

**Time-3 hours**

**M.M.80**

Attempt all questions.

Section A: All questions carry one mark each.

Section B: All questions carry two marks each.

Section C: All questions carry three marks each.

Section D: All questions carry five marks each.

Section E: Case Study (carry four marks each)

**Section A**

- Q1. Represent the atomic number and mass number of the isotopes of Carbon.
- Q2. Write the electronic configuration of potassium ion.
- Q3. On the basis of Thomson's model of an atom, explain how the atom is neutral as a whole?
- Q4. Smoke and fog are both aerosols. In what way they are different?
- Q5. Convert 300 K temperature to Celsius scale.
- Q6. Identify which among the following show "Tyndall effect"?
- Salt solution, milk, starch solution, sugar solution.
- Q7. What is the ratio of the velocity to the speed of an object in a given situation?
- Q8. Can an object speed up or slow down without accelerating?
- Q9. Mass of a body is doubled. How does its acceleration change under a given force?
- Q10. At what place on the earth's surface is the weight of a body minimum?
- Q11. When displacement is in a direction opposite to the direction of force applied, what is the type of work done?
- Q12. What is the distance between the consecutive rarefactions known as?
- Q13. Differentiate between xylem and phloem in terms of its function.
- Q14. What would happen if
- (a) intercalary meristem is absent.
- (b) we cut the tip of shoot of plant.
- Q15. In what way genetic modification is different from hybridisation technique?
- Q16. Name the substance which makes cell wall impervious to air and water in cork cells.
- Direction (Q 17 to Q20): In the following questions the Assertion and reason have been put forward. Read the statement carefully and choose the correct alternative.**
- a) Both the assertion reason are correct and the reason is the correct explanation of the assertion.
- b) Both the assertion reason are correct but the reason is not the correct explanation of the assertion.
- c) Assertion is true but the reason is false.
- d) Assertion is False but the reason is true.
- Q17. **Assertion:** Alloys are a type of homogenous mixture of metals.  
**Reason:** Alloys cannot be separated into its components by physical processes.
- Q18. **Assertion:** Neuron has cell body, axon and nerve endings.  
**Reason:** The cell body is devoid of nucleus.
- Q19. **Assertion:** Plants get nutrients from air, water and soil.  
**Reason:** Nutrients that are required in a large quantity by the plants are macronutrients.
- Q20. **Assertion:** Echo is produced when sound is incident on hard and polished surface.  
**Reason:** Sound energy can be totally reflected by objects with soft and loose texture.

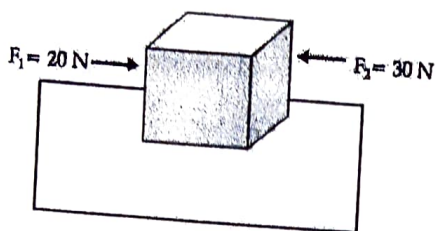
### Section B

Q21. Calculate the mass of glucose to be dissolved to prepare 200g of 5% solution of glucose by mass.

Q22. Calculate the molecular mass of  $\text{CH}_3\text{COOH}$  and  $\text{KMnO}_4$ .  
(Atomic mass of Mn = 55amu).

Q23. Two forces  $F_1 = 20 \text{ N}$  and  $F_2 = 30 \text{ N}$  are acting on an object as shown in figure:  
 $F = 30 \text{ N}$  and  $F = 20 \text{ N}$

- Find the net force acting on the object?
- State the direction of the net force acting on the object?

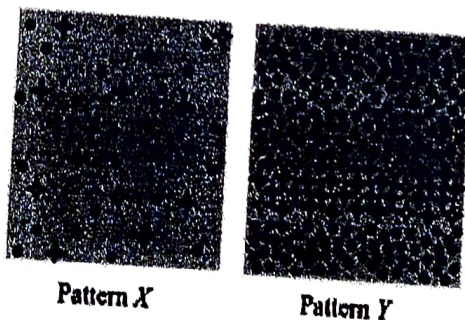


Q 24. A ball is thrown vertically upwards with a velocity of 49 m/s. Calculate:

- The maximum height to which it reaches.
- The total time it takes to return to the surface of the earth.

Q25. Design an activity to demonstrate that plants undergo plasmolysis while animal cells do not.

Q26. The given diagrams show two different cropping patterns, X and Y. Identify these patterns. Write the two advantages of Y over X.

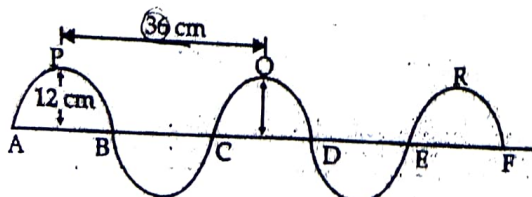


### Section-C

Q27. (a) Rahim and Shahid are two farmers. Rahim used integrated pest and insect management to grow his crops while Shahid employs integrated pest and insect management along with post harvesting management to not only increase his crop yield but for commercial return of his produce. Who manages in the best way and why?

(b) What should be done to get maximum benefit from a crop field? (2 Points)

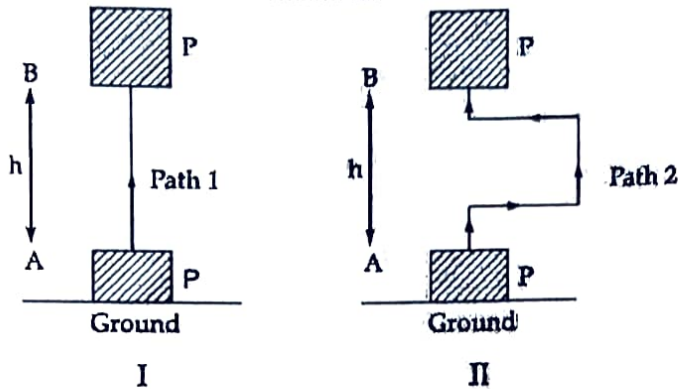
Q.28. Wave of frequency 200Hz is produced in a string as shown in the Figure:



Calculate :

- Amplitude
- Wavelength
- Velocity of the Wave.

Q.29. An object 'P' of mass 'm' is lifted from a point A on ground to point B at a height 'h' above the Earth by Rina and Mita, but the path taken for doing it is different by both (as shown in fig. I and II). Calculate the work done in both the situations.



Q30. Write the chemical formula of the following compounds:

- Ammonium chloride
- Sodium nitrite.
- Magnesium carbonate.

Q.31. (i) Which of the two would be chemically more reactive; element 'X' of atomic number 18 or element 'Z' of atomic number 16 and why?

(ii) Give one example each of a triatomic molecule and a diatomic molecule.

Q.32. A construction worker accidentally drops a brick from a high scaffold. (Given: mass of brick = 2kg)

- What is the velocity of the brick after 4.0 s?
- How far does the brick fall during this time?
- Calculate the kinetic energy of the system at end of 4s.

Q33. (a) Identify A, B and C.

(b) How does collenchyma help in providing flexibility in plants?



**OR**

- Explain scientifically in what ways Hemp and Jute is beneficial for us.
- Give Reasons:
  - Sclerenchymatous are dead tissues.
  - Most of the plant body is made up of parenchymatous tissues.

### Section-D

Q34. (a) From the given table answer the following:

ELEMENT	MASS NUMBER	ATOMIC NUMBER
A	11	5
B	19	9
C	4	2
D	23	11
E	9	4

- (i) How many electrons are present in E?
  - (ii) Which is an inert gas?
  - (iii) Which atom will form a negatively charged ion?
  - (iv) Which element has twelve neutrons?
  - (v) Which atom will form a cation with one-unit positive charge?
  - (vi) Write the symbol of the element D.
- (b) Calculate the ratio by mass of elements present in  $\text{NH}_3$  and  $\text{CO}_2$ .

Q35. (a) What is the role of epidermis in plants (Any 2 Points)

(b) What will happen if

(i) Ligament gets over-stretched.

(ii) Alveoli is multilayered.

(iii) Striated muscles contract rapidly for longer duration.

(c) Cardiac muscles have striations but are still not considered striated muscles. Why?

Q36. Answer the following questions

(i) A lamp consumes 1000 J of electrical energy in 10 s. Calculate its power.

(ii) Do you agree with the statement-value of 'G' depends on the medium present between the two bodies. Justify.

(iii) Micheal Johanson, a great athlete of his time used to take 5 seconds to attain his best speed of 36 km/hr. What is the acceleration in these 5 seconds?

(iv) A Karate player suddenly reduces the speed of his hand while striking a tile. Justify.

(v) Echo's cannot be heard in a small room. Justify.

### Section-E

**Q37. The minimum temperature at which solid melts to become a liquid at the atmospheric pressure is called its melting point. The energy supplied by heat overcomes the forces of attraction between the particles. The particles leave their fixed positions and start moving more freely. A stage is reached when solid melts and is converted to a liquid. The process of melting, that is, change of solid state into a liquid state is also known as fusion. The temperature of the system does not change after the melting point is reached, till the ice melts.**

- (i) \_\_\_\_\_ of a solid is an indication of the strength of the force of attraction between its particles.
- (ii) For any substance, why does the temperature remain constant during the change of state?
- (iii) Explain why ice is more effective in cooling than water at the same temperature.
- (iv) Draw a graph between temperature and time depicting the relation between conversion of state and latent heat.

**38. Osmotic diarrhoea occurs when extra sugars in solid waste cause water to be drawn from the body into the large intestine. This can happen when people drink diet drinks that contain artificial sweeteners. These artificial sweeteners can't be absorbed by the small intestine like regular sugars so they remain in the waste as it moves into the large intestine. Because there is so much extra sugar in the solid waste, osmosis transports water through the intestinal wall to maintain the correct sugar/water balance. Osmotic diarrhoea also happens in people who have lactose intolerance. Patients**

with lactose intolerance can't digest dairy products because they are not able to break down a sugar called lactose. Secretory diarrhoea usually occurs when a human is infected by some sort of bacteria. Bad strains of *E. coli* bacteria that cause food poisoning can be responsible for this kind of diarrhoea. Similarly, cholera is a bacterial disease that causes secretory diarrhoea. Cholera bacteria cause the active transport of salts through transport proteins into the large intestine. Because this results in a high concentration of salts in the intestine, water will travel by osmosis into the intestine to maintain the correct salt/water balance. This extra water in the intestine causes diarrhoea! Other symptoms are usually present if cholera bacteria are responsible for secretory diarrhoea. For example, the patient will usually have low blood pressure, a rapid heart rate, and wrinkled skin. All of these symptoms are due to an abnormal salt/water balance.

(i) Molly arrives at the doctor's office complaining of diarrhoea. She has just returned from a safari trip in Africa. He discovered that Molly's stool sample had a higher concentration of salts than would be expected for a healthy patient, wrinkled skin. Which type of diarrhoea is Molly suffering from, osmotic or secretory? What causes this type of diarrhoea?

(ii) "People who have a habit of taking diet soft drinks have diarrhoea frequently". Justify.

(iii) Rachel complained about diarrhoea after eating paneer tikka at wedding. At the doctor's office, she is diagnosed with lactose intolerance. Which type of diarrhoea is she suffering from? How did you come to this conclusion?

(iv) In what way osmosis is different from diffusion?

**Q39.** If an object moving along the straight line covers equal distances in equal intervals of time, it is said to be in uniform motion along a straight line. Distance and displacement are two quantities that seem to mean the same but are different with different meanings and definitions. Distance is the measure of actual path length travelled by an object. It is a scalar quantity having SI unit of meter while displacement refers to the shortest distance between initial and final position of an object. It is a vector quantity. The magnitude of the displacement for a course of motion may be zero but the corresponding path length is not zero.

Using this data, answer the following questions.

- (i) An object is moved through a distance. Can it have a zero displacement?
- (ii) What does the odometer of a vehicle measure?
- (iii) Is it possible to have a situation where the displacement of an object is greater than the distance travelled by an object?
- (iv) The speedometer readings of a car are shown below. Find the acceleration of the car when the car is travelling in straight line.

Time	Speed
9:25 AM	36km/hr
9:45 AM	72km/hr