# BRAIN INTERNATIONAL SCHOOL
## Class IX
## Session 2024-25
## Subject - Science
## Sample Question Paper-1

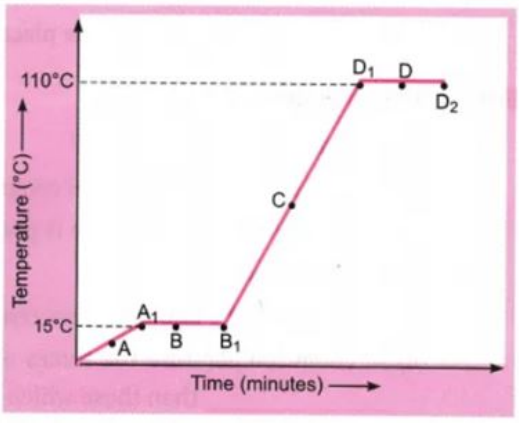
**Time Allowed: 3 hours** **Maximum Marks: 80**

**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**

1. The temperature-time graph given alongside shows the heating curve for pure wax. **[1]**




What is the melting point of the substance?

a) 110°C b) 90°C

c) 9°C d) 15°C

2. Which of the following acts as a garbage disposal system of the cell? **[1]**

a) Vacuole b) Lysosome

c) Peroxisome d) Golgi body

3. In which of the following cases of motion, the distance moved and the magnitude of displacement are equal? **[1]**

a) The earth is revolving around the Sun
b) The pendulum is moving to and fro
c) A car is moving on a straight road
d) A car is moving in a circular path

4. Which of one of the following nutrients is not available in fertilisers. **[1]**

a) Iron
b) Potassium
c) Nitrogen
d) Phosphorous

5. Rhythmic contraction and relaxation throughout life, are shown by **[1]**

a) epithelium of lungs
b) striated muscles of tongue
c) striated muscles of limbs
d) cardiac muscles of heart

6. Which among the following is concerned with the synthesis and transport of lipids within the cell? **[1]**

a) Smooth endoplasmic reticulum
b) Lysosomes
c) Rough endoplasmic reticulum
d) Golgi apparatus

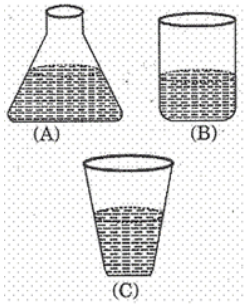
7. Symbol of Iron is:- **[1]**

a) Ir
b) Fe
c) Mg
d) I

8. Branched involuntary muscles fibres are found in **[1]**

a) ureters
b) limbs
c) heart
d) tongue

9. Three students used three different containers (A) (B) and (C) of different shapes, for finding the loss in weight of solid when dipped in water. On dipping a solid sphere in these containers they would observe that the loss in weight is: **[1]**




a) Minimum in [A]
b) Maximum in [A]
c) Maximum in [B]
d) Same in all

10. A ball is dropped onto the floor from a height of 20 m. It rebounds to a height of 10 m. If the ball is in contact with the floor for 0.1 seconds, what is the average acceleration during contact? **[1]**

a) $142\ m\ s^{-2}$
b) $338\ m\ s^{-2}$
c) $564\ m\ s^{-2}$
d) $285\ m\ s^{-2}$

11. A compound of carbon, hydrogen and nitrogen contains these elements in the ratio 9 : 1 : 3.5. If its molecular mass is 108, what is the molecular formula? **[1]**

a) $C_2HN_2$
b) $C_2H_2N$
c) $C_6H_8N_2$
d) $C_3H_4N$

12. The tissue shown in the given figure is **[1]**

a) Angular collenchyma, in which wall thickenings are present at the angles

b) Xylem vessel that forms long channels for conduction of water and minerals

c) Phloem parenchyma with abundant food reserve

d) Scierenchyma, in which uniform wall thickenings are present

13. In the plant cells, many substances important for life are stored in: **[1]**

a) plastids

b) lysosomes

c) mitochondria

d) vacuoles

14. To prepare iron sulphide, by heating a mixture of iron filings and sulphur powder, we should use a: **[1]**

a) copper dish

b) china dish

c) watch glass

d) petri dish

15. Which will not give a stable solution even when stirred for sometimes? **[1]**

a) Milk in water

b) Common salt in water

c) Egg albumin in water

d) Sugar in water

16. Induced breeding is used to increase the production of **[1]**

a) poultry birds

b) draught animals

c) cows

d) fish

17. **Assertion (A):** The speedometer of an automobile measure the average speed of the automobile. **[1]**
**Reason (R):** Average velocity is equal to total displacement per total time-taken.

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

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

c) A is true but R is false.

d) A is false but R is true.

18. **Assertion (A):** It is easier to cook food at high altitudes. **[1]**
**Reason (R):** The boiling point of water decreases at high altitudes.

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

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

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** 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 is still present there. **[1]**

**Reason (R):** The girth of the stem or root increases due to apical meristem (cambium).

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

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

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Isotopes are electrically neutral. **[1]**

**Reason (R):** Isotopes are species with same mass number but different atomic numbers.

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

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

c) A is true but R is false.

d) A is false but R is true.

## Section B

21. Write an expression for the kinetic energy of an object. **[2]**

OR

Write an expression for the work done when a force is acting on an object in the direction of its displacement.

22. The mass per unit volume of a substance is known as density ( density = mass/volume). Arrange the following in order of increasing density:Air, exhaust from chimneys, honey, water, chalk, cotton and iron. **[2]**

23. A ship sends out an ultrasound that returns from the seabed and is detected after 3.42 s. If the speed of ultrasound through seawater is 1531 m/s, what is the distance of the seabed from the ship? **[2]**

24. How will you demonstrate that air contains water vapours? **[2]**

25. Give a few examples of Newton's third law of motion. **[2]**

OR

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

26. Explain Thomson's model of an a atom **[2]**

+

## Section C

27. i. Which characteristic of sound helps to identify your friend by his voice while sitting with others in a dark room? **[3]**

ii. State the relationship between frequency and time period of a wave. The wavelength of vibrations produced on the surface of the water is 4 cm. If the wave velocity is 20 m/s find the frequency and Time period.

28. Justify the statement, 'Protons are constituents of all atoms'. **[3]**

29. A driver of a car travelling at 52 km $h^{-1}$applies the brakes and accelerates uniformly in the opposite direction. **[3]**

The car stops in 5 s. Another driver going at 3 km $h^{-1}$ in another car applies his brakes slowly and stops in 10 s. On the same graph paper, plot the speed versus time graphs for the two cars. Which of the two cars travelled farther after the brakes were applied?

OR

Two cars A and B are moving along a straight line. Car A is moving at a speed of 80 Km/h while car B is moving at a speed 50 Km/h in the same direction. Find the magnitude and direction of:

(a) the relative velocity of car A with respect to B

(b) The relative velocity of car B with respect to A.

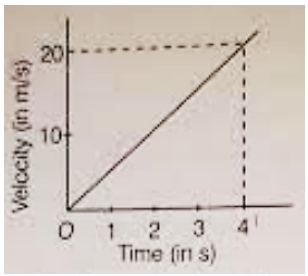
30. Ram's family was worried about heavy electricity bills to be paid. Their neighbour Mohan suggested some easy and effective steps to reduce the same. Next month's bill came as a relief to Ram, as the consumption of electricity had reduced by 50 units and so had the bill. **[3]**

a. In what other aspects of life can this situation help?

b. What is the unit of energy?

c. Write any three steps that you think Mohan might have suggested to Ram.

31. The velocity-time graph of a ball moving on the surface of the floor is as shown in the figure. Calculate the force acting on the ball, if mass of the ball is 100 g. **[3]**




32. What is prokaryotic cell? Differentiate between prokaryotic cell & eukaryotic cell? **[3]**

OR

If you are provided with some vegetables to cook, we generally add salt to the vegetables during cooking process. After adding salt, vegetables releases water. What mechanism is responsible for this?

33. Diagrammatically show the difference amongst three types of muscle fibres. **[3]**

**Section D**

34. The weight of any person on the moon is about 1/6 times that on the earth. He can lift a mass of 15 kg on the earth. What will be the maximum mass, which can be lifted by the same force applied by the person on the moon? **[5]**

OR

What are the differences between the mass of the object and its weight?

35. Draw a well-labeled diagram of a eukaryotic nucleus. How is it different from the nucleoid? **[5]**

OR

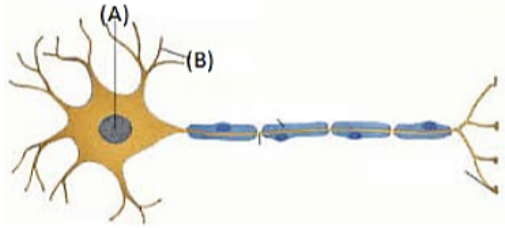
Draw a neat labelled diagram of an animal cell.

36. Iron filings and sulphur were mixed together and divided into two parts, A and B. Part A was heated strongly while part B was not heated. Dilute hydrochloric acid was added to both the parts and evolution of gas was seen in both the cases. How will you identify the gases evolved? **[5]**

**Section E**

37. **Read the following text carefully and answer the questions that follow:** **[4]**

Given below is the diagram of the human nerve cell.




i. Label the part (A) and (B). (1)

ii. What is the function of nervous tissue? (1)

iii. Mention all part of the human body composed of nervous tissue. (2)

**OR**

What enables the animal to move rapidly in response to stimuli? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

Poultry is the rearing of domesticated fowl (chicken), ducks, geese, turkey and some varieties of pigeon for their meat and eggs. Poultry birds are of two types that is broilers and layers. One is specialized meat-producing poultry birds while other is egg-laying poultry birds. The tremendous rise in the availability of poultry products is called Silver Revolution.

i. What is the meaning of layers regarding poultry? (1)

ii. There are different breeds of hens, so give some information about broiler. (1)

iii. We know that different types of revolution regarding animal husbandry. So, what is the silver revolution explain? (2)

**OR**

There are different breeds of poultry birds, mention two examples of indigenous and exotic breeds of poultry birds. (2)

39. **Read the following text carefully and answer the questions that follow:** **[4]**

Homogeneous mixtures are regarded as solutions or true solutions. Heterogeneous mixtures are of two types. These are suspensions and colloidal solutions. These differ in the size of the particles responsible for the difference in their properties. In a suspension, the particle size is more than $10^{-5}$ cm whereas in a colloidal solution, it ranges between $10^{-5}$ cm to $10^{-7}$ cm. The two phases which constitute colloidal solutions, are dispersed phase and dispersion medium. Based upon their nature, the colloidal solutions are classified into eight types. The mixture of the non-reacting gases is always homogeneous irrespective of their nature. Therefore, it is not a colloidal solution.

i. Scattering of light occurs when a beam of light is passed through Blood. Why? (1)

ii. What is Tyndall effect? (1)

iii. What is called colloidal solution? (2)

**OR**

Give an example of colloidal solution and identified their dispersed phase and dispersion medium? (2)

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Class IX Session 2024-25
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Sample Question Paper-2

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3. Section A consists of 20 objective type questions carrying 1 mark each.
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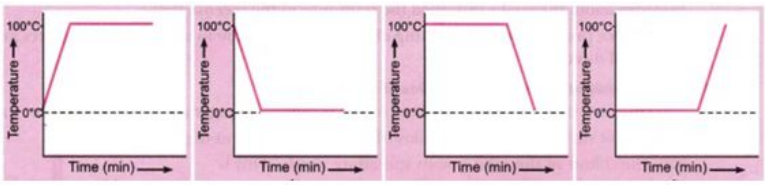
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

**Section A**

1. Ram heats a beaker containing ice and water. He measures the temperature of the content of the beaker as a function of time. Which of the following would correctly represent the result? **[1]**




a) III b) IV

c) I d) II

2. Lysosomes are formed by: **[1]**

a) SER b) Golgi apparatus

c) Plasma membrane d) RER

3. Two identical balls are at rest side by side at the bottom of a hill. Sometime after ball A is kicked up the hill, ball B is given a kick up the hill. Ball A is headed downhill when it passes ball B headed up the hill. At the instant when ball A passes ball B, it has the same **[1]**

a) Position and acceleration as ball B b) Position and velocity as ball B

c) Displacement and velocity as ball B.

d) Velocity and acceleration as ball B

4. Which of the following is micro–nutrient? **[1]**

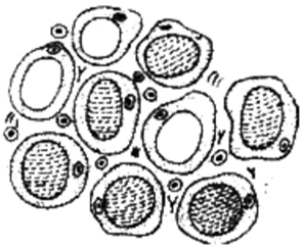
a) Boron

b) Nitrogen

c) Potassium

d) Phosphorus

5. The tissue shown here is _____. **[1]**



a) Adipose tissue

b) Striated muscle tissue

c) Ciliated columnar epithelial tissue

d) Areolar tissue

6. Rough endoplasmic reticulum helps in the synthesis of: **[1]**

a) steroids

b) proteins

c) starch

d) glycogen

7. Which of the following elements are present in Quick lime? **[1]**

A. Calcium, Oxygen

B. Sodium, Hydrogen, Oxygen

C. Calcium, Bromine

D. Calcium chloride

a) (B)

b) (D)

c) (C)

d) (A)

8. You are viewing a prepared slide of striated muscle fibres from a cockroach leg. When you focus the microscope, the striations appear pale and indistinct. To make the stations clearly visible, you would: **[1]**

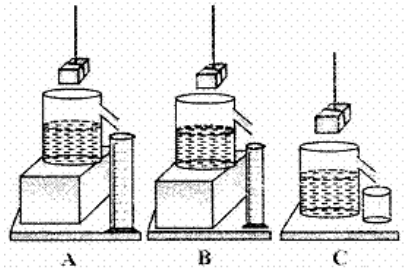
a) remove the mirror to cut out light

b) change the eyepiece to increase magnification

c) replace the objective to decrease the magnification

d) slowly close the diaphragm to reduce the light

9. Three students A, B and C determined the volume of a solid by immersing it in water in the overflow cans are set up as shown. The result obtained will be wrong for : **[1]**




a) Student A

b) All of these

c) Student B

d) Student C

10. Which of the following is the characteristic of displacement of an object? **[1]**

a) Displacement has only magnitude and no specific direction

b) The magnitude of the displacement is greater than the distance travelled by a moving object

c) Displacement has magnitude as well as specific direction

d) Displacement cannot be zero

11. Which of the given pairs of atoms contain(s) the same number of neutrons? **[1]**

i. $^{114}_{48}Cd$ and $^{119}_{50}Sn$

ii. $^{59}_{27}Co$ and $^{59}_{28}Ni$

iii. $^{113}_{55}Cs$ and $^{132}_{54}Xe$

iv. $^{63}_{29}Cu$ and $^{65}_{29}Cu$

a) iii only

b) iv only

c) i and iv only

d) i and III only

12. Choose the chemical compound with which the specimen is temporarily mounted. **[1]**

a) Water

b) Glycerine

c) Alcohol

d) Salt solution

13. Amoeba acquires its food through**:** **[1]**

a) Exocytosis & Endocytosis

b) Exocytosis

c) Plasmolysis

d) Endocytosis

14. Which of the following are physical changes? **[1]**

i. Melting of iron metal

ii. Rusting of iron

iii. Bending of an iron rod

iv. Drawing a wire of iron metal

a) (i), (ii) and (iii)

b) (ii), (iii) and (iv)

c) (i), (ii) and (iv)

d) (i), (iii) and (iv)

15. Which one of the following will form a translucent solution in water? **[1]**

a) Soil

b) Sand

c) Starch

d) Sugar

16. The poultry birds groomed for obtaining meat are called _____ **[1]**

a) Pork

b) Growers

c) Broilers

d) Poultry

17. **Assertion (A):** The speed of the car is constant, its velocity is not constant because the direction of the car is changing continuously. **[1]**

**Reason (R):** The direction of velocity is the same as the direction of displacement of the body.

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

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

c) A is true but R is false.

d) A is false but R is true.

18. **Assertion (A):** During evaporation of liquids, the temperature remains unaffected. **[1]**

**Reason (R):** Kinetic energy of the molecules is directly proportional to absolute temperature.

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

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

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** Vascular or conductive tissue is a distinctive feature of complex plants. **[1]**

**Reason (R):** Vascular tissue has made survival of complex plants possible in the terrestrial environments.

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

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

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Isobars are identical in chemical properties. **[1]**

**Reason (R):** Isobars have same atomic number.

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

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

c) A is true but R is false.

d) A is false but R is true.

## Section B

21. If the power of a motor is 40 kW, at what speed can it raise a load of 20,000 N? **[2]**

OR

Calculate the work done in lifting 200 kg of a mass through a vertical distance of 6 m. Assume g = 10 $m/s^2$.

22. When heat is being supplied to a solid, then what does the heat energy do to the particles of solid? **[2]**

23. When a sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound production remains the same. Do you hear echo sound on a hotter day? **[2]**

24. Why are gases highly compressible? **[2]**

25. Describe balanced forces with the help of two examples. **[2]**

OR

A javelin throw is marked foul if an athlete crosses over the line marked for throw. Explain why the athletes often fall to stop themselves before the line.

26. Explain why chlorine, whether as the element or its compounds, always has a relative atomic mass of about 35.5. **[2]**

## Section C

27. How do stethoscope and megaphone work on the principle of multiple reflections of sound? **[3]**

28. The following data represents the distribution of electrons, protons and neutrons in atoms of four elements A, B, C, D. **[3]**

| Element | Protons | Neutrons | Electrons |
|---|---|---|---|
| A | 10 | 10 | 10 |
| B | 11 | 12 | 11 |
| C | 12 | 12 | 12 |
| D | 13 | 14 | 13 |

Solve the following questions.

i. Write the electronic distribution of atoms of elements A and D.

ii. Element A is an inert gas. Why?

iii. What is the valency of element C?

29. An electron moving with a velocity of $5 \times 10^4$ $ms^{-1}$ enters into a uniform electric field and acquires a uniform acceleration of $10^4$ $ms^{-2}$ in the direction of its initial motion. **[3]**

i. Calculate the time in which the electron would acquire a velocity double of its initial velocity.

ii. How much distance the electron would cover in this time?

OR

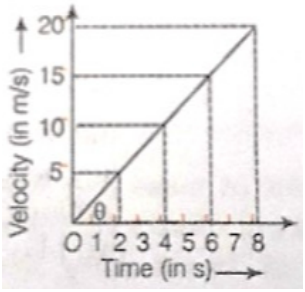
State which of the following situations are possible and give an example for each of these.

(a) An object moving with a constant acceleration but with zero velocity

(b) An object moving in a certain direction with an acceleration in the perpendicular direction.

30. An automobile engine propels a 1,000 kg car A along a levelled road at a speed of 36 km $h^{-1}$. Find the power if the opposing frictional force is 100 N. Now, suppose after travelling a distance of 200 m, this car collides with another stationary car B of same mass and comes to rest. Let its engine also stop at the same time. Now, car B starts moving on the same level road without getting its engine started. Find the speed of the car B just after the collision. **[3]**

31. The motion of a body of mass 5 kg is shown in the velocity-time graph. **[3]**




Find from the graph

i. The acceleration.

ii. The force acting on the body.

iii. The change in momentum of the body in 2 s after the start.

32. Differentiate between hypertonic and hypotonic solution. **[3]**

OR

Differentiate between rough and smooth endoplasmic reticulum. How is the endoplasmic reticulum important for membrane biogenesis?

33. Write a note on the protective tissue in plants. (Give appropriate diagram also). **[3]**

**Section D**

34. From a cliff of 49 m high, a man drops a stone. One second later, he throws another stone. They both hit the ground at the same time. Find out the speed with which he threw the second stone. **[5]**

OR

Derive an expression for the force of attraction between two bodies and then define gravitational constant.

35. What is membrane biogenesis? How is plasma membrane formed during this process? **[5]**

OR

Write a note on Golgi apparatus and the functions it performs.

36. i. Under which category of mixtures will you classify alloys and why? **[5]**

ii. Whether a solution is always liquid or not. Comment.

iii. Can a solution be heterogeneous?

**Section E**

37. **Read the following text carefully and answer the questions that follow:** **[4]**

A few layers of cells beneath the epidermis are generally simple permanent tissue. Parenchyma is the most common simple permanent tissue. It consists of relatively unspecialized cells with thin cell walls. They are living cells. Collenchyma allows bending of various parts of the plant-like tendrils and stems of climbers without breaking. Sclerenchyma tissue makes the plant hard and stiff. We have seen the husk of a coconut. It is made of sclerenchymatous tissue. They are long and narrow as the walls are thickened due to lignin. The tissue is present in stems, around vascular bundles, in the veins of leaves and in the hard covering of seeds and nuts.

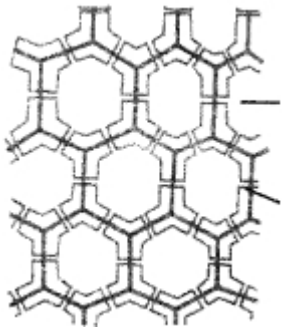

i. The flexibility in plants is due to which tissue? (1)

ii. Is aerenchyma provides mechanical support? (1)

iii. Is apical and intercalary meristems permanent tissue? (2)

**OR**

Menion the function of the tissue which is shown in the below diagram? (2)



38. **Read the following text carefully and answer the questions that follow:** **[4]**

A farmer has grown wheat on his field consecutively two times but when the third time he grows wheat on the same field the quality of the wheat was not up to the desired level. To improve the quality of his crops he uses chemical fertilizer but the condition of the crop became worse. One of his friends told him to grow a different variety of crops after wheat so as to grow two or three crops in a year with good harvests and use biological manure in place of chemical fertilizers which he prepares by animal excreta and plant waste to get the good quality of crops. He also told him about the good storage of his grains to protect them from the biotic and abiotic losses as in agriculture storage losses are very high.

i. What are the bases on which the next crop is decided to grow in the same field also name the process? (1)

ii. What is the advantage of using biological manure over chemical fertilizers? (1)

iii. Is it possible for the farmer to grow two crops at the same time if yes what is the requirement? (2)

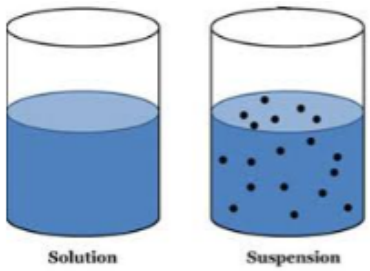
**OR**

Enlist the biotic and abiotic losses? (2)

39. **Read the following text carefully and answer the questions that follow:** **[4]**

A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended

throughout the bulk of the medium. Particles of a suspension are visible to the naked eye. The particles of a suspension scatter a beam of light passing through it and make its path visible. Due to the relatively smaller size of particles, as compared to that of a suspension, the mixture appears to be homogeneous. The scattering of a beam of light is called the Tyndall effect. The components of a colloidal solution are the dispersed phase and the dispersion medium. The solute-like component or the dispersed particles in a colloid form the dispersed phase, and the component in which the dispersed phase is suspended is known as the dispersing medium.




i. Differentiate between Dispersed phase and Dispersion medium? (1)

ii. Differentiate between Homogeneous and Heterogeneous mixture? (1)

iii. What is emulsion? (2)

**OR**

Give an example of solid sol? (2)

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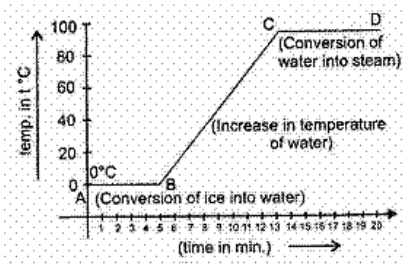
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. 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**

1. The inferences drawn by the temperature versus time graph are **[1]**




A. During the melting, temperature of substance does not change.
B. Temperature rises after all amount of ice melts.
C. At a specific temperature water starts boiling and temperature remains the same during the conversion of water into steam.

Which statement is correct regarding graph?

a) Only (C) is correct
b) All (A), (B) and (C) are correct
c) Only (B) is correct
d) Only (A) is correct

2. The functional units of the Golgi apparatus are: **[1]**

a) cisternae
b) vacuoles
c) vesicles
d) cytoplasm

3. If a moving body comes to rest, then it's acceleration is: **[1]**

a) Negative
b) Positive
c) Constant
d) Zero

4. Bee pasturage refers to **[1]**

a) the flowers available for nectar collection by the bees
b) the trees where bees make the hives
c) the hives where honeybees live and deposit honey
d) the worker bees in a hive, who collect honey

5. Which of the following is not a function of the epidermis? **[1]**

a) Transpiration
b) Conduction of food
c) Exchange of gases
d) Protection

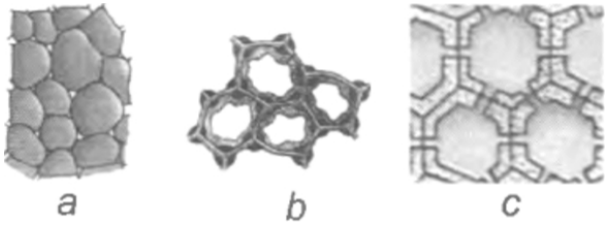
6. The energy currency of the cell is**:** **[1]**

a) AMP
b) GTP
c) ATP
d) ADP

7. The smallest particle of an element is **[1]**

a) Ion
b) Atom
c)Molecule
d) Any of these

8. Observe the given figures of three different plant tissues and select the correct statement. **[1]**




a) Cell walls of a, b and c bear uniform thickening of suberin.
b) a provides mechanical strength to the plant while b and c serve as storage tissues.
c) Cytoplasm is present in cells of a while it is absent in cells of b and c.
d) a and b consist of living cells while c consists of dead cells.

9. In the experiment to establish the relation between loss in weight of an immersed solid with the weight of water displaced by it, the upthrust experience by the object in tap water and in salty water are $U_w$ and $U_s$ respectively, then : **[1]**

a) $U_w < U_s$
b) $U_w > U_s$
c) $U_w = U_s$
d) $U_s = 2U_w$

10. A train starts from a station P and travels some distance with a uniform acceleration $a_1$, then it goes with uniform retardation $a_2$ for some more distance and come to rest at the station Q. If the distance between the stations P and Q is 4 km and the train takes 4 minutes to complete this journey, then $\frac{1}{a_1} + \frac{1}{a_2}$ = **[1]**

a)
b)

$4\ m^{-1}S^2$ $2\ m^{-1}\ S^2$

c) $72\ m^{-1}\ S^2$ d) $7.2\ m^{-1}\ S^2$

11. Which of the following are isotopes and which are isobars? **[1]**
Argon (Ar), Deuterium (D), Calcium (Ca), Tritium (T), Protium (P)

a) Ar, Ca are isotopes and D, T, P are isobars b) D, P are isotopes

c) Ar, Ca are isobars and D, T, P are isotopes d) Ar, P, T are isobars

12. Which is the most widely distributed connective tissue? **[1]**

a) Blood b) Lymph

c) Adipose connective tissue d) Areolar connective tissue

13. Lysosomes arises from **[1]**

a) Nucleus b) Golgi apparatus

c) Endoplasmic reticulum d) Mitochondria

14. Which one of the following will result in the formation of a mixture? **[1]**

a) Breaking of ice cubes into small pieces b) Adding sodium metal to water

c) Agitating a detergent with water in a washing machine d) Crushing of a marble tile into small particles

15. The particles of the colloidal solution are: **[1]**

a) visible with a powerful microscope b) not visible with a powerful microscope

c) visible with the naked eye d) visible with a simple microscope

16. Using fertilizers in farming is an example of **[1]**

a) High cost production b) Low cost production

c) Moderate cost production d) No cost production

17. **Assertion (A):** If a particle is moving with constant velocity, then the average velocity for any time interval is equal to instantaneous velocity. **[1]**
**Reason (R):** If average velocity of a particle moving on a straight line is zero for a given time interval, then instantaneous velocity at some instant within this interval may be zero.

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

c) A is true but R is false. d) A is false but R is true.

18. **Assertion (A):** An iron almirah is a solid at room temperature. **[1]**
**Reason (R):** Water can flow and it assumes the shape of the containing vessel.

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

c) A is true but R is false. d) A is false but R is true.

19. **Assertion (A):** Parenchyma tissue consists of relatively unspecialized cells with thin cell walls and is usually loosely packed. **[1]**

**Reason (R):** They do not have spaces between them.

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

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

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Cathode rays get deflected towards the positive plate of electric field. **[1]**

**Reason (R):** Cathode rays consist of negatively charged particles known as electrons.

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

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

c) A is true but R is false.

d) A is false but R is true.

## Section B

21. A body moves along a circular path. How much work is done in doing so? Explain. **[2]**

OR

Why will a sheet of paper fall slower than one that is crumpled into a ball?

22. Give reasons for the following observation: **[2]**

The smell of hot sizzling food reaches you several metres away, but to get the smell from cold food you have to go close.

23. Why do we see light first and hear the sound later during thunderstorm? **[2]**

24. Why is ice at 273 K more effective in cooling than water at the same temperature? **[2]**

25. Using second law of motion, derive the relation between force and acceleration. A bullet of mass 10 g strikes a sand bag with a velocity of $10^3$ $ms^{-1}$ and gets embedded after travelling 5 cm. Calculate **[2]**

i. the resistive force exerted by the sand bag on the bullet.

ii. the time taken by the bullet to come to rest.

OR

When a force of 40 N is applied on a body it moves with an acceleration of 5 $ms^{-2}$. Calculate the mass of the body.

26. List any three distinguishing features between the models of an atom proposed by J.J. Thomson and Ernest Rutherford. **[2]**

## Section C

27. i. Sound is produced when your school bell is struck with a hammer. Why? **[3]**

ii. A powerful sound signal sent from a ship is received again after 4.8 seconds. How deep is the ocean bottom? (Speed of sound in water = 1500 m/s).

28. Compare the properties of electrons, protons and neutrons. **[3]**

29. The average time taken by a normal person to react to an emergency is one fifteenth of a second and is called the 'reaction time'. If a bus is moving with a velocity of 60 $kmh^{-1}$ and its driver sees a child running across the road, how much distance would the bus had moved before he could press the brakes? The reaction time of the people increases when they are intoxicated. How much distance had the bus moved if the reaction time of the driver were 1/2 s under the influence of alcohol? **[3]**

OR

Starting from a stationary position, Rahul paddles his bicycle to attain a velocity of 6 $ms^{-1}$ in 30 s. Then he applies brakes such that the velocity of the bicycle comes down to 4 $ms^{-1}$ in the next 5 s. Calculate the acceleration of the bicycle in both cases.

30. A test tube loaded with lead shots weighs 50 gf and floats upto the mark 'X' in water. The test tube is then made to float alcohol. It is found that 10 gf of lead shots have to be removed, so as to float it to level 'X'. Find RD of alcohol. **[3]**

31. i. Explain, why is it difficult to walk on sand? **[3]**
ii. Why is the recoil of a heavy gun, on firing, not so strong as that of a light gun using the same cartridge?

32. There would be no plant life if chloroplasts did not exist. Justify. **[3]**

OR

Who discovered cells, and how?

33. Differentiate between various types of muscular tissues. Draw appropriate diagrams. **[3]**

**Section D**

34. i. Suppose the mass of the earth somehow increases by 10% without any change in its size. What would happen to your weight? **[5]**
ii. Suppose the radius of the earth becomes twice of its present radius without any change in its mass. What will happen to your weight?

OR

i. Write the formula to find the magnitude of the gravitational force between the earth and an object on the earth's surface.
ii. Derive how does the value of gravitational force F between two objects change when
a. distance between them is reduced to half and
b. mass of an object is increased four times.

35. Write the main functions of atleast ten cell components. **[5]**

OR

Differentiate between
i. Cell wall and cell membrane.
ii. Nuclear region of a bacterial cell and nuclear region of an animal cell.
iii. Prokaryotic cell & eukaryotic cell.

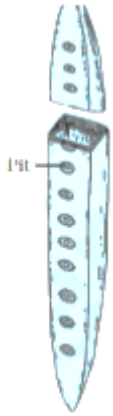
36. i. To make a saturated solution, 36 g of sodium chloride is dissolved in 100 g of water at 293K. Find its concentration at this temperature. **[5]**
ii. Calculate the mass of glucose and mass of water required to make 200g of 25% solution of glucose.

**Section E**

37. **Read the following text carefully and answer the questions that follow:** **[4]**

The process of taking up a permanent shape, size, and a function is called differentiation. Differentiation leads to the development of various types of permanent tissues. A few layers of cells beneath the epidermis are generally simple permanent tissue. another type of permanent tissue is complex tissue. Complex tissues are made of more than one type of cells. All these cells coordinate to perform a common function. Xylem and phloem are examples of such complex tissues. Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres. Phloem is made up of five types of cells: sieve cells, sieve tubes, companion cells, phloem fibres and the phloem parenchyma.

i. Identify the type of cell in the given figure (1)



ii. Which part of desert plants reduces the loss of water? (1)

iii. What is the dead element present in the phloem? (2)

**OR**

Is cardiac muscle A involuntary muscle? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

A bee colony consists of a single queen and a large number of worker bees. Drones are present in the early stages but do not occur later on. All the functions of the colony are performed by worker bees. They build the hive, collect food, feed themselves as well as the queen, store food and protect the hive. Genetically, a worker bee does not differ from a queen bee and can even become a laying worker bee, but in most species will produce only male (drone) offspring.

i. Why are drones absent in the mature bee colony? (1)

ii. When and how are drones produced? (1)

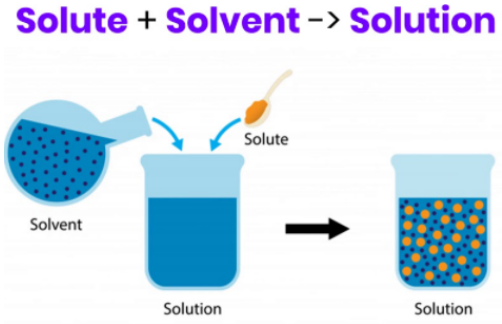
iii. What is bee bread? (2)

**OR**

Why worker bees are females but they do not lay eggs? (2)

39. **Read the following text carefully and answer the questions that follow:** **[4]**

Mixtures are constituted by more than one kind of pure form of matter. Sodium chloride is itself a pure substance matter. The solution is a homogeneous mixture of two or more substances. Lemonade, soda water etc. are all examples of solutions. Alloys are mixtures of two or more metals or a metal and a non-metal and cannot be separated into their components by physical methods. A solution has a solvent and a solute as its components. The component of the solution that dissolves the other component in it (usually the component present in a larger amount) is called the solvent. The component of the solution that is dissolved in the solvent (usually present in lesser quantity) is called the solute.




i. In a water-sugar solution: Identify solute and solvent? (1)

ii. What is the size of the particles of a solution? (1)

iii. What is pure substance? (2)

**OR**

What do you mean by Alloy? (2)