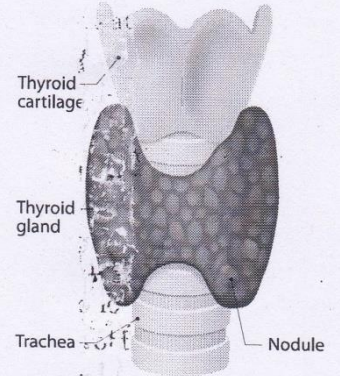


**SSLC SCIENCE GOVT. PUBLIC EXAMINATION – APRIL – 2024**  
**TENTATIVE ANSWER KEY**

Q.No	Answer	Marks
<b>PART – I (12 Marks)</b>		
1	(b) Stem	1
2	(c) Fatty matter	1
3	(d) $8.31\text{J mol}^{-1}\text{K}^{-1}$	1
4	(c) electrical energy	1
5	(b) Restriction endonuclease	1
6	(a) $6.023 \times 10^{23}$	1
7	(b) Pitutary gland	1
8	(c) the followers are brightly coloured, have smell and nectar.	1
9	(c) mass of the object	1
10	(c) Atrium → Ventricle → Arteries → Vein	1
11	(c) $2\text{CO}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g})$	1
12	(c) Carcinoma	1
<b>PART – II (Any Seven Questions. Q.No.22 is compulsory) (14 marks)</b>		
13	<p><b>Co-efficient of apparent expansion:</b></p> <ul style="list-style-type: none"> <li>➤ Ratio of apparent raise in the volume of liquid per degree rise in temperature to its unit volume is co-efficient of apparent expansion.</li> <li>➤ Its SI unit is <math>\text{K}^{-1}</math></li> </ul>	2
14	<p><b>Tungsten – not used as Fuse wire:</b></p> <ul style="list-style-type: none"> <li>➤ Fuse is working in the principle of heating effect of current.</li> <li>➤ Fuse wire is made up of an alloy of low melting point.</li> <li>➤ The melting point of tungsten is very high.</li> <li>➤ So Tungsten is not used as a fuse wire</li> </ul>	2
15	<p><b>Rust – Formation of Rust:</b></p> <ul style="list-style-type: none"> <li>➤ When iron is exposed to moist air, it forms a layer of brown hydrated ferric oxide on its surface.</li> <li>➤ This compound is known as rust and the phenomenon of formation of rust is known as rusting.</li> <li>➤ <math>4\text{Fe} + 3\text{O}_2 + x\text{H}_2\text{O} \rightarrow 2\text{Fe}_2\text{O}_3</math></li> </ul>	1 1
16	<p><b>Stage:</b></p> <ul style="list-style-type: none"> <li>➤ Stage is the background appearing when we open the scratch window.</li> <li>➤ The background will most often be white.</li> <li>➤ The user can change the background colour as he like</li> </ul>	2
17	<p><b>Pacemaker of Heart:</b></p> <ul style="list-style-type: none"> <li>➤ The S.A node is initiating the impulse which can stimulate the heart muscles to contract.</li> </ul>	2

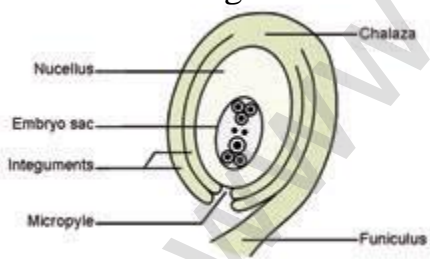
	<ul style="list-style-type: none"> <li>➤ So the Sino atrial (SA node) node is called as the pacemaker of the heart.</li> </ul>	
18	<b>Parts of Hind Brain:</b> <ul style="list-style-type: none"> <li>➤ Cerebellum</li> <li>➤ Pons</li> <li>➤ Medulla oblongata</li> </ul>	2
19		2
20	<b>Colostrum:</b> <ul style="list-style-type: none"> <li>➤ The first fluid which is released from the mammary gland after child birth is called as Colostrum.</li> <li>➤ Milk production is stimulated by prolactin secreted from the anterior pituitary.</li> <li>➤ The ejection of milk is stimulated by posterior pituitary hormone Oxytocin</li> </ul>	2
21	<b>Metastasis:</b> <ul style="list-style-type: none"> <li>➤ The cancerous cells ingrate to distant parts of the body and affect new tissues.</li> <li>➤ This process is called metastasis.</li> <li>➤ The frequent sites of metastasis are lungs, liver, skin and brain.</li> </ul>	
22	<b>The ionic product of water (ie) = <math>\text{pH} + \text{pOH} = 14</math></b> <b>given:</b> $\text{pH} = 4.5$ <b>Asked:</b> $\text{pOH} = ?$ <b>Solution:</b> $\text{pH} + \text{pOH} = 14$ $\text{pOH} = 14 - \text{pH}$ $= 9.5$	1 1
<b>PART – III (Any Seven Questions. Q.No.32 is compulsory) (28 Marks)</b>		
23	<b>Types of Inertia:</b> <b>Types of Inertia:</b> (i) Inertia of rest (ii) Inertia of motion (iii) Inertia of direction <b>a) Inertia of rest:</b> <ul style="list-style-type: none"> <li>➤ The resistance of a body to change its state of rest is called Inertia of rest.</li> <li>➤ Example: When you vigorously shake the branches of a tree,</li> </ul>	1 1 1 1

	<p>some of the leaves and fruits are detached and they fall down.</p> <p><b>b) Inertia of motion</b></p> <ul style="list-style-type: none"> <li>➤ The resistance of a body to change its state of motion is called inertia of motion.</li> <li>➤ Example: An athlete runs some distance before jumping, because, this will help him jump longer and higher.</li> </ul> <p><b>c) Inertia of direction</b></p> <ul style="list-style-type: none"> <li>➤ The resistance of a body to change its direction of motion is called Inertia of direction.</li> <li>➤ Example: When you make a sharp turn while driving a car, you tend to lean sideways</li> </ul>					
24	<p><b>a) Artificial and Natural Radioactivity:</b></p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Natural Radioactivity</th> <th style="width: 50%;">Artificial Radioactivity</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>➤ Emission of radiation due to self-disintegration of nucleus.</li> <li>➤ Alpha(<math>\alpha</math>), beta(<math>\beta</math>) and gamma(<math>\gamma</math>) radiations are emitted.</li> <li>➤ It is a spontaneous process</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>➤ Emission of radiation due to induced process.</li> <li>➤ Mostly elementary particles such a neutron, positron, etc. are emitted.</li> <li>➤ It is an induced process</li> </ul> </td> </tr> </tbody> </table> <p><b>b) Devices – working on the heating effect of current:</b></p> <ul style="list-style-type: none"> <li>➤ Electric iron box,</li> <li>➤ Electric heater and</li> <li>➤ Electric toaster</li> </ul>	Natural Radioactivity	Artificial Radioactivity	<ul style="list-style-type: none"> <li>➤ Emission of radiation due to self-disintegration of nucleus.</li> <li>➤ Alpha(<math>\alpha</math>), beta(<math>\beta</math>) and gamma(<math>\gamma</math>) radiations are emitted.</li> <li>➤ It is a spontaneous process</li> </ul>	<ul style="list-style-type: none"> <li>➤ Emission of radiation due to induced process.</li> <li>➤ Mostly elementary particles such a neutron, positron, etc. are emitted.</li> <li>➤ It is an induced process</li> </ul>	<p>2</p> <p>2</p>
Natural Radioactivity	Artificial Radioactivity					
<ul style="list-style-type: none"> <li>➤ Emission of radiation due to self-disintegration of nucleus.</li> <li>➤ Alpha(<math>\alpha</math>), beta(<math>\beta</math>) and gamma(<math>\gamma</math>) radiations are emitted.</li> <li>➤ It is a spontaneous process</li> </ul>	<ul style="list-style-type: none"> <li>➤ Emission of radiation due to induced process.</li> <li>➤ Mostly elementary particles such a neutron, positron, etc. are emitted.</li> <li>➤ It is an induced process</li> </ul>					
25	<p><b>a) Heating of <math>MgSO_4 \cdot 7H_2O</math>:</b></p> <ul style="list-style-type: none"> <li>➤ When magnesium sulphate hepta hydrate crystals are gently heated,</li> <li>➤ It loses seven water molecules, and becomes anhydrous magnesium sulphate.</li> <li>➤ <math>MgSO_4 \cdot 7H_2O \rightarrow MgSO_4 + 7 H_2O</math></li> </ul> <p><b>b) Solubility:</b></p> <ul style="list-style-type: none"> <li>➤ Solubility is defined as the number of grams of a solute that can be dissolved in 100 g of a solvent to form its saturated solution at a given temperature and pressure.</li> <li>➤ Thus the solubility of NaCl in water is <b>36 g</b> at <math>25^\circ C</math>.</li> </ul> $\text{Solubility} = \frac{\text{Mass of the solute}}{\text{Mass of the solvent}} \times 100$	<p>2</p> <p>2</p>				
26	<p><b>a) Respiratory Quotient:</b></p> <ul style="list-style-type: none"> <li>➤ Respiratory quotient is the ratio of volume of carbon dioxide liberated and the volume of oxygen consumed during respiration.</li> <li>➤ It is expressed as <math>RQ = \frac{\text{Volume of } CO_2 \text{ liberated}}{\text{Volume of } O_2 \text{ consumed}}</math></li> </ul> <p><b>b) Light Dependent reaction should occur before Light</b></p>	<p>2</p> <p>2</p>				

	<p><b>independent reaction:</b></p> <ul style="list-style-type: none"> <li>➤ In the light-independent reaction or calvin cycle, the energized electrons from the light-dependent reactions provide the energy to form carbohydrates.</li> </ul>																	
27	<p><b>Dental formula of Rabbit:</b></p> <ul style="list-style-type: none"> <li>➤ ( I 2/1, C 0/0, PM 3/2, M 3/3 )</li> <li>➤ Rabbit has no Canines, so a gap formed between Incisors and Premolars.</li> <li>➤ It is called diastema</li> <li>➤ The tooth of rabbit is of different types. So it is called heterodont</li> </ul>	2 2																
28	<p><b>a) Advantages of Euploidy:</b></p> <ul style="list-style-type: none"> <li>➤ It is the condition in which the individual bears more than the usual number of diploid (2n) chromosomes.</li> <li>➤ If an individual has three haploid sets of chromosomes, is called triploidy (3n).</li> <li>➤ Triploid plants and animals are typically sterile.</li> <li>➤ If it has four haploid sets of chromosomes, is called tetraploidy (4n).</li> <li>➤ Tetraploid plants are advantageous as they often result in increased fruit and flower size.</li> </ul> <p><b>b) Classification of Neurons based on the structure:</b></p> <p>Unipolar neurons:</p> <ul style="list-style-type: none"> <li>➤ Only one nerve process arises from the cyton which acts as both axon and dendron. (found in Embryo)</li> </ul> <p>Bipolar neurons:</p> <ul style="list-style-type: none"> <li>➤ The cyton gives rise to two nerve processes of which one acts as an axon while another as a Dendron. (found in Retina of eye)</li> </ul> <p>Multipolar neurons:</p> <ul style="list-style-type: none"> <li>➤ The cyton gives rise to many dendrons and an axon(cerebral cortex)</li> </ul>	2 2																
29	<p><b>Differences – Arteries and Veins</b></p> <table border="1"> <thead> <tr> <th>Artery</th> <th>Vein</th> </tr> </thead> <tbody> <tr> <td>Distributing vessel</td> <td>Collecting vessel</td> </tr> <tr> <td>Pink in colour</td> <td>Red in colour</td> </tr> <tr> <td>Deep location</td> <td>Superficial in location</td> </tr> <tr> <td>Blood flow with high pressure</td> <td>blood flow with low pressure</td> </tr> <tr> <td>wall of artery is strong, thick and elastic</td> <td>wall of vein is weak, thin and non-elastic</td> </tr> <tr> <td>All arteries carry oxygenated blood except pulmonary artery</td> <td>All veins carry deoxygenated blood except pulmonary veins</td> </tr> <tr> <td>Internal valves are absent</td> <td>Internal valves are present</td> </tr> </tbody> </table>	Artery	Vein	Distributing vessel	Collecting vessel	Pink in colour	Red in colour	Deep location	Superficial in location	Blood flow with high pressure	blood flow with low pressure	wall of artery is strong, thick and elastic	wall of vein is weak, thin and non-elastic	All arteries carry oxygenated blood except pulmonary artery	All veins carry deoxygenated blood except pulmonary veins	Internal valves are absent	Internal valves are present	4
Artery	Vein																	
Distributing vessel	Collecting vessel																	
Pink in colour	Red in colour																	
Deep location	Superficial in location																	
Blood flow with high pressure	blood flow with low pressure																	
wall of artery is strong, thick and elastic	wall of vein is weak, thin and non-elastic																	
All arteries carry oxygenated blood except pulmonary artery	All veins carry deoxygenated blood except pulmonary veins																	
Internal valves are absent	Internal valves are present																	
30	<p><b>Ethno botany:</b></p> <p><b>Ethnobotony:</b></p> <ul style="list-style-type: none"> <li>➤ It is the study of a region's plants and their practical uses</li> </ul>	4																

	<p>through the traditional knowledge of the local culture of people.</p> <p><b>Importance of Ethnobotony:</b></p> <ul style="list-style-type: none"> <li>➤ It provides traditional uses of plant.</li> <li>➤ It gives information about certain unknown useful plants.</li> <li>➤ The ethno medicinal data will serve as a useful source of information for the chemists, pharmacologists and practitioners of herbal medicine.</li> </ul>	
31	<p><b>a) Consequences of deforestation:</b></p> <ul style="list-style-type: none"> <li>➤ Deforestation gives rise to ecological problems like floods,</li> <li>➤ drought, soil erosion, loss of wild life, extinction of species,</li> <li>➤ imbalance of biogeochemical cycles,</li> <li>➤ Alteration of climatic conditions and desertation.</li> </ul> <p><b>b) DNA fingerprinting technique.</b></p> <ul style="list-style-type: none"> <li>➤ DNA fingerprinting technique is widely used in forensic applications like crime investigations such as indentfuying the culprit.</li> <li>➤ It is also used for paternity testing in case of disputes.</li> <li>➤ It also helps in the study of genetic diversity of population, evolution and speciation.</li> </ul>	2 2
32	<p><b>a) Acid that renders Aluminum passive:</b></p> <ul style="list-style-type: none"> <li>➤ Dilute or concentrated Nitric acid renders Aluminum passive.</li> <li>➤ because, when it get contact with aluminum, a layer of aluminum oxide is formed, prevents further reaction.</li> </ul> <p><b>b) No. of moles in <math>1.51 \times 10^{23}</math> molecules of <math>\text{NH}_4\text{Cl}</math></b></p> <p style="text-align: center;">No.of molecules</p> <p>No.of moles = <math>\frac{\text{-----}}{\text{Avogadro number}}</math></p> <p style="text-align: center;"><math>1.51 \times 10^{23}</math></p> <p>No.of moles = <math>\frac{\text{-----}}{6.023 \times 10^{23}} = \mathbf{0.25 \text{ moles}}</math></p>	2 2
<b>PART – IV (15Marks)</b>		
33(a)	<p><b>i) uses of Convex lense:</b></p> <ul style="list-style-type: none"> <li>➤ Convex lenses are used as camera lenses</li> <li>➤ They are used as magnifying lenses</li> <li>➤ They are used in making microscope, telescope and slide projectors</li> <li>➤ They are used to correct the defect of vision called hypermetropia</li> </ul> <p><b>ii) Dispersion of Light:</b></p> <ul style="list-style-type: none"> <li>➤ When a beam of white light or composite light is refracted through any transparent media such as glass or water, it is split</li> </ul>	2 2 2 1

	<p>into its component colours.</p> <ul style="list-style-type: none"> <li>➤ This phenomenon is called as 'dispersion of light'</li> </ul> <p><b>iii) Red colour – in traffic signals:</b></p> <ul style="list-style-type: none"> <li>➤ Due to the longer wave length, the red colour scatters less.</li> <li>➤ So it can be seen clearly even in a mid day.</li> </ul> <p><b>iv) Least count of Travelling Microscope:</b></p> <ul style="list-style-type: none"> <li>➤ The least count is 0.01mm</li> </ul>	
33(b)	<p><b>i) Echo:</b></p> <ul style="list-style-type: none"> <li>➤ An echo is the sound reproduced due to the reflection of the original sound from various rigid surfaces such as walls, ceilings, surfaces of mountains, etc.</li> </ul> <p><b>ii) Conditions necessary for hearing an echo:</b></p> <ul style="list-style-type: none"> <li>➤ The minimum time gap between the original sound and an echo must be 0.1s.</li> <li>➤ The minimum distance required to hear an echo is <math>1/20^{\text{th}}</math> part of the magnitude of the velocity of sound in air.</li> <li>➤ The minimum distance required hearing an echo is 17.2m.</li> </ul> <p><b>iii) Medical Applications of echo:</b></p> <ul style="list-style-type: none"> <li>➤ The principle of echo is used in obstetric ultrasonography, which is used to create real-time visual images of the developing embryo or fetus in the mother's uterus.</li> <li>➤ This is a safe testing tool, as it does not use any harmful radiations.</li> </ul> <p><b>iv) Calculation of speed of sound using echo:</b></p> <ul style="list-style-type: none"> <li>➤ The sound travels a total distance of <math>2d</math> while travelling from the source and then back to the receiver.</li> <li>➤ The time taken for this has been observed to be 't'.</li> <li>➤ Hence,</li> <li>➤ The speed of sound = <math>2d / t</math></li> </ul>	1 2 2 2
34(a)	<p><b>i)</b></p> <ul style="list-style-type: none"> <li>➤ Under the same conditions of temperature and pressure, the no of molecules of any gases is same for a liter volume.</li> </ul> <p>A) As hydrogen is (<math>\text{H}_2</math>) 6litre, it has highest number of molecules. B) As Oxygen is (<math>\text{O}_2</math>) 3litre, it has lowest number of molecules.</p> <p><b>ii) Salient features of Modern Atomic theory:</b></p> <ul style="list-style-type: none"> <li>➤ An atom is no longer indivisible.</li> <li>➤ Atoms of the same element may have different atomic mass. (isotopes <math>_{17}\text{Cl}^{35}</math>, <math>_{17}\text{Cl}^{37}</math>).</li> <li>➤ Atoms of different elements may have same atomic masses (Isobars <math>_{18}\text{Ar}^{40}</math>, <math>_{20}\text{Ca}^{40}</math>).</li> <li>➤ Atoms of one element can be transmuted into atoms of other elements. (artificial transmutation)</li> <li>➤ Atoms may not always combine in a simple whole number ratio</li> <li>➤ E.g. Glucose <math>\text{C}_6\text{H}_{12}\text{O}_6</math> C:H:O = 1:2:1 but Sucrose(combination of gulucose and fructose) <math>\text{C}_{12}\text{H}_{22}\text{O}_{11}</math> C:H:O = 12:22:11).</li> <li>➤ Atom is the smallest particle that takes part in a chemical</li> </ul>	2 5

	<p>reaction.</p> <ul style="list-style-type: none"> <li>➤ The mass of an atom can be converted into energy (<math>E = mc^2</math>).</li> </ul>					
34(b)	<p><b>i) Detergents – water pollution:</b></p> <ul style="list-style-type: none"> <li>➤ Some detergents having a branched hydrocarbon chain are not fully biodegradable by micro-organisms present in water. So, they cause water pollution.</li> </ul> <p><b>ii) Esterification reaction:</b></p> <p>A) The compound A is Ethanoic Acid. <math>CH_3COOH</math></p> <p>B) <math>CH_3CH_2OH + CH_3COOH \rightarrow CH_3COOCH_2CH_3</math></p> <p>C) This process is called esterification.</p>	2 5				
35(a)	<p><b>i) Synthetic Auxins:</b></p> <ul style="list-style-type: none"> <li>➤ Artificially synthesized auxins that have properties like auxins are called as synthetic auxins.</li> <li>➤ Example: 2, 4 D (2,4 Dichlorophenoxy Acetic Acid).</li> </ul> <p><b>ii) Angiospermic Ovule:</b></p> <ul style="list-style-type: none"> <li>➤ The ovule is formed by the <b>nucellus tissue</b>.</li> <li>➤ It is enclosed by two integuments.</li> <li>➤ there is an opening in the integuments called as <b>micropyle</b>.</li> <li>➤ The ovule is attached to the ovary wall by a stalk known as <b>funiculus</b>.</li> <li>➤ <b>Chalaza</b> is the basal part.</li> <li>➤ The embryo sac contains seven cells and the eighth nuclei located within the <b>nucellus</b>.</li> <li>➤ Three cells at the <b>micropylar</b> end form the egg apparatus and,</li> <li>➤ The three cells at the <b>chalaza</b> end are the antipodal cells.</li> <li>➤ The remaining two nuclei are called <b>polar nuclei</b> found in the centre.</li> <li>➤ In the egg apparatus one is the egg cell (female gamete) and the remaining two cells are the <b>synergids</b>.</li> </ul> 	2 5				
35(b)	<p><b>i) Father of Indian Green Revolution</b></p> <ul style="list-style-type: none"> <li>➤ Dr.M.S.Swaminathan</li> </ul> <p><b>ii) Out-breeding – In-breeding:</b></p> <table border="1"> <thead> <tr> <th>Inbreeding</th> <th>Outbreeding</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>➤ Mating of closely related animals within the same breed for about 4-6 generations.</li> <li>➤ Superior males and females of the same breed are mated.</li> <li>➤ It helps in the accumulation</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>➤ Cross between two different species with desirable features of economic value is mated.</li> <li>➤ It is the breeding of unrelated animals.</li> <li>➤ The offspring's forms are</li> </ul> </td> </tr> </tbody> </table>	Inbreeding	Outbreeding	<ul style="list-style-type: none"> <li>➤ Mating of closely related animals within the same breed for about 4-6 generations.</li> <li>➤ Superior males and females of the same breed are mated.</li> <li>➤ It helps in the accumulation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Cross between two different species with desirable features of economic value is mated.</li> <li>➤ It is the breeding of unrelated animals.</li> <li>➤ The offspring's forms are</li> </ul>	1 3 3
Inbreeding	Outbreeding					
<ul style="list-style-type: none"> <li>➤ Mating of closely related animals within the same breed for about 4-6 generations.</li> <li>➤ Superior males and females of the same breed are mated.</li> <li>➤ It helps in the accumulation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Cross between two different species with desirable features of economic value is mated.</li> <li>➤ It is the breeding of unrelated animals.</li> <li>➤ The offspring's forms are</li> </ul>					

	<p>of superior genes and elimination of genes which are undesirable.</p> <ul style="list-style-type: none"> <li>➤ Eg: Hissardale is a new breed of sheep developed by crossing Bikaneri and Australian Marino rams.</li> <li>➤ Continued inbreeding reduces the fertility and productivity.</li> </ul>	<p>called hybrids.</p> <ul style="list-style-type: none"> <li>➤ The hybrids are stronger and vigorous than their parents.</li> <li>➤ Eg; Mule is the hybrid animal, mated between male donkey with female horse.</li> <li>➤ They are superior but sterile.</li> </ul>	
<b>iii) Type-I and Type-II Diabetes mellitus:</b>			
	<b>Type-1 Diabetes Mellitus</b>	<b>Type-2 Diabetes Mellitus</b>	
1	Pancreas does not produce sufficient insulin	The target organ does not respond insulin.	
2	The immune system destroys insulin producing beta cells in the pancreas.	The body produces insulin but unable to use effectively.	
3	Cannot be controlled without taking insulin	Possible to treat initially without medication or treating with tablets.	

**Prepared by**

**AROCKIAM.S**

Shaukathul Islam (BMS) Hr.Sec.School,

Valoothoor,

Thanjavur District - 614210

9443798666