

### 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)

✓ Find out the correct sentences.

- (I) Hybridisation means crossing between genetically dissimilar plants.
- (II) Cross between two varieties is called interspecific hybridisation.
- (III) Introducing genes of the desired character into a plant gives genetically modified crops.
- (IV) Cross between plants of two species is called intervarietal hybridisation.

Options:

- (a) (I) and (III)                      (b) (II) and (IV)
- (c) (II) and (III)                    (d) (III) and (IV)

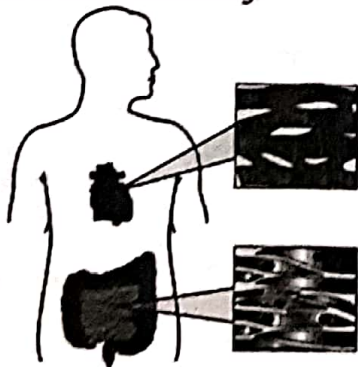
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2. The shape of which of the following substances is not fixed:

- (a) Iron nail and glass of water
- (b) Glass of water and beaker containing nitrogen
- (c) Iron nail and beaker containing nitrogen
- (d) Glass of water and beaker containing ice

1

3. The image shows the structure of two types of muscles that are present in two different locations in the human body.



Based on their location, what can be concluded about their function?

- (a) Both the muscles protect body organs.
- (b) Both the muscles show voluntary movements.
- (c) Both the muscles help in movement of body.
- (d) Both the muscles show involuntary movements.

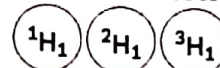
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4. If the cell is placed in a hypotonic solution, water will move ..... the cell, causing it to .....

- (a) into, swell
- (b) out of, shrink
- (c) in and out of the cell, stay the same
- (d) water will not move at all

1

5. Hydrogen exists in three isotopic forms,



Why are all the isotopes neutral in nature?

- (a) All isotopes are electrically neutral because neutrons are neutral in nature.
- (b) All isotopes are neutral since they have one electron and one proton.
- (c) All isotopes are neutral since they have one proton and one neutron.
- (d) As the number of protons in an isotope increases, it becomes neutral.

1

6. If the mass of object is doubled but the force acting on the object is same. How will acceleration change?

- (a) Acceleration gets doubled
- (b) Acceleration becomes half
- (c) Acceleration remains same
- (d) Cannot be determined

1





7. During a Desert Safari School tour, Rajesh was told by a guide that desert plants have a lower rate of water loss. He was told by his biology teacher that it happens due to the presence of:

- (a) cuticle (b) stomata  
(c) photosynthesis (d) suberin

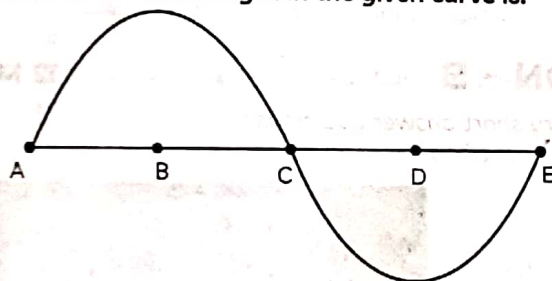
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8. A key of a mechanical piano struck gently and then struck again but much harder this time. In the second case:

- (a) Sound will be louder but pitch will not be different.  
(b) Sound will be louder and pitch will also be higher.  
(c) Sound will be louder but pitch will be lower.  
(d) Both loudness and pitch will remain unaffected.

1

9. Half of the wavelength in the given curve is:



- (a) AC (b) BC  
(c) BD (d) DE

1

10. An object is put one by one in three liquids having different densities  $d_1$ ,  $d_2$  and  $d_3$ . The object floats with  $\frac{1}{9}$ ,  $\frac{2}{11}$  and  $\frac{3}{7}$  of their

volumes outside the liquid surface in liquids of densities respectively. Which of the following statements is correct?

- (a)  $d_1 > d_2 > d_3$  (b)  $d_1 > d_2 < d_3$   
(c)  $d_1 < d_2 > d_3$  (d)  $d_1 < d_2 < d_3$

1

11. What should be the least distance between the reflecting surface and the person, to hear a clear echo at  $20^\circ\text{C}$ .

- (a) 34.4 m (b) 68.8 m  
(c) 8.6 m (d) 17.2 m

1

12. Rita throws the ball vertically upward with velocity 'u'. How high will the ball rise before falling back to the ground?

- (a)  $\frac{u}{g}$  (b)  $\frac{u^2}{2g}$   
(c)  $\frac{u^2}{g}$  (d)  $\frac{u}{2g}$

1

13. Match the Column-I with Column-II and select the correct option from the following:

Column I	Column II
(A) Matter	(i) Rapid vaporisation of a liquid.
(B) Condensation	(ii) Liquid turns into a solid when its temperature is lowered.
(C) Evaporation	(iii) Water vapour becomes liquid.
(D) Humidity	(iv) Made of small particles.
(E) Freezing	(v) Amount of vapour present in air.

Options:

- (a) (A) - (i), (B) - (iii), (C) - (ii), (D) - (iv), (E) - (v)  
(b) (A) - (iv), (B) - (iii), (C) - (i), (D) - (v), (E) - (ii)  
(c) (A) - (iv), (B) - (iii), (C) - (v), (D) - (ii), (E) - (i)  
(d) (A) - (iii), (B) - (iv), (C) - (v), (D) - (ii), (E) - (i)

1

14. When a mango falls from a mango tree, which of the following is true?

- (a) The mango is only attracted to the Earth.  
(b) The mango is the only thing that draws the Earth.  
(c) The mango and Earth are attracted to each other.  
(d) The mango and Earth opposed each other.

1

15. Meristems are tissues that contains undifferentiated or meristematic cells. Which of the following tissue is responsible for a bamboo stem's rapid extension?

- (a) Lateral meristem  
(b) Intercalary meristem  
(c) Apical meristem  
(d) Cambium

1

16. Meera lives in the hilly areas of Srinagar around 2 km away from her school. Because of the hilly terrain, neither school bus nor any public transport is available to her. Being a studious child, Meera walks to her school daily through hills, crossing a stream, bridges, etc., at an average speed of 4 km/hr.

Find the time taken by Meera to reach her school from home everyday.

- (a) 2 hrs (b) 0.5 hr  
(c) 8 hrs (d) 1 hr

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): Nitrogen has an atomic mass of 14.

Reason (R): Nitrogen atoms are 14 times heavier than carbon-12 atoms of the same mass. 1

18. Assertion (A): On a hot summer day, sound travels faster than on a freezing winter day.

Reason (R): The square of the absolute temperature of sound is directly proportional to its velocity. 1

19. Assertion (A): Robert Hooke discovered cells.

Reason (R): The protoplasm is made up of the nucleoplasm and cytoplasm of a living cell. 1

20. Assertion (A): The displacement-time graph of a body moving uniformly is a straight line.

Reason (R): A body travelling with uniform velocity covers equal distance in equal time intervals of time with changing direction. 1

## SECTION - B

12 Marks

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

21. The common names of the cell organelles have been given below. Identify and also state the reason, why are they called:

(A) Transporting channel of the cell

(B) Control room of the cell 2

22. (A) Why do some elements lose or gain electrons?

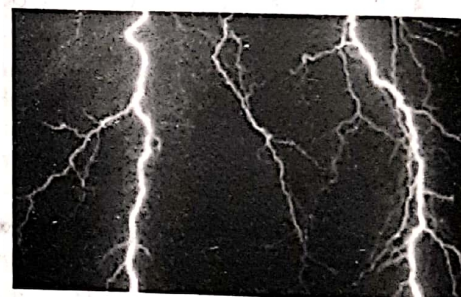
(B) Write the electronic configuration of Phosphorus.

OR

(A) Which parameter is needed for the identification of any element?

(B) In response to a question, a student stated that in an atom, the number of protons is greater than the number of neutrons, which in turn is greater than the number of electrons. Do you agree with the statement? Justify your answer by providing a suitable reason. 2

23. (A) Akash told Drishti that the sound of thunder is preceded by a flash of lightning. Support his view and give response for the same.



(B) What are the applications of ultrasonic waves in medicine? 2

24. Suppose gravity of Earth suddenly becomes zero, then in which direction will the moon begin to move if no other celestial body affects it?

OR

Identical packets are dropped from two aeroplanes, one above the equator and the other above the North Pole, both at same height. Assuming all conditions are identical, will those packets take the same time to reach the surface of Earth? Justify your answer. 2

25. The sea water can be classified as a homogeneous as-well-as a heterogeneous mixture. Comment. 2



26. (A) Density of a wood is  $800 \text{ kg/m}^3$ . Will it float or sink when dipped in a bucket of water? (Density of water =  $1000 \text{ kg/m}^3$ ).

- (B) Give the expression for the inverse square law of gravitation. Why is it called the universal law of gravitation? 2

## SECTION - C

21 Marks

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

27. (A) Hydrogen and oxygen combine in the ratio of 1 : 8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas?

- (B) How many atoms are present in a  
(i)  $\text{H}_2\text{S}$  molecule (ii)  $\text{PO}_4^{3-}$  3

28. Analyse the statements given below and give reasons:

- (A) Mitochondria is called as 'Powerhouse of the cell'.  
(B) Vacuoles acts as storage sacs inside a cell.  
(C) Why lysosomes are called 'Suicidal bags of the cell'? 3

29. State three points of difference between evaporation and boiling.

OR

Differentiate between sol, solution and suspension. 3

30. (A) It is difficult to pull out the husk of a coconut tree. Give reason.



- (B) "Blood is the river of life". Justify the statement. 3

31. (A) What is an ion? What are cations and anions?

- (B) State the law of conservation of mass.

- (C) You are provided with a fine white coloured powder which is either sugar or salt. How would you identify it without tasting? 3



32. A train starting from rest attains a velocity of  $72 \text{ km/h}$  in 5 minutes. Assuming the acceleration is uniform, find:

- (A) the acceleration  
(B) the distance traveled by train for attaining this velocity. 3

33. Which kind of plastid is more common in:

- (A) roots of the plant?  
(B) leaves of the plant?  
(C) flowers and fruits? 3

## SECTION - D

15 Marks

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

34. The nuclei of two atomic elements, A and B, have the following composition:

	A	B
Protons	6	6
Neutrons	6	8

- (A) Give the mass number of A and B.  
(B) What are the similarities and differences between these two species?  
(C) Write the element to which they belong.

- (D) Write its electronic configuration.

OR

- (A) Show diagrammatically the electron distribution in a sodium atom and sodium ion. Also give their atomic number.  
(B) The average atomic mass of a sample of an element Y is  $12.2 \text{ u}$ . What are the percentages of isotopes  $^{12}_6\text{Y}$  and  $^{14}_6\text{Y}$  in the sample? 5

Sample Paper 2



41





35. (A) A light and a heavy object have the same momentum. Find out the ratio of their kinetic energies. Which one has a larger kinetic energy?

(B) Evaluate kinetic energy in terms of momentum.

OR

(A) During motion, the object's total kinetic and potential energy would be constant throughout. In other words, mechanical energy is defined as potential energy plus kinetic energy equaling a constant. State law of conservation of energy.

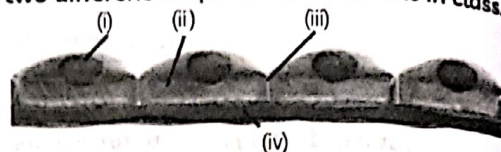
(B) In hydroelectric power plant which energy conversion happens?

(C) Which of the energy conversion takes place when ball drops from height? 5

36. Differentiate between sclerenchyma and parenchyma tissues. Draw a well-labelled diagram.

OR

A teacher shows a type of animal tissue in two different shapes to the students in class.



Study the given picture carefully and answer the questions that follows:

- (A) Which animal tissue is represented in the above figure?  
 (B) Label (i) to (iv).  
 (C) Describe tissue and write its function.  
 (D) What are the different types of epithelial tissue? 5

## SECTION - E

12 Marks

(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. Teacher divided the class into four groups and asked them to make a group chain according to her instruction. The first group will hold each other from the back and lock arms like Idu-Mishmi dancers as in figure.



The second group will hold hands to form a human chain.



The third group will form a chain by touching each other with only their fingertips.



Now, the fourth group of students should run around and try to break the three human chains one by one into as many small groups as possible.

- (A) (i) Name the following groups in form of state of matter.  
 (ii) Which state of matter has strong inter-molecular force between the particles? 2

- (B) (i) Which group was the easiest to break? Why?  
 (ii) We can easily move our hand in air, but to do the same through a solid block of wood, we need a karate expert. Why?

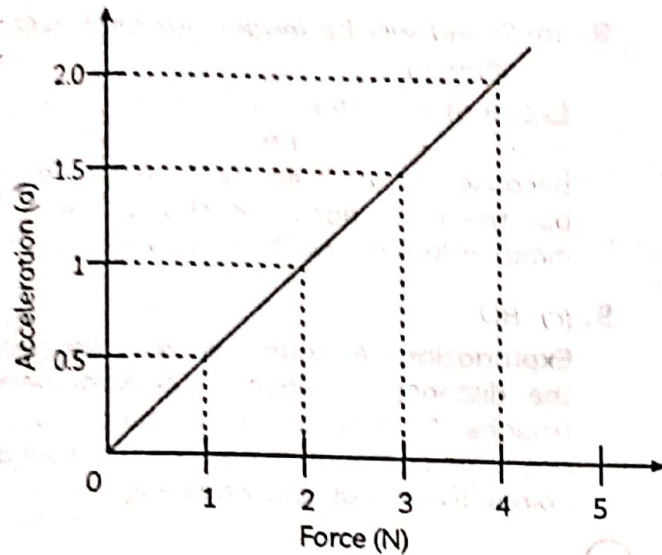
OR

- (B) Give reason for the following:  
 (i) Cooling occurs due to evaporation.  
 (ii) The evaporation rate of the aqueous solution decreases as the humidity rises. 2

38. Yogesh measures the acceleration of the Volvo using an apparatus. The result is obtained as shown in the acceleration-force graph. It is known that the more is force applied to an object, the more is its acceleration. Acceleration is proportional to force, as may be demonstrated experimentally. It may also be demonstrated that the greater the object's mass, the lower is its acceleration for the same force. The force must rise in proportion to the mass to obtain the same acceleration.







- (A) Calculate the mass of Volvo from the given graph. 1
- (B) If the force applied on the Volvo is doubled and acceleration is halved. What is the ratio of mass? 1
- (C) What happens to the momentum of a body if its speed is doubled? Define momentum.

OR

- (C) A man, 30 yrs old, was travelling by train. As the station was about to arrive, he jumped out of the train and got injured. The whole scenario was witnessed by a girl. She asked her teacher why the man got injured when he jumped off the moving train. 2

**39.** Animal protein for our meals can be found at low cost in fish. The finned real fish as well as invertebrates like prawns and molluscs are all produced as fish. Fish can be obtained in two different methods. One comes from catching fish, a type of natural resource. The other method is cultural fishery, or fish farming. The fish's water source can be either fresh or saltwater, like those found in ponds and rivers. Fish can thus be caught or raised in freshwater and marine ecosystems for use in fishing. Fish are occasionally raised in water in paddy fields when a rice crop is also being cultivated there. Composite fish culture techniques enable more intense fish farming. In such systems, fish species which are both domestic and imported are utilised.

- (A) Define Blue Revolution. 1
- (B) What is aquaculture? 1
- (C) Mention one merit and one demerit of the fish culture system.

OR

- (C) (i) Give examples of fish reared in culture fisheries in India. 2
- (ii) What is animal husbandry? 2