

SSLC EXAMINATION APRIL – 2023**SCIENCE – ANSWER KEY****MARKS : 75****PART – I****I. Choose the correct answer****12 x 1 = 12**

Q.NO	ANSWER	MARKS
1	c) Either positive (or) negative	1
2	a) α decay	1
3	c) 18 g	1
4	c) water	1
5	c) – al	1
6	a) 3	1
7	b) mitochondrial matrix	1
8	a) retina of eye	1
9	c) zygote	1
10	a) 1-iii , 2- iv , 3-ii, 4-i	1
11	c) independent assortment	1
12	b) J.W.Harsh berger	1

PART – II**II. Answer any 7 questions (Q.No.22 is compulsory)****7 x 2 = 14**

Q.NO	ANSWER	MARKS
13	<p>"The inherent property of a body to resist any change in its state of rest or the state of uniform motion, unless it is influenced upon by an external unbalanced force, is known as 'inertia'.</p> <p>Classification</p> <p>i. inertia of rest ii. inertia of motion iii. inertia of direction</p>	1
14	When sunlight passes through the atmosphere, the blue colour (shorter wavelength) is scattered to a greater extent than the red colour (longer wavelength). This scattering causes the sky to appear in blue colour.	2
15	<p><u>One Calorie</u></p> <p>One calorie is defined as the amount of heat energy required to rise the temperature of 1 gram of water through 1°C</p>	2
16	<p><u>Applications of Avogadro's law</u></p> <ol style="list-style-type: none"> 1. It explains Gay-Lussac's law. 2. It helps in the determination of atomicity of gases. 3. Molecular formula of gases can be derived using Avogadro's law 4. It determines the relation between molecular mass and vapour density. 5. It helps to determine gram molar volume of all gases (i.e, 22.4 litre at S.T.P) 	2 x 1 = 2 (Any 2 Points)
17	<p><u>Parasitic Adaptations of Leech</u></p> <ol style="list-style-type: none"> 1. Blood is sucked by pharynx. 	

	<p>2. Anterior and posterior ends of the body are provided with suckers by which the animal attaches itself to the body of the host.</p> <p>3. The three jaws inside the mouth, causes a painless Y-shaped wound in the skin of the host.</p> <p>4. The salivary glands produce hirudin which does not allow the blood to coagulate. Thus, a continuous supply of the blood is maintained.</p> <p>5. Parapodia and setae are completely absent</p> <p>6. Blood is stored in the crop. It gives nourishment to the leech for several months. Due to this reason there is no elaborate secretion of the digestive juices and enzymes.</p>	<p>2 x 1 = 2 (Any 2 Points)</p>
18	<p>It is covered by three connective tissue membrane or meninges</p> <p>(i) Duramater</p> <p>(ii) Arachnoid membrane</p> <p>(iii) Piamater</p> <p>Meningeal membranes protect the brain from mechanical injury.</p>	2
19.	<p>A – Exine B – Intine</p> <p>C – Generative cell D- Vegetative nucleus</p>	4 x ½ = 2
20	Genetic engineering is the manipulation and transfer of genes from one organism to another organisms to create a new DNA called as recombinant DNA(rDNA).	2
21	Sprite: The characters on the background of a Scratch window are known as Sprite.	2
22	<p>Solution:</p> <p>Mass defect in the reaction m = 2 kg</p> <p>Velocity of light (c) = $3 \times 10^8 \text{ m s}^{-1}$</p> <p>By Einstein's equation,</p> <p>Energy released $E = mc^2$</p> <p>So</p> <p style="text-align: center;">$E = 2 \times (3 \times 10^8)^2$ $= 1.8 \times 10^{17} \text{ J}$</p>	<p>Formula – 1</p> <p>Ans - 1</p>

PART – III

III. Answer any 7 questions (Q.No. 32 is compulsory)

7 x 4 = 28

Q.N O	ANSWER	MARKS
23	<p>According to this law, “the force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force”.</p> <p>This law helps us to measure the amount of force. So, it is also called as ‘law of force’. Let, ‘m’ be the mass of a moving body, moving along a straight line with an</p>	

	<p>initial speed 'u' After a time interval of 't', the velocity of the body changes to 'v' due to the impact of an unbalanced external force F.</p> <p>Initial momentum of the body $P_i = mu$</p> <p>Final momentum of the body $P_f = mv$</p> <p>Change in momentum $\Delta p = P_f - P_i$</p> $= mv - mu$ <p>By Newton's second law of motion,</p> <p>Force, $F \propto$ rate of change of momentum</p> $F \propto \text{change in momentum} / \text{time}$ $F \propto mv - mu / t$ $F = km(v - u) / t$ <p>Here, k is the proportionality constant.</p> $k = 1 \text{ in all systems of units.}$ <p>Hence, $F = m(v - u) / t$</p> <p>Since, acceleration = change in velocity/ time,</p> $a = (v - u) / t.$ <p>Hence, we have</p> $F = m \times a$ <p>Force = mass \times acceleration</p>	4																					
24	<table border="1"> <thead> <tr> <th>S.N</th><th>Myopia</th><th>Hypermetropia</th></tr> </thead> <tbody> <tr> <td>1</td><td>Myopia, also known as short sightedness</td><td>Hypermetropia, also known as long sightedness</td></tr> <tr> <td>2</td><td>occurs due to the lengthening of eye ball.</td><td>occurs due to the shortening of eye ball.</td></tr> <tr> <td>3</td><td>Nearby objects can be seen clearly but distant objects cannot be seen clearly.</td><td>Distant objects can be seen clearly but nearby objects cannot be seen clearly</td></tr> <tr> <td>4</td><td>The focal length of eye lens is reduced or the distance between eye lens and retina increases.</td><td>The focal length of eye lens is increased or the distance between eye lens and retina decreases.</td></tr> <tr> <td>5</td><td>Image of distant objects are formed before the retina</td><td>Image of nearby objects are formed behind the retina</td></tr> <tr> <td>6</td><td>This defect can be corrected using a concave lens</td><td>This defect can be corrected using a convex lens</td></tr> </tbody> </table>	S.N	Myopia	Hypermetropia	1	Myopia, also known as short sightedness	Hypermetropia, also known as long sightedness	2	occurs due to the lengthening of eye ball.	occurs due to the shortening of eye ball.	3	Nearby objects can be seen clearly but distant objects cannot be seen clearly.	Distant objects can be seen clearly but nearby objects cannot be seen clearly	4	The focal length of eye lens is reduced or the distance between eye lens and retina increases.	The focal length of eye lens is increased or the distance between eye lens and retina decreases.	5	Image of distant objects are formed before the retina	Image of nearby objects are formed behind the retina	6	This defect can be corrected using a concave lens	This defect can be corrected using a convex lens	4 (Any 4 point)
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25	<p>a) Ultrasonic waves – These are sound waves with a frequency greater than 20kHz</p> <p>b) When sound waves travel in a given medium and strike the surface of another medium, they can be bounced back into the first medium. This phenomenon is known as reflection.</p>	2 2																					
26	<p>a) An amalgam is an alloy of mercury with another metal.</p> <p><u>Example</u> : Silver tin amalgam is used for dental filling</p> <p>b) <u>Uses of Copper</u>:</p> <p>i. It is extensively used in manufacturing electric cables and other electric appliances.</p>	2																					

	<p>ii. It is used for making utensils, containers, calorimeters and coins,</p> <p>iii. It is used in electroplating.</p> <p>iv. It is alloyed with gold and silver for making coins and jewels</p>	<p>2 x 1 = 2 (any 2 point)</p>
27	<p>A soap molecule contains two chemically distinct parts that interact differently with water.</p> <p>It has one polar end, which is a short head with a carboxylate group ($-\text{COONa}$) and one non-polar end having the long tail made of the hydrocarbon chain.</p> <p>The polar end is hydrophilic (Water loving) in nature and this end is attracted towards water.</p> <p>The non-polar end is hydrophobic (Water hating) in nature and it is attracted towards dirt or oil on the cloth, but not attracted towards water.</p> <p>Thus, the hydrophobic part of the soap molecule traps the dirt and the hydrophilic part makes the entire molecule soluble in water.</p> <p>When a soap or detergent is dissolved in water, the molecules join together as clusters called 'micelles'.</p> <p>Their long hydrocarbon chains attach themselves to the oil and dirt.</p> <p>The dirt is thus surrounded by the non-polar end of the soap molecules .</p> <p>The charged carboxylate end of the soap molecules makes the micelles soluble in water. Thus, the dirt is washed away with the soap.</p>	4
28	<p>a) i. Epidermal tissue system ii. Ground tissue system iii. vascular tissue system</p> <p>b) <u>Factors Affecting Photosynthesis</u></p> <p>Internal Factors:</p> <p>i) Pigments ii) Leaf age iii) Accumulation of carbohydrates iv) Hormones</p> <p>External Factors:</p> <p>i) Light ii) Carbon dioxide iii) Temperature iv) Water v) Mineral elements</p>	<p>1</p> <p>1 ½</p> <p>1 ½</p>
29	<p><u>Functions of blood</u></p> <p>i) Transport of respiratory gases (Oxygen and CO_2).</p> <p>ii) Transport of digested food materials to the different body cells.</p> <p>iii) Transport of hormones.</p> <p>iv) Transport of nitrogenous excretory products like ammonia, urea and uric acid.</p> <p>v) It is involved in protection of the body and defense against diseases.</p> <p>vi) It acts as buffer and also helps in regulation of pH and body temperature.</p> <p>vii) It maintains proper water balance in the body.</p>	<p>4 x 1 = 4 (Any 4 point)</p>
30	<p><u>Methods of recharge ground water</u></p> <p>i. <u>Roof top rainwater harvesting:</u></p> <p>Rooftops are excellent rain catchers. The rain water that falls on the roof of</p>	

	<p>the houses, apartments, commercial buildings etc. is collected and stored in the surface tank and can be used for domestic purpose.</p> <p>ii. <u>Recharge pit</u>:</p> <p>In this method, the rainwater is first collected from the roof tops or open spaces and is directed into the percolation pits through pipes for filtration. After filtration the rainwater enters the recharge pits or ground wells.</p>	<p>$2 \times 2 = 4$ (Each topic- 2 marks)</p>
31	<p>a) <u>Phenotype</u> : External expression of a particular trait is known as phenotype</p> <p><u>Genotype</u>: A genotype is the genetic expression of an organism</p> <p>b) Allosomes are chromosomes which are responsible for determining the sex of an individual. They are also called as sex chromosomes or hetero-chromosomes. There are two types of sex chromosomes, X and Y- chromosomes.</p>	<p>1 1 2</p>
32.	<p>a)</p> <p>Given: $[H^+] = 0.01 \text{ M}$ $= 1 \times 10^{-2} \text{ M}$ $p^H = ?$</p> <p>Solution: $p^H = -\log_{10} [H^+]$ $= -\log_{10} [1 \times 10^{-2}]$ $= -(\log_{10} 1.0 + \log_{10} 10^{-2})$ $= -(0 - 2 \log_{10} 10)$ $= -(-2 \times 1)$ $p^H = 2$</p> <p>b) Given:</p> <p>Mass of the solute = 25 g Mass of the solvent = 100 g Mass percentage of the solute = ?</p> <p>Solution:</p> <p>Mass percentage of solute = $\frac{\text{mass of solute}}{\text{mass of solution}} \times 100$</p> <p>Mass percentage of solute = $\frac{\text{mass of solute}}{\text{mass of solute} + \text{solvent}} \times 100$ $= \frac{25}{25+100} \times 100$ $= \frac{25}{125} \times 100$ $= 20 \%$</p>	<p>Formula – 1</p> <p>Step – $\frac{1}{2}$</p> <p>pH : Ans – $\frac{1}{2}$</p> <p>Formula – 1 (Any one)</p> <p>Step – $\frac{1}{2}$</p> <p>Ans – $\frac{1}{2}$</p>

PART – IV

IV. Answer all the questions

3 x 7 = 21

Q.NO	ANSWER	MARKS
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33	<p>a) (i) Joule's law of heating states that the heat produced in any resistor is:</p> <ul style="list-style-type: none"> • directly proportional to the square of the current passing through the resistor. • directly proportional to the resistance of the resistor. • directly proportional to the time for which the current is passing through the resistor. $H = I^2 R t$ <p>(ii)</p> <ul style="list-style-type: none"> • it has high resistivity • it has a high melting point • it is not easily oxidized. <p>(iii)</p> <p>The fuse wire is connected in series, in an electric circuit. When a large current passes through the circuit, the fuse wire melts due to Joule's heating effect and hence the circuit gets disconnected. Therefore, the circuit and the electric appliances are saved from any damage.</p> <p style="text-align: center;">(OR)</p> <p>b)</p> <p>(i) it is a wave in which particles are vibrating along the direction of wave motion.</p> <p>(ii)</p> <p>The essential components of a nuclear reactor are (i) fuel, (ii) moderator, (iii) control rod, (iv) coolant and (v) protection wall.</p> <p>i. Fuel: A fissile material is used as the fuel. The commonly used fuel material is uranium.</p> <p>ii. Moderator: A moderator is used to slow down the high energy neutrons to provide slow neutrons. Graphite and heavy water are the commonly used moderators.</p> <p>iii. Control rod: Control rods are used to control the number of neutrons in order to have sustained chain reaction. Mostly boron or cadmium rods are used as control rods. They absorb the neutrons.</p> <p>iv. Coolant: A coolant is used to remove the heat produced in the reactor core, to produce steam. This steam is used to run a turbine in order to produce electricity. Water, air and helium are some of the coolants.</p> <p>v. Protection wall: A thick concrete lead wall is built around the nuclear reactor in order to prevent the harmful radiations from escaping into the environment.</p>	<p>3</p> <p>2</p> <p>2</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
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34

- a) (i) The number of atoms present in the molecule is called its 'atomicity'
(ii)

Solution:

$$\begin{aligned}\text{molecular mass of H}_2\text{SO}_4 &= (1 \times 2) + (32 \times 1) + (16 \times 4) \\ &= 2 + 32 + 64 \\ &= 98 \text{ g}\end{aligned}$$

$$\% \text{ of S in H}_2\text{SO}_4 = \frac{\text{Mass of sulphur}}{\text{Molecular mass of H}_2\text{SO}_4} \times 100$$

$$\begin{aligned}\% \text{ of S in H}_2\text{SO}_4 &= \frac{32}{98} \times 100 \\ &= 32.65 \%\end{aligned}$$

(iii)

S.No	Hygroscopic substances	Deliquescence substances
1	When exposed to the atmosphere at ordinary temperature, they absorb moisture and do not dissolve.	When exposed to the atmospheric air at ordinary temperature, they absorb moisture and dissolve.
2	Hygroscopic substances do not change its physical state on exposure to air.	Deliquescent substances change its physical state on exposure to air
3	Hygroscopic substances may be amorphous solids or liquids.	Deliquescent substances are crystalline solids.

(OR)

b)

(i)

S.No	Reversible reaction	Irreversible reaction.
1	can be reversed under suitable conditions	cannot be reversed
2	Both forward and backward reaction take place.	Forward reaction only take place.
3	Equilibrium is attained	Equilibrium is not attained
4	Reactants cannot be converted completely into products	completely converted into products
5	Relatively slow	Relatively fast

(ii) Neutralization Reactions:

2

molecular
mass - $\frac{1}{2}$

Formula -1

Ans - $\frac{1}{2}$

3 x 1 = 3
(Each poin -
1Mark)

2 x 1 = 2
(Any 2 points)

	<p>acid reacts with the base to form a salt and water. It is called 'neutralization reaction' as both acid and base neutralize each other.</p> <p style="text-align: center;">Acid + Base → Salt + Water</p> <p>Example :</p> <ul style="list-style-type: none"> sodium replaces hydrogen from hydrochloric acid forming sodium chloride, a neutral soluble salt. $\text{NaOH}_{(aq)} + \text{HCl}_{(aq)} \rightarrow \text{NaCl}_{(aq)} + \text{H}_2\text{O}_{(l)}$ <ul style="list-style-type: none"> when ammonium hydroxide reacts with nitric acid, it forms ammonium nitrate and water. $\text{HNO}_{3(aq)} + \text{NH}_4\text{OH}_{(aq)} \rightarrow \text{NH}_4\text{NO}_{3(aq)} + \text{H}_2\text{O}_{(l)}$ <p><u>(iii) Characteristics of homologous series</u></p> <ol style="list-style-type: none"> Each member of the series differs from the preceding or succeeding member by one methylene group ($-\text{CH}_2$) and hence by a molecular mass of 14 amu. All members of a homologous series contain the same elements and functional group. They are represented by a general molecular formula. e.g. Alkanes, $\text{C}_n\text{H}_{2n+2}$ The members in each homologous series show a regular gradation in their physical properties with respect to their increase in molecular mass. Chemical properties of the members of a homologous series are similar. All the members can be prepared by a common method. 	<p>1</p> <p>1 (any one example)</p> <p>3 x 1 = 3 (Any 3 points)</p>
35	<p>a) (i) Gibberellin</p> <p>(ii) It is Essential for normal physical, mental and personality development .</p> <p>(iii)</p> <p><u>Use and disuse theory</u></p> <p>Lamarck's use and disuse theory states that if an organ is used constantly, the organ develops well and gets strengthened. When an organ is not used for a long time, it gradually degenerates. The ancestors of giraffe were provided with short neck and short forelimbs. Due to shortage of grass, they were forced to feed on leaves from trees. The continuous stretching of their neck and forelimbs resulted in the development of long neck and long forelimbs which is an example for constant use of an organ. The degenerated wing of Kiwi is an example for organ of disuse.</p> <p><u>Theory of Inheritance of acquired characters</u></p> <p>When there is a change in the environment, the animals respond to the change. They develop adaptive structures. The characters developed by the animals</p>	<p>1</p> <p>2</p> <p>2</p>

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