

## Half Yearly Common Examination Dec – 2023

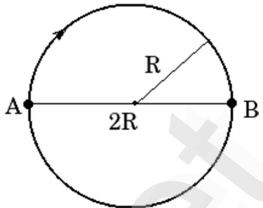
## Science – Answer Key

## IX Standard

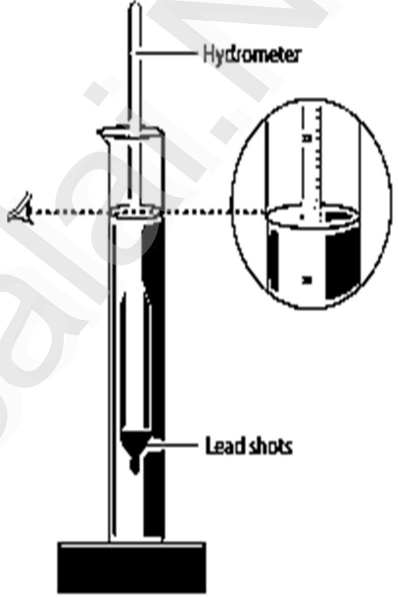
Question No.	Answer Key	Marks						
<b>Part - I</b>								
1	(a) 100 kg	1						
2	(a) density	1						
3	(c) both a and b	1						
4	(a) Concave mirror	1						
5	(c) 2	1						
6	(b) 14	1						
7	(c) Mercury	1						
8	(c) Na	1						
9	(c) Fish, Frog, Lizard, Snake	1						
10	(c) Xylem	1						
11	(c) Testes	1						
12	(c) liver	1						
<b>Part - II</b>								
13.	Least Count: Least count is the least distance measured in a given device by it.	2						
14	If $v < u$ , i.e. if final velocity is less than initial velocity, the velocity decreases with time and the value of acceleration is negative. It is called negative acceleration. It is also called as retardation (or) deceleration.	2						
15	Current is the rate at which charges flow past a point on a circuit. Current (I) is represented as, $I = \frac{q}{t}$ The standard SI unit for current is ampere with the symbol A.	1 1						
16	The protons and neutrons are collectively called nucleons.	2						
	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Ionic bond</th> <th>Covalent bond</th> <th>Coordinate covalent bond</th> </tr> </thead> <tbody> <tr> <td>CaO, CaCl<sub>2</sub>, KBr</td> <td>H<sub>2</sub>O, HF, CO<sub>2</sub>, CCl<sub>4</sub>, Al<sub>2</sub>Cl<sub>6</sub></td> <td>CO</td> </tr> </tbody> </table>	Ionic bond	Covalent bond	Coordinate covalent bond	CaO, CaCl <sub>2</sub> , KBr	H <sub>2</sub> O, HF, CO <sub>2</sub> , CCl <sub>4</sub> , Al <sub>2</sub> Cl <sub>6</sub>	CO	2
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18	“The chemical and physical properties of the elements are the periodic functions of their atomic numbers”.	2						
19	<ul style="list-style-type: none"> <li>• Increases the impurity in the food items</li> <li>• Lack of Nutritional value</li> <li>• Leads to various diseases</li> </ul>	2						
20	<table border="1" style="width: 100%;"> <thead> <tr> <th>Absorption</th> <th>Assimilation</th> </tr> </thead> <tbody> <tr> <td>Absorption is the process by which nutrients obtained after digestion are absorbed by villi and circulated throughout the body by blood and lymph and supplied to all body cells according to their requirements.</td> <td>Assimilation means the incorporation of the absorbed food materials into the tissue cells as their internal and homogenous components.</td> </tr> </tbody> </table>	Absorption	Assimilation	Absorption is the process by which nutrients obtained after digestion are absorbed by villi and circulated throughout the body by blood and lymph and supplied to all body cells according to their requirements.	Assimilation means the incorporation of the absorbed food materials into the tissue cells as their internal and homogenous components.	2		
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21.	Meiosis is important as it produces gametes i.e., male or female germ cells. During meiosis a germ cell or gamete divides to make four new sex cells. As a result of fertilization two gametes join together to form an egg or zygote. Therefore only if gametes are produced, fertilization can take place	2
22	$\mu = \frac{\text{Speed of light in air}}{\text{Speed of light in glass}}$ $= \frac{3 \times 10^8}{2 \times 10^8} = 1.5$ Refractive index of glass = 1.5	2
PART - III		
23	<ol style="list-style-type: none"> <li>1. Linear motion: Motion along a straight line.</li> <li>2. Circular motion: Motion along a circular path.</li> <li>3. Oscillatory motion: Repetitive to and fro motion of an object at regular interval of time. Random motion: Motion of the object which does not fall in any of the above categories.</li> <li>4. Uniform motion: Uniform motion: An object is said to be in uniform motion if it covers equal distances in equal intervals of time</li> <li>5. Non-uniform motion: An object is said to be in Non-uniform motion if it covers unequal distances in equal intervals of time</li> </ol>	Any 4 points
24	<ul style="list-style-type: none"> <li>• The weight of a floating body in a fluid is equal to the weight of the fluid displaced by the body.</li> <li>• The centre of gravity of the floating body and the centre of buoyancy are in the same vertical line.</li> </ul>	2 2
25	<p>Applications of electromagnets – Electromagnetism has caused a great impact on various fields such as medicine, industries, space, etc. In our day to day life, it finds application in;</p> <p>(a) Speakers – In a speaker the electromagnet is placed in front of a permanent magnet. The permanent magnet is fixed whereas the electromagnet is mobile.</p> <p>(b) Maglev – Magnetic levitation trains are suspended with no support other than magnetic fields. In maglev trains two sets of magnets are used. One set to repel and push the train up off the track, and another to move the floating train ahead at a great speed without friction. The train travels along a guideway of magnets which controls the tram's stability and speed using the basic principles of magnets.</p> <p>(c) MRI Scanner – Magnetic resonance imaging is a procedure using sophisticated instruments that work on the principle of electromagnetism that can scan minute details of the human body. Other medical equipment such as X-rays etc., also use this principle for their functioning.</p>	4
26.	<ul style="list-style-type: none"> <li>• Chromatography is a separation technique.</li> <li>• It is used to separate different components of a mixture based on their different solubilities in the same solvent.</li> <li>• There are several types of chromatography based on the above basic principles.</li> <li>• The simplest type is paper chromatography.</li> <li>• This method is used to separate the different coloured dyes in a sample of ink.</li> <li>• A spot of the ink (e.g. black ink) is put on to a piece of chromatography paper.</li> <li>• This paper is then set in a suitable solvent</li> <li>• The black ink separates into its constituent dyes.</li> <li>• As the solvent moves up the paper, the dyes are carried with it and begin to separate. They separate because they have different solubility in the solvent and</li> </ul>	4

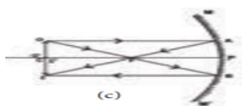
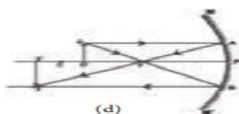
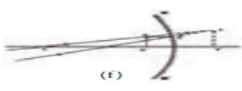
	<p>are adsorbed to different extents by the chromatography paper.</p> <ul style="list-style-type: none"> <li>The chromatogram shows that the black ink contains three dyes.</li> </ul>	
27	<p>The following conclusions were made from the observations.</p> <ul style="list-style-type: none"> <li>Atom has a very small nucleus at the centre.</li> <li>There is a large empty space around the nucleus.</li> <li>The entire mass of an atom is concentrated in a very small positively charged region, which is called Nucleus.</li> <li>The electrons are distributed in the vacant space around the nucleus.</li> <li>The electrons move in circular paths around the nucleus.</li> </ul>	<p><b>Any four points</b> 4</p>
28	<ol style="list-style-type: none"> <li>Substances that have the ability to oxidize other substances are called oxidizing agents. These are also known as electron acceptors as they remove electrons from other substances. Example <math>H_2O_2</math>, <math>MnO_4</math>, <math>CrO_3</math>, <math>Cr_2O_3</math>?</li> <li>The substances that have the ability to reduce other substances are called reducing agents. These are also called as electron donors as they donate electrons to other substances. Example – <math>NaBH_4</math>, <math>LiAlH_2</math> and metals like palladium and platinum</li> </ol>	<p>2 2</p>
29	<p>Xylem is composed of different kinds of elements. They are</p> <ol style="list-style-type: none"> <li>xylem tracheids</li> <li>xylem fibres</li> <li>xylem vessels and</li> <li>xylem parenchyma.</li> </ol> <p><b>(i) Xylem tracheids:</b> They are elongated or tube-like dead cells with hard, thick and lignified walls. Their ends are tapering, blunt or chisel-like. These cells are devoid of protoplast. They have large lumen without any content. Their function is conduction of water and providing mechanical support to the plant.</p> <p><b>(ii) Xylem fibers:</b> These cells are elongated, lignified and pointed at both the ends. Xylem fibres help in conduction of water and nutrients from root to the leaf and also provide mechanical support to the plant.</p> <p><b>(iii) Xylem vessels:</b> They are long cylindrical, tube like structures with lignified walls and wide central lumen. These cells are dead as these do not have protoplast. They are arranged in longitudinal series in which the partitioned walls (transverse walls) are perforated, and so the entire structure looks-like a water pipe. Their main function is transport of water and minerals from root to leaf, and also to provide mechanical strength.</p> <p><b>(iv) Xylem parenchyma:</b> Its cells are living and thin walled. The main function of xylem parenchyma is to store starch and fatty substances.</p>	4
	<ul style="list-style-type: none"> <li>Controls blood sugar and amino acid levels</li> <li>Synthesizes foetal red blood cells</li> <li>Produces fibrinogen and prothrombin, used for clotting of blood</li> <li>Destroys red blood cells</li> <li>Stores iron, copper, vitamins A, and D.</li> <li>Produces heparin (an anticoagulant)</li> <li>Excretes toxic and metallic poisons</li> <li>Detoxifies substances including drugs and alcohol</li> </ul>	<p><b>Any 4 points</b></p>
31. i).	<p>It is transmitted by Aedes aegypti mosquito that has previously bitten an infected person.</p> <p>Symptoms:- Vomiting and abdominal pain, difficulty in breathing,</p>	2

ii).	<p>minute spots on the skin significant bleeding within the skin are also associated with dengue fever.</p> <p>No. The fallopian tube provides the pathway for the egg to travel from the ovary to the uterus. So it is not possible to get pregnant without fallopian tubes.</p>	2
32	<p>Diameter of the circular track <math>D=2R=200</math> m As the athlete completes one round in 40 seconds, thus he will be at point B after 140 seconds by covering three and half rounds. Displacement = <math>2R = 200</math> m Distance covered <math>d = 3.5 \times (2\pi R) = 3.5 \times \frac{22}{7} \times 200 = 2200</math> m</p>	 <p>4</p>

## PART-IV

33).i.	<p><b><u>Hydrometer:-</u></b> A direct-reading instrument used for measuring the density or relative density of the liquid is called hydrometer. Hydrometer is based on the principle of flotation, i.e., the weight of the liquid displaced by the immersed portion of the hydrometer is equal to the weight of the hydrometer.</p> <p>Hydrometer consists of a cylindrical stem having a spherical bulb at its lower end and a narrow tube at its upper end. The lower spherical bulb is partially filled with lead shots or mercury. This helps hydrometer to float or stand vertically in liquids. The narrow tube has markings so that relative density of a liquid can be read directly.</p>	 <p>Diagram m 2</p> <p>Worki ng 5</p>
ii.	<p>The liquid to be tested is poured into the glass jar. The hydrometer is gently lowered into the liquid until it floats freely. The reading against the level of liquid touching the tube gives the relative density of the liquid.</p> <p><b><u>Fleming's left hand rule:-</u></b> The law states that while stretching the three fingers of left hand in perpendicular manner with each other, if the direction of the current is denoted by the middle finger of the left hand and the second finger is for direction of the magnetic field, then the thumb of the left hand denotes the direction of the force or movement of the conductor.</p>	

OR

b) i) & ii)	Position of the object	Ray diagram	Position and nature of the image									
	At C		The image is at the centre of curvature itself. real, inverted and same size as the object									
	Between C and F		The image is beyond C. It is real, inverted and magnified.									
	Between F and P		The image is behind the mirror. It is virtual, erect and magnified.									
34) a).i).	<p><b>Properties of Ionic Compounds:-</b></p> <ul style="list-style-type: none"> <li>• Ionic compounds are crystalline solids at room temperature</li> <li>• They are poor conductors of electricity in solid state. However, in molten state and their aqueous solutions conduct electricity.</li> <li>• They have high melting and boiling point</li> <li>• Soluble in polar solvents and insoluble in non-polar solvent</li> <li>• They have high density and they are quite hard because of the strong electrostatic force between the ions.</li> <li>• They are highly brittle</li> <li>• Undergoes ionic reactions which are practically rapid and instantaneous</li> </ul>											
ii)	<table border="1"> <thead> <tr> <th>Element</th> <th>Atomic Number</th> <th>Configuration</th> </tr> </thead> <tbody> <tr> <td>K</td> <td>19</td> <td>2,8,8,1</td> </tr> <tr> <td>Cl</td> <td>17</td> <td>2,8,7</td> </tr> </tbody> </table>			Element	Atomic Number	Configuration	K	19	2,8,8,1	Cl	17	2,8,7
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Cl	17	2,8,7										

Any 5

2

OR

b). i).	<p><b>Tests to identify Acids and Bases:-</b></p> <p>a) Test with a litmus paper: An acid turns blue litmus paper into red. A base turns red litmus paper into blue.</p> <p>b) Test with an indicator Phenolphthalein: In acid medium, phenolphthalein is colourless. In basic medium, phenolphthalein is pink in colour.</p> <p>c) Test with an indicator Methyl orange: In acid medium, methyl orange is pink in colour. In basic medium, methyl orange is yellow in colour.</p>	3
ii).	<p><b>Oxidation number of Mn in KMnO<sub>4</sub></b></p> $1 + x + 4(-2) = 0$ $1 + x - 8 = 0$ $x - 7 = 0$ $x = 7$ <p>Oxidation number of Mn in KMnO<sub>4</sub> = +7</p>	4
35.a).i)	<p><b>Different types of Transpiration:-</b></p> <p>There are three types of transpiration:</p>	

**Stomatal transpiration:** Loss of water from plants through stomata. It accounts for 90-95% of the water transpired from leaves.

**Cuticular transpiration:** Loss of water in plants through the cuticle.

**Lenticular transpiration:** Loss of water from plants as vapour through the lenticels. The lenticels are tiny openings that protrude from the barks in woody stems and twigs as well as in other plant organs.

3

ii)

Flat worms	Round worms
The flatworms come under phylum Platyhelminthes.	The roundworms come under phylum Nematoda
Flatworms do not have cuticle.	Roundworms have an outer covering called cuticle.
Flatworms are parasitic in nature.	Roundworms live either on water or in soil.
acoelomate	pseudo coelomates

4

b).i).

Macronutrients	Micronutrients
Nutrients required in large amount for the proper functions of the cells.	Nutrients required in very small amount for the proper functions of the cells.
Calcium, potassium, sodium etc, are some macronutrients.	Iron, iodine etc are some micro-nutrients.

2

ii).

**Alimentary canal (digestive tract/gastro-intestinal tract):**

The glands associated with the digestive system are the salivary glands, gastric glands, pancreas, liver and intestinal glands.

Structure of the Alimentary Canal:

Alimentary canal is a muscular coiled, tubular structure. It consists of mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine (consisting of duodenum, jejunum and ileum), large intestine (consisting of caecum, colon and rectum) and anus.

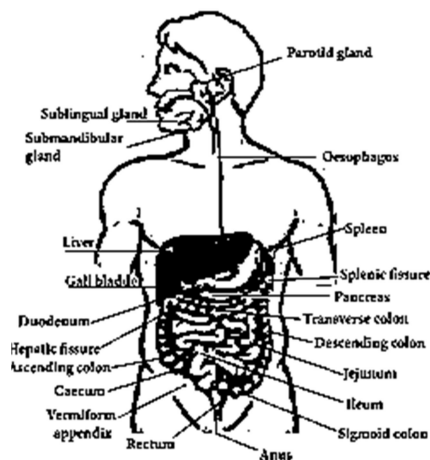
**Mouth:** The mouth leads into the buccal cavity. It is bound by two soft, movable upper and lower lips. The buccal cavity is a large space-bound above by the palate (which separates the windpipe and food tube), below by the throat and on the sides by the jaws. The jaws bear teeth.

**Teeth:** Teeth are hard structures meant for holding, cutting, grinding and crushing the food. In human beings, two sets of teeth (Diphyodont) are developed in their lifetime.

The first appearing set of 20 teeth called temporary or milk teeth are replaced by the second set of thirty-two permanent teeth, sixteen in each jaw. Each tooth has a root fitted in the gum (Thecodont). Permanent teeth are of four types (Heterodont), according to their structure and function namely incisors, canines, premolars, and molars.

**Salivary glands:** Three pairs of salivary glands are present in the mouth cavity. They are: parotid glands, sublingual glands and submaxillary or submandibular glands

- Parotid glands are the largest salivary glands, which lie in the cheeks in front of the ears (in Greek Par – near; otid – ear).
- Sublingual glands are the smallest glands and lie beneath the tongue.
- Submaxillary or Submandibular glands lie at the angles of the lower jaw.



5

The salivary glands secrete a viscous fluid called saliva, approximately 1.5 liters per day. It digests starch by the action of the enzyme ptyalin (amylase) in the saliva which converts starch (polysaccharide) into maltose (disaccharide). Saliva also contain an antibacterial enzyme called lysozyme.

**Tongue:** The tongue is a muscular, sensory organ which helps in mixing the food with the saliva. The taste buds on the tongue help to recognize the taste of food.

The masticated food in the buccal cavity becomes a bolus which is rolled by the tongue and passed through pharynx into the oesophagus by swallowing. During swallowing, the epiglottis (a muscular flap-like structure at the tip of the glottis, beginning of trachea) closes and prevents the food from entering into trachea (wind pipe).

**Pharynx** is a membrane lined cavity behind the nose and mouth, connecting them to the oesophagus. It serves as a pathway for the movement of food from mouth to oesophagus.

**Oesophagus** or the food pipe is a muscular-membranous canal about 22 cm in length. It conducts food from pharynx to the stomach by peristalsis (wave-like movement) produced by the rhythmic contraction and relaxation of the muscular walls of alimentary canal.

**Stomach** is a wide J-shaped muscular organ located between oesophagus and the small intestine. The gastric glands present in the inner walls of the stomach secrete gastric juice. The gastric juice is colourless, highly acidic, containing mucus, hydrochloric acid and enzymes rennin (in infants) and pepsin.

**Small intestine** is the longest part of the alimentary canal, which is a long coiled tube measuring about 5 – 7 m. It comprises three parts- duodenum, jejunum and ileum.

1. Duodenum is C-shaped and receives the bile duct (from liver) and pancreatic duct (from the pancreas).
2. Jejunum is the middle part of the small intestine. It is a short region of the small intestine. The secretion of the small intestine is intestinal juice which contains enzymes like sucrase, maltase, lactase and lipase.
3. Ileum forms the lower part of the small intestine and opens into the large intestine. Ileum is the longest part of the small intestine. It contains minute finger-like projections called villi (one millimeter in length) where absorption of food takes place. They are approximately 4 million in number. Internally, each villus contains fine blood capillaries and lacteal tubes.

The small intestine serves both for digestion and absorption. It receives

- the bile from liver and
- the pancreatic juice from pancreas in the duodenum. The intestinal glands secrete the intestinal juices.

**Liver** is the largest digestive gland of the body which is reddish brown in colour. It is divided into two main lobes, right and left lobes. The right lobe is larger than the left lobe. On the under surface of the liver, gall bladder is present. The liver cells secrete bile which is temporarily stored in the gall bladder.

**Pancreas** is a lobed, leaf shaped gland situated between the stomach and duodenum. Pancreas acts both as an exocrine gland and as an endocrine gland. The gland's upper surface bears the islets of Langerhans which have endocrine cells and secrete hormones in which  $\alpha$  (alpha) cells secrete glucagon and  $\beta$  (beta) cells secrete insulin.

The intestinal glands secrete intestinal juice called succusentericus which contains enzymes like maltase, lactase, sucrase and lipase which act in an alkaline medium. From the duodenum the food is slowly moved down to ileum, where the digested food gets absorbed

### **Large intestine**

The unabsorbed and undigested food is passed into the large intestine. It extends from the ileum to the anus. It is about 1.5 meters in length. It has three parts- caecum, colon and rectum.

The caecum is a small blind pouch like structure situated at the junction of the small and

<p>large intestine. From its blind end a finger – like structure called vermiform appendix arises. It is a vestigial (functionless) organ in human beings. The colon is much broader than ileum. It passes up the abdomen on the right (ascending colon), crosses to the left just below the stomach (transverse colon) and down on the left side (descending colon).</p>	
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