Delhi Public School, Howrah

FINAL EXAMINATION (2024-2025)

Class-IX

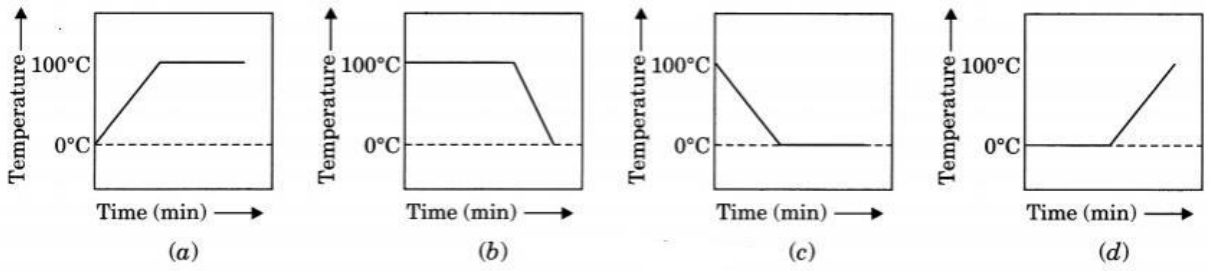
Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

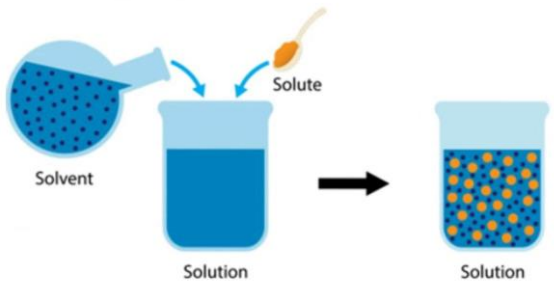
Subject:- Science (Code No. 086)

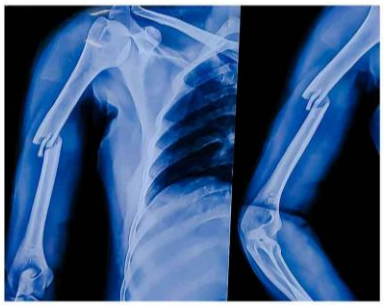
Time: -3 Hours **F.M.-80**

General Instructions:

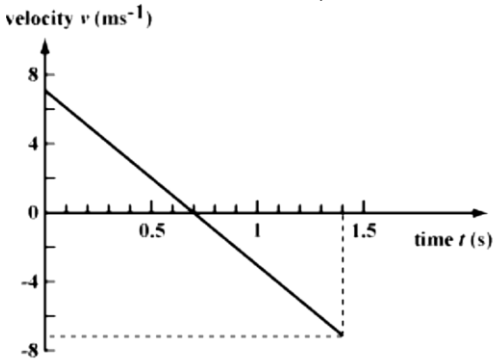
1. All questions are compulsory. However, an internal choice of approximately 33% is provided. 50% marks is allotted to competency-based questions.
2. Section A has 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B has 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C has 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D has 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E has 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 **Question 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.	An element A having mass M is combined with another element B having mass N. On reacting, they form compound AB with mass M+N. Which law is applicable here? a. Law of conservation of mass b. Law of constant proportion c. Law of conservation of energy d. Law of multiple proportion	**1**
2.	An element X is divalent. Another element Y is tetravalent. What will be the formula of the compound formed by their combination? a. XY b. X_2Y c. XY_2 d. X_4Y_2	**1**
3.	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 graph would correctly represent the result? 	**1**

4.	Which of the given pairs of atoms contain the same number of protons? 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. Only iii b. Only iv c. Both i and iv d. Both i and iii	**1**
5.	A solution is made by a process depicted in the following diagram. Identify the correct option that shows property of the solution. **Solute + Solvent –> Solution**  a. It is a heterogeneous mixture. b. It is translucent in nature. c. It is unstable. d. Particle size is smaller than 10^{-9} m.	**1**
6.	During the process of fusion of ice into water, temperature remains constant even when the ice is heated continuously. What happens to the heat energy in this process? a. Utilised to break the force of attraction between the particles of matter. b. It raises the temperature of the beaker only. c. It is utilised to decrease the intermolecular space. d. It slows down the molecular motion.	**1**
7.	A mixture of two miscible liquids with different boiling points is heated. What will be the nature of the vapour formed? a. Vapour will contain liquid lower in boiling point. b. Vapour will contain liquid higher in boiling point. c. Vapour will contain both liquids but concentration of the liquid having low boiling point will be higher. d. Vapour will contain both liquids but concentration of the liquid having high boiling point will be higher.	**1**
8.	The students of Grade IX prepared temporary mounts of onion peels by taking onions of different sizes, along with the leaf peel and root tip. For the activity, each student obtained a small piece of peel or section and stained it using safranin. Later they placed it on a slide having glycerine and observed it under a compound microscope. For one student the onion peel had already dried before he could initiate the staining process. What could he have done to avoid this? a. He should have immediately placed the peel in glycerine. b. He should have immediately placed the peel between the two glass slides. c. He should have covered the peel with a coverslip. d. He should have immediately placed the peel in a watch glass containing water.	**1**

9.	Keshav had a problem of vertigo. One day, he fainted while climbing the stairs and fell down. He suffered multiple injuries on his head, hands and legs. His parents immediately took him to the doctor where the doctor did an X-ray. The doctor diagnosed multiple fractures and began the treatment for the same.   A B On observing his X-ray images, Keshav was surprised to see that only the internal structures of the nose and ear were visible and not the external image. Identify the reason for the same. a. The external nose and ear pinna are made of cartilages and bones. b. The external nose tip and ear pinna are made of cartilage. c. The internal structures of the nose and ear are made of cartilage. d. The internal structure of the nose and ear is made of both bones and cartilages.	**1**
10.	An experiment is designed to understand the growth requirements of crops. For this experiment, mustard seeds were chosen and were exposed to different temperature conditions. The given table lists the locations of the seeds sown with respective temperature conditions. **Location** / **Temperature Conditions** A / 15°C to 18°C B / 35°C to 38°C C / -1°C to 2°C D / 45°C to 48°C At which location would the mustard grow most effectively? a. A b. B c. C d. D	
11.	One of Raju's cattle is affected by an internal parasite. Which parts of the cattle are most likely to be affected? a. Skin and liver b. Liver and intestine c. Stomach and skin d. Intestine and eye	**1**
12.	Ravi obtained a large amount of wheat this year. He has to store all the wheat produced in his fields, until the price is good enough in the market to get a high profit. What advice would you give Raju to store grains without any spoilage? a. Sun dry the wheat grains and immediately store them in glass jars. b. Sun dry the grains, cool and store them in earthen pots and jute sacks on the floor. c. Store the harvested grains immediately in plastic bags. d. Sun dry the grains, cool and store them in jute bags stacked away from the wall.	**1**
13.	Few statements about a uniformly accelerated motion are as follows- A: v-t graph is a straight line not parallel to t or v axis.	**1**

	B: x-t graph is not a straight line. C: Slope of v-t graph varies. D: Slope of x-t graph is constant. Identify the correct statement. a. Only A is correct. b. Only A and B are correct. c. Only A, B and C are correct. d. Only B, C and D are correct.	
14.	A block resting on a smooth horizontal floor is being pushed by a constant horizontal force. If the kinetic energy gained by the block at first, second and third second are K_1, K_2 and K_3, respectively, then K_1: K_2: K_3 would be equal to a. 1:1:1 b. 1:3:5 c. 1:4:9 d. 1:2:3	**1**
15.	Identify the characteristics of striped or striated muscles from the options given below. a. Spindle shaped, long fibres with central nucleus b. Long, branched fibres with distinct nucleus c. Long fibres, multinucleate with light and dark bands d. Branched, multinucleate fibres with alternate light and dark bands	**1**
16.	Column I lists the names of the scientists and Column II lists their contributions. From the given options select the one which correctly matches the two. **Column I** **Column II** (A) Knoll and Ruska (i) Coined the term 'protoplasm' (B) Robert Brown (ii) Observed living cells for the first time (C) Purkinje (iii) Invented the electron microscope (D) Antony van Leeuwenhoek (iv) Discovered the nucleus a. (A)-(i); (B)-(ii); (C)-(iii); (D)-(iv) b. (A)-(ii); (B)-(iii); (C)-(i); (D)-(iv) c. (A)-(iii); (B)-(iv); (C)-(i); (D)-(ii) d. (A)-(iii); (B)-(i); (C)-(iv); (D)-(ii)	**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, 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.**	
17.	**Assertion (A):** The atoms of different elements having same mass number but different atomic numbers are known as isobars. **Reason (R):** The sum of protons and neutrons, in the isobars is always different.	**1**
18.	**Assertion (A):** The sperms and ova have half the number of chromosomes as compared to the somatic cells in the body. **Reason (R):** The process of meiosis guarantees the genetic integrity of a species.	**1**
19.	**Assertion (A):** An object may have acceleration even if it is moving at a constant speed. **Reason (R):** With change in the direction of motion, an object can acquire acceleration.	**1**
20.	**Assertion (A):** Message is transferred only in one direction from the nerve endings of the axon to the dendrites of another neuron. **Reason(R):** Axon is a long hair like projection arising from the cell body of a nerve cell.	**1**

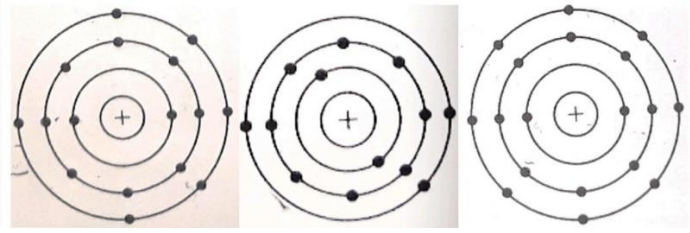
<table>
<tr><td></td><td>SECTION B
Question No. 21 to 26 are very short answer questions</td><td></td></tr>
<tr><td>21.</td><td>a. What is an unsaturated solution?
b. Suggest two methods to convert a saturated solution into unsaturated solution.</td><td>2</td></tr>
<tr><td>22.</td><td>“Shape of cells varies not only in different organisms but also in different parts of the same organism.” Justify the trueness of the statement with suitable diagrams.</td><td>2</td></tr>
<tr><td>23.</td><td><u>Attempt either option a or b.</u>
a. “As many as 100 chickens were found dead at a poultry farm in Vehloli village of Shahapur tehsil in Thane district.”, said Thane District Magistrate and Collector Rajesh J Narvekar on Friday. How can such loss of poultry be reduced? Explain in detail.
OR
b. i. Why is Apis mellifera adopted for domestication to produce honey?
ii. One of Naresh’s cattle, P on his farm, is used to pull his cart. There is a cattle Q that recently gave birth to a calf. Identify the term given to cattle P and Q.</td><td>2</td></tr>
<tr><td>24.</td><td>A sound wave travels at a speed of 340 m/s. If its wavelength is 1.5 cm, what is the frequency of the wave? Will it be audible? Justify your answer.</td><td>2</td></tr>
<tr><td>25.</td><td><u>Attempt either option a or b.</u>
a. i. Can a rocket propel itself in vacuum? Explain.
ii. An object experiences a net zero external unbalanced force. Is it possible for the object to be travelling with a non-zero velocity? Justify it.
OR
b. i. Velocity-time graph of a moving car is depicted in the diagram given below. Find the time when the car started moving backward. Also find the displacement of the car.
 

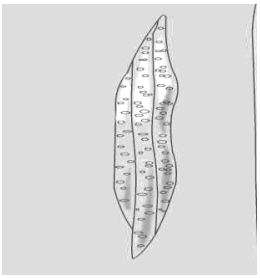
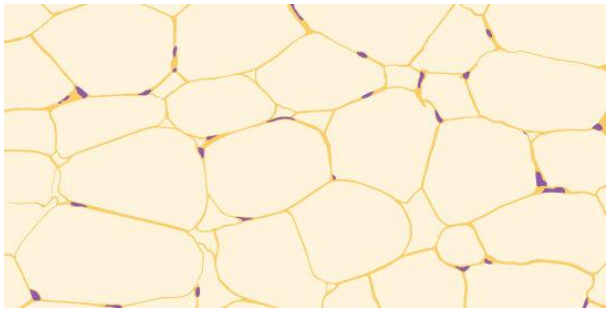
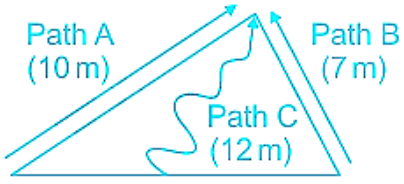
ii. A circular cycle track has a radius of 14 m with AB as one of its diameter. A cyclist travels from A to B along the circular path with a constant speed 22 m/s. Find the average velocity of the cyclist.</td><td>2</td></tr>
<tr><td>26.</td><td>The weight of a body on the surface of the earth is 392N. There is another planet whose mass is double of that of the earth and radius is four times that of the earth. Find the ratio of the followings:
a. The masses of the body on the surface of earth and on the surface of the given planet.
b. The weight of the body on the earth and on the given planet.</td><td>2</td></tr>
<tr><td></td><td>SECTION C
Q.no. 27 to 33 are short answer questions.</td><td></td></tr>
<tr><td>27.</td><td>The following data represents the distribution of electrons, protons and neutrons in atoms of four elements A, B, C, D. Solve the given questions based on the data provided.
<table>
<tr><th>Elements</th><th>Protons</th><th>Neutrons</th><th>Electrons</th></tr>
<tr><td>A</td><td>10</td><td>10</td><td>10</td></tr>
<tr><td>B</td><td>11</td><td>12</td><td>11</td></tr>
<tr><td>C</td><td>12</td><td>12</td><td>12</td></tr>
<tr><td>D</td><td>13</td><td>14</td><td>13</td></tr>
</table>
a. Write the electronic distribution of atoms of element D.
b. Why element A is considered as an inert gas?</td><td>3</td></tr>
</table>

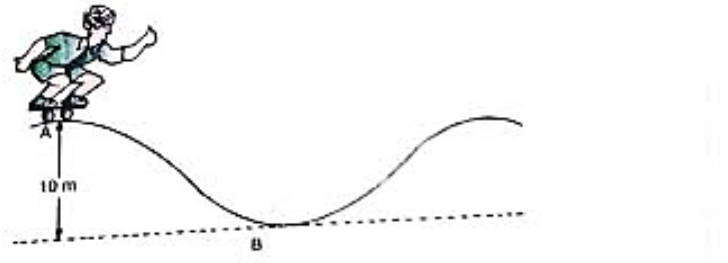
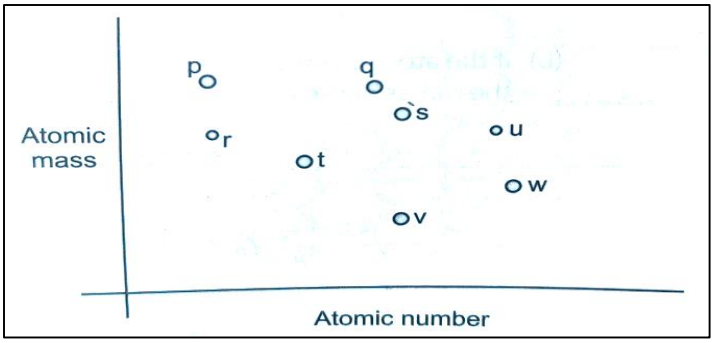
	c. What is the valency of elements B and C?	
28.	**Attempt either option a or b** a. 2mL of distilled water is added to 4g of a powdered sugar. The final volume is 3mL. What is the concentration of sugar in g/100mL of solution? Also find out the (v/v) percent of the solution? Write the formulae used here for calculation. **OR** b. The solubility of ammonium chloride in water at various temperatures is given below:	**3**

Temperature (°C)	10	20	40	60	80
Solubility (g/100mL)	24	37	41	55	66

i. What mass of ammonium chloride would be needed to make a saturated solution of ammonium chloride in 50g of water at 40°C? Write the formula used here for calculation.
ii. What type of solution can be made at 80°C?

29.	a. The major role of the cell wall in bacteria is protecting the cell against changes in osmotic pressure, pressure caused by different solute concentrations in the environment. Bacterial cells swell, but do not burst, in low solute concentrations. What happens to bacterial cells if a compound that interferes with the synthesis of the cell wall is added to an environment with low solute concentrations? b. What is the functional relationship between chloroplasts and mitochondria?	**3**
30.	Town X is situated on the banks of a river. Due to the inadequate release of water from the reservoir, often the agricultural farms of the town suffer from crop failures. a. Which type of irrigation would be suitable for town X? Give a reason. b. Name any two rececent initiatives of water management. Also state their advantages.	**3**
31.	A bullet of mass 10 g moving with a speed of 300 m/s hits a fixed wooden target. The bullet penetrates through 50 cm into the target and comes to rest. a. Find the initial kinetic energy of the bullet. b. Find the resistive force of the target on the bullet. c. How much work is done by the wooden target on the bullet to bring it at rest?	**3**
32.	a. Find the minimum distance required for an echo to be heard. Assume speed of sound in air as 344 m/s at a temperature of 20 ^{0}C. Show all necessary steps. b. Frequency of a wave is 25 Hz. How many crests and troughs will be produced by the source of wave in 6 seconds?	**3**
33.	a. An apple attracts the earth and the earth also attracts the apple towards its centre. Then, why only apple falls towards the earth but not the earth moves towards the apple? Explain. b. Does the velocity of a body during free fall remain constant? Give a supporting statement of your answer.	**3**
	SECTION-D **Q.no. 34 to 36 are long answer questions.**	
34.	**Attempt either option a or b** a. i. Find out the valency of atoms represented by the following three figures.  I II III	**5**

	ii. Identify any two elements from these figures. **OR** b. i. Helium atom has 2 electrons in its valence shell but its valency is not 2. Explain why. ii. An atom of an element has seven electrons in its 2nd orbit that is the outermost shell. Identify the element. What is the atomic number of the element? iii. According to Bohr, what is the maximum capacity of M shell of holding electrons?	
35.	**Attempt either option a or b** a. i. Draw well labelled diagrams of muscles found in the heart and stomach in the human body. ii. State one unique feature not exhibited by the muscles of heart and stomach but exhibited by the muscles of arms. iii. The cell given below is a part of the xylem tissue. Identify the cell and state its function.  iv. A child falls while playing and twists his ankle. He experiences pain in his ankle while walking and has a minor swelling. He goes to the doctor, who on examining the injury, tells the child that he has a sprain. Identify the tissue that gets overstretched causing sprain and pain. **OR** b. i. Draw a labelled diagram of a section of the phloem tissue. ii. We know that each part of the plant performs gaseous exchange on its own. Will there be any change in the epidermal structures involved in the process of gaseous exchange for roots and stem? Explain. iii. Identify the tissue given below which act as shock absorbing cushion around the vital organs.  iv. We are always advised to inhale through our nose and not the mouth. It is because the lining of the nasal cavity helps remove the dust particles and microorganisms. Identify the tissue present in the nasal cavity which helps in the elimination of the same.	**5**
36.	**Attempt either option a or b** a. i. There are three paths leading to the top of the hill as shown in the figure below. In which of the following paths A, B and C more energy is required to reach the top? Why?  	**1+2+2**

	ii. Water is pouring down from a waterfall at the rate of 75 kg/s on the blades of a turbine. If the height of the fall is 100m, then find the power delivered to the turbine in KW unit. iii. Two bodies have masses 2m and m, their kinetic energies are in the ratio 8:1. Find the ratio of their linear momentum. **OR** b. i. During free fall of an object under the gravity of Earth, show that its total mechanical energy remains conserved. ii. A skater of mass 50 kg moves down along the curved path from A to B. The frictional forces are absent. Find his kinetic energy at point B? (take g = 10 m/s^2)  iii. Sumona buys few grams of gold at the poles as per the instructions of one of her friends. She hands over the same when she meets her at the equator. Will the friend agree with the weight of gold bought? Justify your answer.	**2+1+2**
	SECTION - E ***Question No. 37 to 39 are case-based/data -based questions***	
37.	Nucleons are the components of the nucleus of an atom. A nucleon can either be a proton or a neutron. Each element has a unique number of protons in it, which is described by its unique atomic number. However, several atomic structures of an element can exist, which differ in the total number of nucleons. The structure of atom of an element can be simply represented via the total number of protons, electrons, and neutrons present in it. The following graph is plotted against atomic mass and atomic number, for the elements marked as p, q, r, s, t, u, v, and w. Study the graph and answer the following questions.  a. i. What is the relation between s and v? ii. Identify one pair of isobar from the graph. **Attempt either subpart b or c.** b. If atomic number of p is 4, which element is it? **OR** c. If atomic number of v is 17 and its atomic mass is 35, how will you represent its symbol in $^{A}X_{Z}$ format?	**4**

38.	A patient undergoes surgery to remove a tumor from her liver. Post-surgery, the liver regenerates, and the patient's health improves and she lives a normal life.  **Attempt either subpart a or b.** a. Can you identify the type of cell division which takes place in the liver cells during the regeneration of the liver? **OR** b. What is the number of chromosomes present in the new cells formed in the regenerated liver? c. Is the type of cell division observed during the regeneration of liver same as observed during- (i) growth and (ii) formation of gametes in reproductive cells? Give reason for your answer. d. Name the cell organelle present in the liver which is involved in metabolism of biochemicals. Also state the function of the same organelle in the plant cell.	**4**
39.	The Dead Sea straddles the border of Israel and Jordan and is a unique place. The Dead Sea is landlocked and in the lowest valley on Earth. All the minerals of the surrounding countryside get washed into one pool, which in turn gets baked by the Sun. This concentrates the salts so much that the Dead Sea is 10 times as salty as the ocean. It is believed that no one can drown in the Dead Sea even if they try due to the presence of excessive salt.  a. Explain how people are able to float in the Dead Sea without any effort, as shown in the picture. b. On what factors does buoyant force acting on a body immersed in a liquid depend? **<u>Attempt either subpart c or d</u>** c. i. State Archimedes' principle of floatation. ii. A small iron needle sinks in water but a ship made of iron floats in water. Why? **OR** d. i. Density of a body is 90% the density of liquid. It floats in the liquid. Find the percentage volume of the body inside the liquid. ii. An air tight plastic bottle when released under water come up to the surface of water. Explain why.	**4**