



**SSLC PUBLIC EXAMINATION – MARCH -2025**

**SCIENCE –ANSWER KEY**

**Instructions :** 1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2. Use **Blue** or **Black** ink to write and underline pencil to draw diagrams.

**Note :** This Question Paper contains **four** parts.

**PART-I**

**Note: i) Answer all questions.**

**(ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.**

**12x1=12**

Q.No	Option	Answer	Marks
1	(c)	$98 \times 10^4$ dyne	1
2	(d)	bifocal lens	1
3	(b)	10 V	1
4	(b)	Irene Curie	1
5	(b)	Hg	1
6	(b)	increases	1
7	(c)	$1 \times 10^{-11}$ M	1
8	(b)	Combustion of ethanol	1
9	(d)	endodermis	1
10	(b)	Metacentric	1
11	(a)	December 1	1
12	(d)	Scratch	1

**SECTION – II**

**Note: Answer any seven questions. Question No. 22 is compulsory.**


**7X2=14**

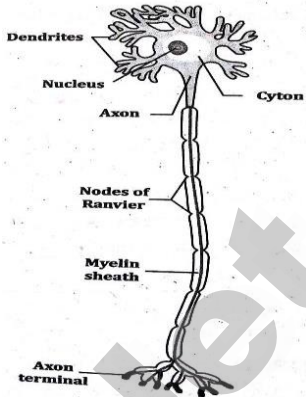
13	One calories is the amount of heat energy required to rise the temperature of 1 gram of water through 1°C.	2
14	It is the wave in which particles vibrate along the direction of propagation of wave.	2
15	Air and moisture are the two necessary conditions for rusting of iron.	2
16	1. Functional group -OH → (iii) Alcohol 2. Heterocyclic compounds → (iv) Furan 3. Unsaturated compounds → (v) Ethene 4. Soap → (ii) Potassium Stearate 5. Carbocyclic compounds → (i) Benzene	2
17	<ul style="list-style-type: none"> <li>Valves regulate blood flow in single direction.</li> <li>It prevents backward flow of blood into ventricles.</li> </ul>	2
18	<ul style="list-style-type: none"> <li>Bolting is the sudden shoot elongation followed by flowering.</li> <li>It can be induced artificially by treatment of gibberellin.</li> </ul>	2
19	<b>A – Exine</b> <b>B – Intine</b> <b>C – Generative cell</b> <b>D – Vegetative nucleus</b>	
20	<ul style="list-style-type: none"> <li>Kiwi have learnt to walk. According to use and disuse theory, wings of Kiwi degenerate.</li> <li>This occurs in response to their change in habitat. Thus, it is an acquired character.</li> </ul>	2
21	Ecological problems like floods, drought, soil erosion, etc., will arise if trees are cut down.	2
22	molecular mass of $\text{CH}_4 = 12 + 4$ $= 16 \text{ g}$ $\text{Mass \% of carbon} = \frac{12}{16} \times 100$ $= 75 \%$ $\text{Mass \% of hydrogen} = \frac{4}{16} \times 100$ $= 25 \%$	2

## SECTION - III

**Note: Answer any three of the following questions. Question No. 32 is compulsory.**

**7X4=28**

23	<p><b>According to Boyle's law</b> <math>PV = \text{Constant}</math> .....(1)</p> <p><b>According to Charles's law</b> <math>\frac{V}{T} = \text{Constant}</math> .....(2)</p> <p><b>According to Avogadro's law</b> <math>\frac{V}{n} = \text{Constant}</math> .....(3)</p> <p>Combine (1), (2) &amp; (3) <math>\frac{PV}{nT} = \text{Constant}</math> .....(4)</p> <p>This is called a combined law of gases.</p> <p>Gas contains <math>\mu</math> moles. <math>\therefore n = \mu N_A</math> .....(5)</p> <p>(5) in (4), <math>\frac{PV}{\mu N_A T} = \text{Constant}</math></p> <p><math>\frac{PV}{\mu N_A T} = k_B</math> (<math>k_B</math> = Boltzmann constant = <math>1.38 \times 10^{-23} \text{ JK}^{-1}</math>)</p> <p><math>PV = \mu N_A k_B T</math></p> <p>Considering <math>\mu N_A k_B = R = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}</math> <math>R</math> is Universal gas constant.</p> <p>Thus ideal gas equation (or) equation of state is <b><math>PV = RT</math></b>.</p>				4																												
24	<table><thead><tr><th>Myopia (short sightedness)</th><th>Hypermetropia (long sightedness)</th></tr></thead><tbody><tr><td>1. Nearby objects can be seen clearly.</td><td>1. Nearby objects cannot be seen clearly.</td></tr><tr><td>2. Distant objects cannot be seen clearly.</td><td>2. Distant objects can be seen clearly.</td></tr><tr><td>3. Due to lengthening of eye ball</td><td>3. Due to shortening of eye ball.</td></tr><tr><td>4. Far point comes closer.</td><td>4. Near point moves farther.</td></tr><tr><td>5. Image is formed before retina.</td><td>5. Image is formed behind retina.</td></tr><tr><td>6. Corrected using concave lens.</td><td>6. Corrected using convex lens.</td></tr></tbody></table>		Myopia (short sightedness)	Hypermetropia (long sightedness)	1. Nearby objects can be seen clearly.	1. Nearby objects cannot be seen clearly.	2. Distant objects cannot be seen clearly.	2. Distant objects can be seen clearly.	3. Due to lengthening of eye ball	3. Due to shortening of eye ball.	4. Far point comes closer.	4. Near point moves farther.	5. Image is formed before retina.	5. Image is formed behind retina.	6. Corrected using concave lens.	6. Corrected using convex lens.			4														
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25	<table><thead><tr><th>Properties</th><th><math>\alpha</math> rays</th><th><math>\beta</math> rays</th><th><math>\gamma</math> rays</th></tr></thead><tbody><tr><td>Definition</td><td>Helium nucleus (<math>{}_2\text{He}^4</math>).</td><td>Electrons (<math>{}_{-1}\text{e}^0</math>).</td><td>Electromagnetic waves.</td></tr><tr><td>Charge</td><td>Positively charged Charge is <math>+2e</math>.</td><td>Negatively charged Charge is <math>-e</math>.</td><td>neutral particles Charge is 0.</td></tr><tr><td>Ionising power</td><td>Very high.</td><td>Lower than <math>\alpha</math> rays.</td><td>Very less.</td></tr><tr><td>Penetrating power</td><td>Low</td><td>Greater than <math>\alpha</math> rays.</td><td>Very high</td></tr><tr><td>electric and magnetic field</td><td>Deflected by both fields.</td><td>Deflected by both fields; but in opposite direction</td><td>Not deflected by both fields.</td></tr><tr><td>Speed</td><td>1/10 to 1/20 times the speed of light.</td><td>can go up to 9/10 times the speed of light.</td><td>Same as speed of light.</td></tr></tbody></table>	Properties	$\alpha$ rays	$\beta$ rays	$\gamma$ rays	Definition	Helium nucleus ( ${}_2\text{He}^4$ ).	Electrons ( ${}_{-1}\text{e}^0$ ).	Electromagnetic waves.	Charge	Positively charged Charge is $+2e$ .	Negatively charged Charge is $-e$ .	neutral particles Charge is 0.	Ionising power	Very high.	Lower than $\alpha$ rays.	Very less.	Penetrating power	Low	Greater than $\alpha$ rays.	Very high	electric and magnetic field	Deflected by both fields.	Deflected by both fields; but in opposite direction	Not deflected by both fields.	Speed	1/10 to 1/20 times the speed of light.	can go up to 9/10 times the speed of light.	Same as speed of light.				4
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26	<p>i. It explains Gay-Lussac's law.</p> <p>ii. It helps in the determination of atomicity of gases.</p> <p>iii. Molecular formula of gases can be derived using Avogadro's law</p> <p>iv. It determines the relation between molecular mass and vapour density.</p> <p>v. It helps to determine gram molar volume of all gases (i.e., 22.4 litre at S.T.P)</p>				4																												
27	<p>(i) An alloy is a homogeneous mixture of two or more metals or of one or more metals with certain non-metallic elements.</p> <p><b>(ii) Reasons for alloying:</b></p> <p>i. To modify appearance and colour</p> <p>ii. To modify chemical activity.</p> <p>iii. To lower the melting point.</p> <p>iv. To increase hardness and tensile strength.</p> <p>v. To increase resistance to electricity.</p>				4																												
28	<p><b>Structure of Soap :</b></p> <p>* <b>Polar end:</b> It is hydrophilic (water loving). Short head with carboxylate group (<math>-\text{COONa}</math>)</p> <p>* <b>Non-polar end :</b> It is hydrophobic (water hating). Long tail of hydrocarbon chain.</p> <p>Cleansing action of Soap:</p> <div></div> <p>* When a soap is dissolved in water, molecules join together as clusters called micelles.</p> <p>* Dirt is surrounded by non-polar end.</p>				4																												

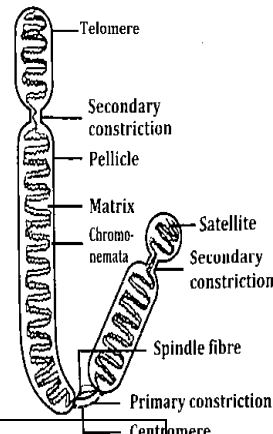
	<ul style="list-style-type: none"> <li>* Polar end makes micelles soluble in water.</li> <li>* Thus, dirt is washed away with the soap.</li> </ul>	
29	<p>Locomotion in leech takes place by,</p> <p><b>Looping or crawling movement:</b></p> <ul style="list-style-type: none"> <li>* It occurs by contraction and relaxation of muscles.</li> <li>* The two suckers are used for attachment during movement.</li> </ul> <p><b>Swimming movement:</b></p> <ul style="list-style-type: none"> <li>* Leeches swim very actively and perform undulating movements in water.</li> </ul>	4
30	<p><b>(i) Cyton / Cell body / Perikaryon :</b></p> <ul style="list-style-type: none"> <li>* It has nucleus with cytoplasm called neuroplasm.</li> <li>* Cytoplasm has Nissl's granules and other cell organelles.</li> <li>* Neurofibrils help in transmission of nerve impulse.</li> </ul> <p><b>(ii) Dendrites:</b></p> <ul style="list-style-type: none"> <li>* They are branched cytoplasmic processes</li> <li>* They project from surface of the cell body.</li> <li>* They conduct nerve impulses towards cyton.</li> <li>* They increase the surface area for receiving signals.</li> </ul> <p><b>(iii) Axon:</b> It is a single, elongated, slender projection.</p> <ul style="list-style-type: none"> <li>* Axon end has <b>Synaptic knobs</b>.</li> <li>* Its plasma membrane is called <b>axolemma</b></li> <li>* Its cytoplasm is called <b>axoplasm</b>.</li> <li>* <b>Myelin sheath</b> acts as insulator and ensures rapid transmission of nerve impulses. It is covered by <b>neurilemma</b>.</li> <li>* <b>Nodes of Ranvier</b> - Depressions in Myelin sheath</li> <li>* <b>Synapse / synaptic junction</b> - Between synaptic knob of one neuron and dendron of next neuron.</li> <li>* Information from one neuron is passed to another through synapse with the release of chemicals called <b>Neurotransmitters</b>.</li> </ul> 	4
31	<p><b>(i)</b></p> <ul style="list-style-type: none"> <li>* <b>Loss of topsoil</b> : Soil erosion removes topsoil which reduces the fertility.</li> <li>* <b>Soil compaction</b> : Due to this, ability of the soil to absorb water is reduced.</li> <li>* <b>Water pollution</b> : It increases sedimentation in streams &amp; rivers causing reduction of fishes.</li> <li>* Soil erosion causes loss of humus, nutrients and decreases soil fertility</li> <li>* It disturbs the soil structure, fertility, acidity, etc., thus disrupting the ecosystem.</li> </ul> <p><b>(ii)</b></p> <ul style="list-style-type: none"> <li>* Retain vegetation cover.</li> <li>* Cattle grazing should be controlled.</li> <li>* Crop rotation and soil management.</li> <li>* Runoff water should be stored in catchment.</li> <li>* Reforestation, terracing and contour ploughing.</li> <li>* Wind speed is controlled by planting trees as shelterbelt.</li> </ul>	4
32	<p><b>Solution:</b> When the source is moving towards the stationary listener, the expression for apparent frequency is</p> $n' = \left( \frac{v}{v - v_s} \right) n$ $= \left( \frac{v}{v - \left( \frac{1}{10} \right) v} \right) n = \left( \frac{10}{9} \right) n$ $= \left( \frac{10}{9} \right) \times 90 = 100 \text{ Hz}$	4

## SECTION - IV

Note: Answer all the questions.

3X7=21

33 (a)	<p><b>(i) Law of Conservation of momentum:</b> There is no change in the linear momentum of a system of bodies as long as no net external force acts on them.</p> <p><b>Proof:</b></p> <div><div><div><div><div><div></div><div><math>u_1</math></div></div><div><math>m_1</math></div><div>A</div></div><div><div><div></div><div><math>u_2</math></div></div><div><math>m_2</math></div><div>B</div></div></div><div><div><div><div><math>F_A</math></div><div><math>F_B</math></div></div><div><math>m_1</math></div><div><math>m_2</math></div><div>A</div><div>B</div></div></div><div><div><div><div><math>v_1</math></div><div><math>v_2</math></div></div><div><math>m_1</math></div><div><math>m_2</math></div><div>A</div><div>B</div></div></div></div><div><div>Before collision</div><div>on collision</div><div>After collision</div></div></div> <p>* Let A and B with mass <math>m_1</math>, <math>m_2</math> move in straight line with velocity <math>u_1</math>, <math>u_2</math> such that <math>u_1 &gt; u_2</math>. * At 't second', they have a collision. * After collision, A and B move in same straight line with velocity <math>v_1</math> and <math>v_2</math>.</p> <p style="text-align: center;">Force on body B due to A, <math>F_A = m_2 (v_2 - u_2)/t</math> Force on body A due to B, <math>F_B = m_1 (v_1 - u_1)/t</math> By Newton's III law of motion, Action force = Reaction force <math>F_B = -F_A</math> <math>m_1 (v_1 - u_1)/t = -m_2 (v_2 - u_2)/t</math> <math>m_1 v_1 + m_2 v_2 = m_1 u_1 + m_2 u_2</math> -----</p> <p>The above equation confirms <b>in the absence of an external force, the algebraic sum of the momentum after collision is numerically equal to sum of the momentum before collision.</b></p> <p>Hence the law of conservation linear momentum is proved.</p> <p><b>(ii) The principle of moments.</b> At equilibrium, the algebraic sum of the moments of all the individual forces about any point is equal to zero. <b>Moment of clockwise direction = Moment of anticlockwise direction</b></p>	5												
		2												
(b)	<p>(i) It is the rate of flow of charges in a conductor. (or) It is the amount of charges flowing in any cross section of a conductor in unit time. <math>I = \frac{Q}{t}</math> (ii) * SI unit of electric current is ampere (A). * Current flowing through a conductor is said to be one ampere, when a charge of one coulomb flows across any cross-section of a conductor, in one second. <math>1 \text{ ampere} = \frac{1 \text{ coulomb}}{1 \text{ second}}</math> (iii) <b>Ammeter.</b> It should be <b>connected in series</b> in a circuit.</p>	2 3 2												
34 (a) (i)	<table><tr><td><b>Hygroscopic substances</b></td><td><b>Deliquescence substances</b></td></tr><tr><td>1. When exposed to atmosphere, they absorb moisture and <b>do not dissolve</b>.</td><td>1. When exposed to atmosphere, they absorb moisture and <b>dissolve</b>.</td></tr><tr><td>2. Do not change its physical state.</td><td>2. <b>Change its physical state</b> on exposure to air.</td></tr><tr><td>3. <b>Amorphous</b> solids or liquids.</td><td>3. <b>Crystalline</b> solids.</td></tr><tr><td>4. Do not form saturated solutions.</td><td>4. <b>Form saturated solutions</b>.</td></tr><tr><td>5. <b>Ex:</b> Quick lime, Silica gel.</td><td>5. <b>Ex:</b> Caustic soda, Caustic potash.</td></tr></table> <p>(ii) * In cold regions, solubility of gas in liquid is more at lower temperature. * Thus, more oxygen is dissolved in water. Hence, aquatic animals live more in cold regions.</p> <p>(iii) * It is the percentage by volume of solute (in ml) present in the given volume of the solution. Volume percentage = <math>\frac{\text{Volume of the solute}}{\text{Volume of the solute} + \text{Volume of the solvent}} \times 100</math></p>	<b>Hygroscopic substances</b>	<b>Deliquescence substances</b>	1. When exposed to atmosphere, they absorb moisture and <b>do not dissolve</b> .	1. When exposed to atmosphere, they absorb moisture and <b>dissolve</b> .	2. Do not change its physical state.	2. <b>Change its physical state</b> on exposure to air.	3. <b>Amorphous</b> solids or liquids.	3. <b>Crystalline</b> solids.	4. Do not form saturated solutions.	4. <b>Form saturated solutions</b> .	5. <b>Ex:</b> Quick lime, Silica gel.	5. <b>Ex:</b> Caustic soda, Caustic potash.	3 2 2
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(b)	(i)	<table><tr><th>Reversible reaction</th><th>Irreversible reaction</th></tr><tr><td>1. It can be reversed under suitable condition. 2. Both forward and backward reactions take place simultaneously. 3. It attains equilibrium. 4. It is relatively slow.</td><td>1. It cannot be reversed. 2. It proceeds only in forward direction. 3. Equilibrium is not attained. 4. It is fast.</td></tr></table>	Reversible reaction	Irreversible reaction	1. It can be reversed under suitable condition. 2. Both forward and backward reactions take place simultaneously. 3. It attains equilibrium. 4. It is relatively slow.	1. It cannot be reversed. 2. It proceeds only in forward direction. 3. Equilibrium is not attained. 4. It is fast.	4																				
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	(ii)	<p>Calcium carbonate(A) decompose to give calcium oxide(B) and carbon dioxide(C) on heating.</p> <div><math display="block">\text{CaCO}_{3(s)} \xrightarrow{\text{heat}} \text{CaO}_{(s)} + \text{CO}_{2(s)} \uparrow</math><p style="text-align: center;"><i>calcium carbonate</i>                      <i>Calcium oxide</i>                      <i>Carbon dioxide</i></p></div> <p>Carbon dioxide (C) is mixed with water to form carbonic acid</p> <div><math display="block">\text{CO}_{2(g)} + \text{H}_2\text{O}_{(g)} \longrightarrow \text{H}_2\text{CO}_{3(l)}</math><p style="text-align: center;"><i>Carbon dioxide</i>                      <i>Carbonic acid</i></p></div> <div><p>Compound A → CaCO<sub>3</sub> Compound B → CaO Compound C → CO<sub>2</sub> gas</p></div>	3																								
35 (a)	(i) Monocot root and Dicot root:	<table><tr><th>S.No</th><th>Tissues</th><th>Dicot Root (Bean)</th><th>Monocot Root (Maize)</th></tr><tr><td>1.</td><td>Number of xylem</td><td>Tetrarch</td><td>Polyarch</td></tr><tr><td>2.</td><td>Cambium</td><td>Present</td><td>Absent</td></tr><tr><td>3.</td><td>Secondary growth</td><td>Present</td><td>Absent</td></tr><tr><td>4.</td><td>Pith</td><td>Absent</td><td>Present</td></tr><tr><td>5.</td><td>Conjunctive tissue</td><td>Parenchyma</td><td>Sclerenchyma</td></tr></table>	S.No	Tissues	Dicot Root (Bean)	Monocot Root (Maize)	1.	Number of xylem	Tetrarch	Polyarch	2.	Cambium	Present	Absent	3.	Secondary growth	Present	Absent	4.	Pith	Absent	Present	5.	Conjunctive tissue	Parenchyma	Sclerenchyma	4
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	(ii) Aerobic and Anaerobic respiration:	<table><tr><th>Aerobic respiration</th><th>Anaerobic respiration</th></tr><tr><td>1) Takes place in presence of oxygen.</td><td>1) Takes place in absence of oxygen.</td></tr><tr><td>2) Occurs in most plants and animals</td><td>2) Occurs in some bacteria.</td></tr><tr><td>3) Carbohydrate is completely oxidized into carbon dioxide, water and energy.</td><td>3) Glucose is converted into ethanol (in plants) or lactate (in bacteria).</td></tr><tr><td>4) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> + 6O<sub>2</sub>→ 6CO<sub>2</sub> + 6H<sub>2</sub>O + ATP</td><td>4) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>→ 2 CO<sub>2</sub> + 2 C<sub>2</sub>H<sub>5</sub>OH + Energy (ATP)</td></tr></table>	Aerobic respiration	Anaerobic respiration	1) Takes place in presence of oxygen.	1) Takes place in absence of oxygen.	2) Occurs in most plants and animals	2) Occurs in some bacteria.	3) Carbohydrate is completely oxidized into carbon dioxide, water and energy.	3) Glucose is converted into ethanol (in plants) or lactate (in bacteria).	4) C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> + 6O <sub>2</sub> → 6CO <sub>2</sub> + 6H <sub>2</sub> O + ATP	4) C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> → 2 CO <sub>2</sub> + 2 C <sub>2</sub> H <sub>5</sub> OH + Energy (ATP)	3														
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(b)	(i) * Chromosomes are thin, long, thread like structures. * It consists of two identical strands called sister chromatids. * They are held together by centromere. * They are made up of DNA, RNA, chromosomal proteins, etc., * Proteins provide structural support to the chromosome. * A chromosome consists of the following regions. <b>i) Primary constriction / centromere:</b> Two arms meet at this point. <b>ii) Secondary constriction:</b> It occur at any point. <b>iii) Telomere:</b> End of the chromosome. Provides stability. <b>iv) Satellite:</b> Some have an elongated knob-like appendage.																										
	(ii) Somatic gene therapy and Germ line gene therapy.	<table><tr><th>Somatic gene therapy</th><th>Germ line gene therapy</th></tr><tr><td>1. It replaces defective gene in somatic cells. 2. It cannot be carried to next generation.</td><td>It replaces defective gene in germ cell. It can be carried to next generation.</td></tr></table>	Somatic gene therapy	Germ line gene therapy	1. It replaces defective gene in somatic cells. 2. It cannot be carried to next generation.	It replaces defective gene in germ cell. It can be carried to next generation.																					
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