	Atomic Mass	Molecular Mass	Atomicity
Carbon	12	y	1
Oxygen	16	32	2
Sulphur	32	x	8
Chlorine	z	71	2

(A) (i) Find the value of y and z from the given table.

(ii) What are molecules made up of?

(iii) Atomic mass of Sulphur is 32 and atomicity is 8. Calculate the value of x.

(B) Write down the formula of Aluminium oxide.

(C) What is the valency of nitrogen in  $NH_3$ ?

OR

(A) Analysis revealed 0.056 g of boron and 0.169 g of oxygen in a 0.36 g sample of oxygen and boron compound. Determine the compound's weight-based percentage composition.

(B) Carbon dioxide is made up of molecules that each have one carbon atom covalently double bonded to two oxygen atoms. Calculate the molecular mass of  $CO_2$ .

(C) What is the formula mass of any compound? 5

35. (A) Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?

(B) What happens when plasma membrane of a cell breaks down?

(C) What happens when Rheo leaves are first boiled in water and then dipped in sugar syrup?

OR

(A) Sachin was helping his mother in laying the table when they had some guest for dinner. Sachin was about to sprinkle salt on salad for dressing. His mother stopped him from doing so and told him that it is too early to sprinkle salt on the salad, he should do so only when they are seated for having the dinner.





- (i) What would happen if salt is sprinkled on the salad?
- (ii) Which property of cells is seen in adding salt to it?
- (iii) What value of Sachin is seen?

(B) Gaurav's mother wanted to use some eggs for incubation. Gaurav helped his mother in separating rotten and spilt eggs from the good ones. He took a bucket of water to separate them.

- (i) How can one separate the rotten eggs from the good ones using water?
- (ii) What is the egg shell made up of?
- (iii) What value of Gaurav is seen in this act?

5

36. Two objects of masses  $m_1$  and  $m_2$  having the same size are dropped simultaneously from heights  $h_1$  and  $h_2$  respectively. Find out the ratio of time they would take in reaching the ground. Will this ratio remain the same if:

- (i) one of the objects is hollow and the other one is solid
- (ii) both of them are hollow, size remaining the same in each case?

Give a reason.

OR

(A) When rahul puts a fresh egg into a beaker with water, it sinks. Then he dissolved a lot of salt in water, the egg began to rise and started floating. Give reason for the same.

(B) In Shreya's home, guests arrived. She observed that when a guest is taking rest, the depression in the cushion is less whereas after sometime she saw that child while playing, stood on cushion and depression is more. She asked her teacher what's the reason behind this.



5

## SECTION - E

12 Marks

(Q. 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. Ankita was travelling by bus to her hometown. She saw a lot of trees and plants with flowers blooming on them on her way. When she observed them carefully, the pattern of growth was different in different types of plants, some had a thick trunk with profuse branches while others had soft green stems with less branching. Some trees were tall while the others were short.

After returning from her trip, Ankita discussed this strange pattern of growth of different plants with her teacher. Her teacher taught her about the pattern of growth in various types of plant tissues.

(A) (i) Plants have certain specific areas of growth while animals do not have clearly demarcated areas of growth. Justify the statement by giving a suitable reason.

(ii) Which property does the meristematic tissue have that results in growth of the plants?

2

(B) (i) Which tissue is responsible for the growth of new branches in plants?

(ii) Tissue A and tissue B constitute tissue C. A carries water, while B carries food for the plants. Identify the tissues A, B and C.

OR

(B) (i) Which structure protects the plant body against the invasion of parasites?

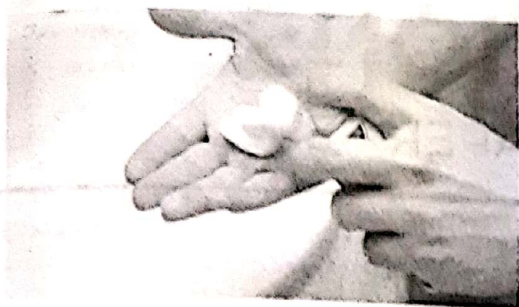
(ii) During a visit to the lake-side, Ritik saw water hyacinth floating on the surface of water. He was surprised to see plants floating on the surface without roots anchored to soil and asked the reason behind it. What can be the reason for floating of such plants on water?

2

38. Rahul observed that his father is shaving using shaving cream in the morning while going to office. He makes a mound of the shaving cream and it maintains its shape without a container. In another incident, he saw his brother was playing with sand, pouring it from one cup to another. He got confused by seeing this as he was told sand is solid but it was flowing very easily.







- (A) How does the shaving cream maintain its shape without container? 1
- (B) Arrange the following in increasing order of intermolecular space.  
Shaving foam, Orange juice, Iodine crystals, Water vapours. 1
- (C) Is sand liquid or solid? Explain.

OR

- (C) While pouring hot water from a jug to a tumbler, the jug accidentally slipped from Poonam's mother's hand and steam of water severely burned her hand. Immediately her father applied ice on the

affected area. Shreya was observing the whole scenario. Next day, she asked her teacher why water as ice has a cooling effect whereas, water as steam causes severe burns? 2

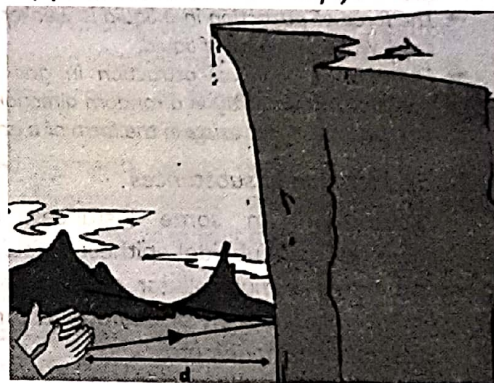
39. Lata, while visiting London, attended an opera performance. Its architecture and furnishings appealed to her. The draperies, cushions, and curtains on the curved ceiling were all arranged correctly. Behind the stage, she noticed a sound board. She was now curious as to whether each of these decorations was placed for the benefit of the hall's aesthetics or for a scientific cause.

- (A) In an opera house, what are the functions of curtains, pillows, and draperies? 1
- (B) What are the benefits of the curved ceiling and sound board? 1
- (C) Write the difference between echo and reverberation.

OR

- (C) Sneha clapped her hand near a cliff and heard the echo after 4 s.

(Speed of sound = 346 m/s)



- (i) What is the total distance covered by sound? 2
- (ii) Define echo.

