No. of printed pages-11

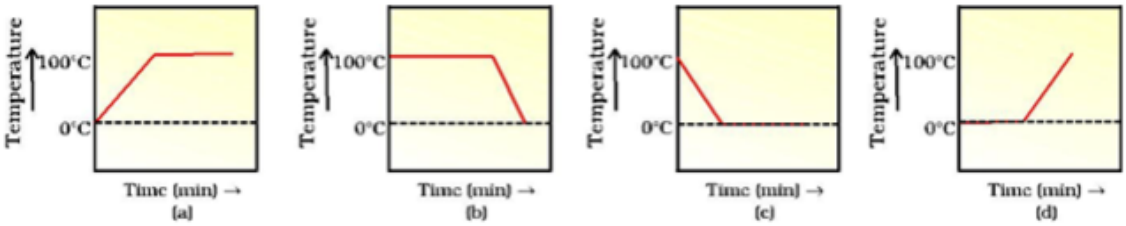
Class: IX
Annual Examination (2024-25)
Science(Subject Code-086)
Set B2

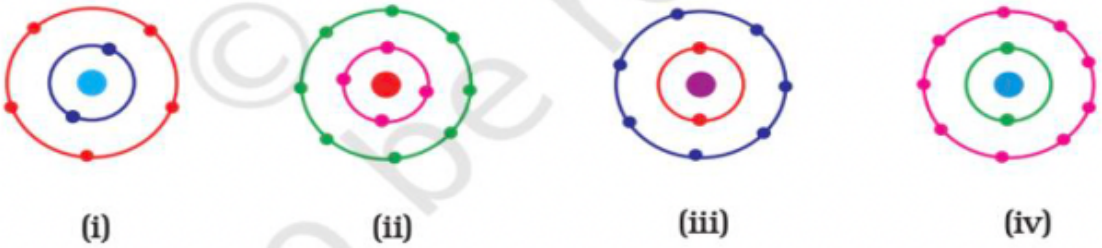
Time Allowed: 3h **Max. Marks:80**

1. All questions are compulsory. However, an internal choice of approximately 33% is provided.
2. Section A contains 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B contains 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C contains 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D contains 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E contains 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.

Section A

Questions 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

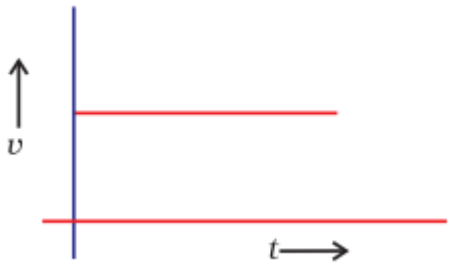
Q.NO	Questions	Marks
1	A student heats a beaker containing ice and water. He measures the temperature of the content of the beaker as the function of time. Which of the following would correctly represent the result? 	1
2	Which one of the following sets of phenomena would **increase** on raising the temperature? (a) Diffusion, evaporation, compression of gases (b) Evaporation, compression of gases, solubility (c) Evaporation, diffusion, expansion of gases (d) Evaporation, solubility, diffusion, compression of gases	1

3	A mixture of sulphur and carbon disulphide is: (a) Heterogeneous and shows Tyndall effect (b) Homogeneous and shows Tyndall effect (c) Heterogeneous and does not show Tyndall effect (d) Homogeneous and does not show Tyndall effect	1
4	Rusting of an article made up of iron is called: (a) Corrosion and it is a physical as well as a chemical change (b) Dissolution and it is a physical change (c) Corrosion and it is a chemical change (d) Dissolution and it is a chemical change.	1
5	An element M forms oxide M_2O_3. The formula of its phosphate is- (a) MPO_4 (b) M_2PO_4 (c) $M_3(PO_4)_3$ (d) None of the above	1
6	Isobars do not differ in the number of: (a) Protons (b) Electrons (c) Neutrons (d) Nucleons	1
7	Which of the following do not represent Bohr's model of an atom correctly?  (i) (ii) (iii) (iv) (a) (ii) and (iv) (b) (ii) and (iii) (c) (i) and (ii) (d) (iii) and (iv)	1
8	Crop Y is grown only in a few areas due to specific temperature requirements. To increase the productivity of crop Y, it is recommended to develop its different varieties. Which feature should be included while developing the different varieties of crop Y in order to increase its productivity? (a) Developing varieties with strong biotic resistance. (b) Developing varieties with less dependence on water. (c) Developing varieties with extended maturity duration. (d) Developing varieties adaptable to different climatic conditions.	1

9	Rama studied the features of tendon and ligaments and recorded her observations in the given table; The incorrect observations are (a) 1 and 3 (b) 2 and 4 (c) 2, 3 and 4 (d) 1 and 2	1
10	Which of the following statements are correct about the functions of Golgi apparatus? 1. Storage, modification and packaging of products in vesicles. 2. Complex sugars may be made from simple sugars. 3. Storage of starch, oils and protein granules. 4. Helps in membrane biogenesis. (a) Only 4 (b) 1, 2 and 4 (c) 1 and 2 (d) 3 and 4	1
11	Select the correct function of the folds in the inner mitochondrial membrane. (a) To store nutrients. (b) To protect the DNA. (c) To increase surface area for ATP production. (d) To transport waste products.	1
12	Four groups capture marine fishes with different instruments as listed in the table. Which set of groups will most likely get the maximum fish catch? (a) Groups A and B	1

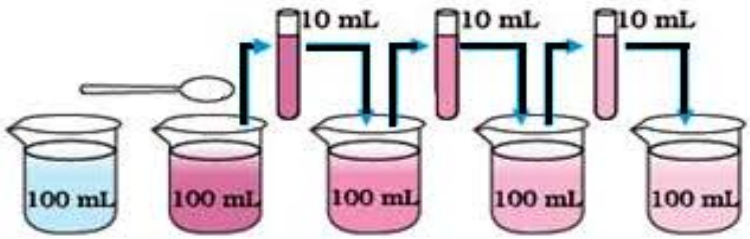
	Tendons	Ligament
1	Connect muscles to bones	Connect bones with bones
2	Very elastic	Has limited flexibility
3	Have great strength	Has considerable strength
4	Is a type of muscular tissue	Is a type of epithelial tissue

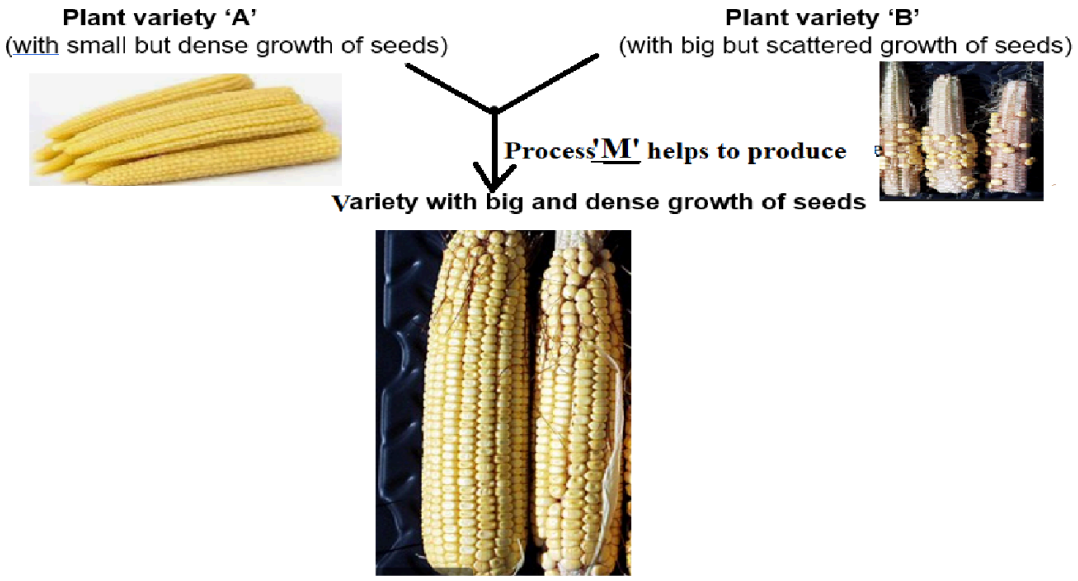
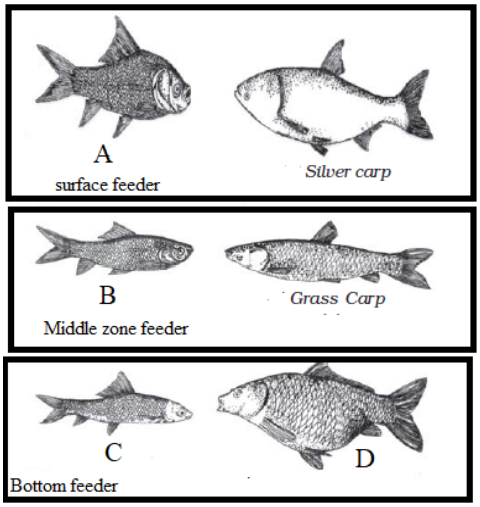
Group	Tool/Equipment Used to Capture Marine Fishes
A	Hand-pulled fishing nets
B	Fishing nets guided by echo sounders
C	Fishing nets guided by satellites
D	Pulley based fishing nets

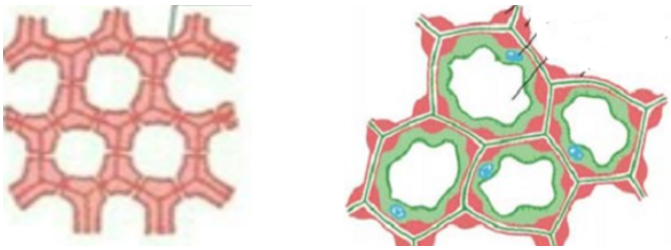
	(b) Groups B and C (c) Groups C and D (d) Groups D and A	
13	The upper limit of frequency of sound waves audible to human beings is (a) 5 Hz (b) 20 Hz (c) 20,000 Hz (d) 35,000 Hz	1
14	Among the following statements which is /are correct related to acceleration due to gravity of earth ? (A) decreases from equator to poles (B) decreases from pole to equator (C) is maximum at the centre of earth (a)(A) only (b) (B) only (c)(C) only (d)(B) and (C) only	1
15	A passenger in a moving train tosses a coin which falls behind him . It means that motion of the train is (a) uniform (b) accelerated (c) retarded (d) along circular track	1
16	From the given v – t graph , it can be inferred that the object is  (a) at rest (b) in non- uniform motion (c) in uniform motion (d) moving with non uniform acceleration	1

Question No. 17 to 20 consist of two statements- **Assertion (A)** and **Reason (R).** Answer these questions by 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):** Layers utilise more fibrous cheaper diets formulated using agricultural by-products. **Reason (R):** The level of vitamins B and D is kept high in the poultry feeds.	1
18	**Assertion (A):** Smooth Endoplasmic Reticulum (SER) is involved in protein synthesis. **Reason (R):** SER helps in the manufacture of fat molecules and lipids.	1
19	**Assertion (A)**: A body at rest may be in motion simultaneously with respect to different observer **Reason (R):** Rest and motion are absolute terms and do not depend on the observer**s.**	1
20	**Assertion(A):** 1 amu is equal to 1/12th of an atom of C-14 **Reason(R):** C-12 isotope is the standard reference for measuring atomic masses.	1
SECTION - B **Question No. 21 to 26 are very short answer questions.**		
21	***Attempt either option A or B*** **A.** An artificial satellite is moving in a circular orbit of radius 42000 km. Calculate its speed if it takes 24 hours to revolve around the earth. **OR** **B.** State which of the following situations are possible and give an example for each of these: a) An object with an acceleration but with zero velocity. b) An object moving in a certain direction with an acceleration in the perpendicular direction.	2 2
22	A bat can hear sound of frequencies up to 120 kHz. Determines the wavelength of sound in air at this frequency. (Take the speed of sound in air as 344m/s.)	2
23	Cl-35 and Cl-37 isotopes are in the ratio of 3:1 respectively. Calculate the average atomic mass of Cl.	2
24	Suggest any two preventive and control measures before storage of grains.	2
25	Differentiate between xylem and phloem on the basis of; (a) Materials transported. (b) Direction of transportation of materials.	2
26	(a) Name any two parts of the body where cuboidal epithelial tissue is found. (b) Striated muscles are also called skeletal muscles. Why?	2

	SECTION - C **Question No. 27 to 33 are short answer questions.**	
27	***Attempt either option A or B*** **A.** Rahul mixed iron filings and sulphur powder and heated them strongly in a china dish to form a solid substance. He then added Hydrochloric acid in the contents. Based on the given information, answer the following questions. i) Comment upon the colour and texture of the solid formed on strong heating of iron filings and sulphur powder. ii) Name the gas produced after adding acid to the contents.Also state any one feature of the gas produced. iii) What will he observe if the contents are mixed with Carbon disulphide solution? **OR** **B**.Give reason for the following: a) True solutions do not show the Tyndall effect. b) Both Smoke and fog are aerosols, yet they are different. c) Burning is categorised as a chemical change.	3
28	A student added 2 to 3 crystals of Potassium permanganate in 100 ml of water and then took out 10 ml of this solution for adding in 90 ml of water in clear water. The process is repeated as seen in the figure. Based on the given information answer the following questions:  a) What were the observations taken by the student while performing this activity? b) State the conclusion drawn from this activity. c) Why is 10 ml of coloured solution added to 90 ml of clear water and not 100 ml as done initially?	3
29	Mention any three differences between mitosis and meiosis.	3
30	***Attempt either option A or B.*** **A.** In the given diagram, two crop varieties are crossed to obtain a new crop variety having desired traits of parental crops. Process '**M**' helps to incorporate desirable characters of both the parents into this new crop variety.	3

	 (a) Identify the process 'M'. (b) State any two advantages of this process. **OR** **B.** (a) State any two desirable characters of bee varieties suitable for honey production. (b) What are the two normal food components (animal feed) of dairy animals? (c) Name the fish farming system shown in the given diagram. Identify the fish species A. 	
31	A constant force acts on an object of mass 5 kg for a duration of 2 s. It increases the objects velocity from 3 m/s to 7m/s. Find the magnitude of the force applied. Now if the same force were applied for another 5s, then what would be the final velocity of the object?	3
32	***Attempt either option A or B*** A. a) State two factors on which gravitational force between two objects depends.	3

	b) If a planet existed whose mass and radius were both half of that of the earth. what would be the acceleration due to gravity at the surface of the planet in terms of that on the surface of the earth? **OR** **B.** a) When we stand on loose sand, our feet go deep into the sand. But when we lie down on the sand, our body does not go that deep in the sand. Why? b) A sphere of mass 5 kg and volume 2.2x10$^{-4}m^3$ is completely immersed in water. Find the buoyant force exerted by water on the sphere. (Density of water =1000kg/m^3)	3
33	A mass of 5 kg is dropped from a height of 10 m. Find its a) potential energy just before dropping b) kinetic energy on touching the ground c) velocity with which it hits the ground	3
	SECTION - D Question No. 34 to 36 are Long answer questions.	
34	***Attempt either option A or B.*** **A.** (a) Explain the structure of smooth muscle cells. (b) Specify any three locations in the human body where smooth muscles are found. (c) Name the following; (i) Tissue that forms the inner lining of our mouth. (ii) Tissue that stores fat in our body. (iii) Connective tissue with a fluid matrix. **OR** **B.** (a) Give reasons for the following: (i) Aquatic plants like water hyacinth, float on the water surface. (ii) Various parts of a plant show easy bending without breaking. (iii) It is difficult to pull out the husk of coconut. (b) Identify the given diagrams of two different types of plant tissues labelled as 'A' and 'B'. How are they different from each other with respect to the composition of their cell wall?  A B	5

35	***Attempt either option A or B*** **A.** (i) A student lifts an object in the upward direction. In doing so, he applies the force on the object in an upward direction and displaces it in that direction. However, the force of gravity is also acting on the object. a) Which force is doing positive work in this situation? Give reason. b) Which force is doing negative work? Give reason. (ii) An electric pump is used to pump water from a ground tank to the overhead tank situated 20 m above. It transfers 2000 kg of water to the overhead tank in 15 min. Calculate the power of the pump. **OR** **B.** (i). Derive an expression for kinetic energy of an object . (ii) A force acting on a 10 kg changes its velocity from 54 km/h to 90 km/h. calculate the work done by the force.	5
36	***Attempt either option A or B*** **A.** a) State the Dalton's postulate which is in accordance with Law of Conservation of mass. b) In a reaction, 5.3 g of Sodium carbonate reacted with 6 g of Ethanoic acid. The products were 2.2 g of Carbon dioxide, 0.9 g water and some Sodium ethanoate. Calculate the amount of Sodium ethanoate produced. Sodium carbonate + Ethanoic acid → Sodium ethanoate + Carbon dioxide + water c) State the atomicity of the following compounds- HCl, $KMnO_4$ d) When 3.0 g of carbon is burnt in 8.00 g oxygen, 11.00 g of carbon dioxide is produced. What mass of carbon dioxide will be formed when 3.00 g of carbon is burnt in 50.00 g of oxygen? Give reason for your answer. **OR** **B**.a) State the Law of Constant Proportion. b) Carbon and oxygen combine in the ratio of 3:8 by mass to form Carbon dioxide. What mass of oxygen would be required to react completely with 9g of carbon? c) Calculate the molecular mass of the following compounds- (i) Ethyne, C_2H_2. (ii) Nitric acid, HNO_3 [Given atomic mass of C=12u, H=1u, N=14u, O=16u] d) A student wrote CO as a symbol for cobalt. Correct the symbol with reasoning.	5
	SECTION - E **Question No. 37 to 39 are case - based/data -based questions.**	
37	Sound bounces off a solid or a liquid like a rubber ball bounces off a wall. Like light, sound gets reflected at the surface of a solid or liquid and follows the same laws of reflection as you have studied in earlier classes. The directions in which the sound is incident and is reflected make equal angles with the normal to the reflecting surface at the point of incidence, and the three are in the same plane. An obstacle of large size which may be polished or rough is needed for the reflection of sound waves **A.** What is reverberation? **B.** Why are the ceilings of concert halls curved?	4

Attempt either sub-part C or D

C. An echo returned in 3 s. What is the distance of the reflecting surface from the source, given that the speed of sound is 342 m/ s?

OR

D. Give two medical uses of ultrasound.

38 **A.** Substances from A to E have in them, the distribution of electrons, neutron and protons as follows: 4

Making use of these data find:

SUBSTANCE	ELECTRON	NEUTRON	PROTON
A	**10**	**12**	**11**
B	**18**	**16**	**16**
C	**18**	**22**	**18**
D	**17**	**20**	**17**
E	**17**	**18**	**17**

(i) An anion and write its representation.
(ii) A pair of isotopes with relevant reasoning.
(iii) An atom of noble gas with relevant reasoning.

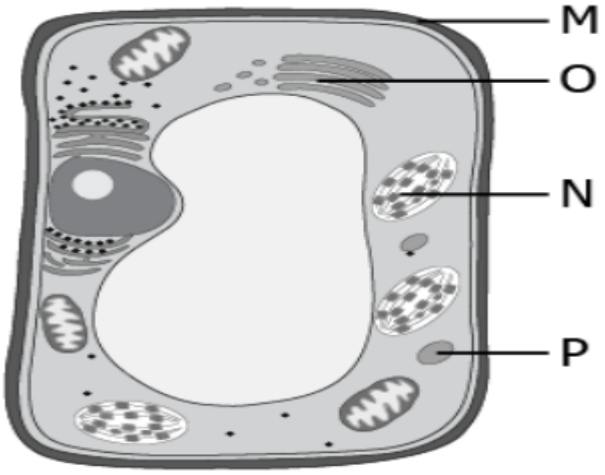
Attempt either sub-part B or C.

B. Calculate the mass number of element A. Show all steps of working.

OR

C. Identify the element which is a metal. Give suitable reasoning.

39 A biology student was observing a plant cell under a microscope. After closely examining the sample, the student drew the following diagram: 4



The diagram includes the following labelled structures:

1. A thick outer layer M.

	2. Green, oval-shaped organelles ‘N’ inside the cell. 3. A large, central area that appears hollow or empty. 4. Smaller round bodies scattered throughout the cell and many more parts. Based on this observation and diagram, answer the following questions: A. What type of cell is depicted in the diagram? B. Why is the central area important for this cell? ***Attempt either sub-part C or D.*** C. List two key features from the diagram that helped identify this cell. D. Identify the oval-shaped organelles labelled as N. How does the presence of these organelles benefit the plant as a whole?	