

SSLC PUBLIC EXAMINATION – MAY 2022

SCIENCE - ANSWER KEY

Note :

(Max. Marks : 75 Marks)

1. Answer written only in BLUE or BLACK ink should be evaluated.
2. In PART – I the correct answer should have been written with the corresponding option code.
3. If one of them (option or answer) is wrong, then award zero marks only.
4. Diagrams should be drawn wherever necessary using pencil.

PART – I

Answer all the questions.

(12 x 1 = 12 Marks)

Q.no	Option	Answers	Marks
1	(c)	2f	1
2	(c)	homo atomic molecule	1
3	(a)	2	1
4	(c)	2.4 A	1
5	(a)	95.5%	1
6	(b)	stem	1
7	(c)	2	1
8	(a)	Generative cell	1
9	(b)	Pituitary gland	1
10	(d)	wheat	1
11	(b)	(1)-(iii), (2)-(iv), (3)-(i), (4)-(ii)	1
12	(b)	Waldeyer - Chromosome	1

PART – II

Answer any seven of the following questions. Q.no 22 is compulsory.

(7 x 2 = 14 Marks)

13	<u>Newton's second law :</u> 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. $F = \frac{m(v-u)}{t} \text{ (OR) } F = ma$	1 1	2
14	<u>Applications of echo :</u> <ul style="list-style-type: none">• Some animals communicate with each other over long distances and also locate objects by sending the sound signals and receiving the echo as reflected from the targets.• 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. This is a safe testing tool, as it does not use any harmful radiations.• Echo is used to determine the velocity of sound waves in any medium. (Any two points)	1 1	2

15	<p>Boyle's law : When the temperature of a gas is kept constant, the volume of a fixed mass of gas is inversely proportional to its pressure.</p> $P \propto \frac{1}{V} \quad (\text{i.e.}) \quad PV = \text{constant}$	1 1	2															
16	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Class of Compounds</th> <th style="width: 33%;">Functional Group</th> <th style="width: 33%;">Suffix used</th> </tr> </thead> <tbody> <tr> <td>Alcohol</td> <td>-OH</td> <td>-ol</td> </tr> <tr> <td>Aldehyde</td> <td>-CHO</td> <td>-al</td> </tr> <tr> <td>Ketone</td> <td style="text-align: center;">O -C-</td> <td>-one</td> </tr> <tr> <td>Carboxylic acid</td> <td>-COOH</td> <td>-oic acid</td> </tr> </tbody> </table>	Class of Compounds	Functional Group	Suffix used	Alcohol	-OH	-ol	Aldehyde	-CHO	-al	Ketone	O -C-	-one	Carboxylic acid	-COOH	-oic acid	¼ ¼ ¼ ¼	2
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17	<p>Importance of rainwater harvesting :</p> <ul style="list-style-type: none"> • Overcome the rapid depletion of ground water levels. • To meet the increase demand of water. • Reduces flood and soil erosion • Water stored in ground is not contaminated by human and animal wastes and hence can be used for drinking purpose. 	¼ ¼ ¼ ¼	2															
18	<ul style="list-style-type: none"> • A – Capsule • B – Cortex • C – Medulla • D – Blood vessels 	¼ ¼ ¼ ¼	2															
19	<p>Evolution :</p> <ul style="list-style-type: none"> • Evolution is the gradual change occurring in living organisms over a period of time. <p style="text-align: center;">(OR)</p> <p>Formation of new species due to changes in specific characters over several generations as response to natural selection, is called evolution.</p> <ul style="list-style-type: none"> • Theories of evolution is proposed by Lamarck and Darwin. 	1 1	2															
20	<ul style="list-style-type: none"> • Protina • Shakti • Rathna <p>(Any two)</p>	1 1	2															
21	<p>Importance of valves in heart :</p> <ul style="list-style-type: none"> • Valves regulate the blood flow in a single direction. • It prevents the backward flow of blood into the ventricles. 	1 1	2															
22	<p>Given : x = 4 m, y = 20 m</p>																	

	<p>Solution : <u>Focal length of the required lens :</u></p> $f = \frac{xy}{x - y} = \frac{4 \times 20}{4 - 20} = \frac{80}{-16}$ $f = -5 \text{ m}$ <p>∴ The person must wear concave lens of focal length 5 m.</p> <p><u>Power of lens :</u></p> $P = \frac{1}{F} = \frac{1}{5}$ $P = 0.2 \text{ D}$	1	2
		1	

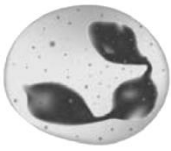

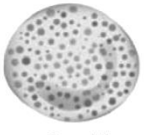
PART – III

Answer any seven of the following questions. Q.no 32 is compulsory.

(7 x 4 = 28 Marks)

23	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Mass</th> <th style="width: 50%; text-align: center;">Weight</th> </tr> </thead> <tbody> <tr> <td>• It is a fundamental quantity.</td> <td>• It is a derived quantity.</td> </tr> <tr> <td>• It measures the quantity of matter contained in the body.</td> <td>• It measures the gravitational force exerted on the mass due to the Earth's gravity.</td> </tr> <tr> <td>• Its SI unit is Kilogram (Kg).</td> <td>• Its SI unit is Newton (N).</td> </tr> <tr> <td>• It is a scalar quantity.</td> <td>• It is a vector quantity.</td> </tr> <tr> <td>• It is measured using physical balance.</td> <td>• It is measured using spring balance.</td> </tr> </tbody> </table> <p style="text-align: center;">(Any four points)</p>	Mass	Weight	• It is a fundamental quantity.	• It is a derived quantity.	• It measures the quantity of matter contained in the body.	• It measures the gravitational force exerted on the mass due to the Earth's gravity.	• Its SI unit is Kilogram (Kg) .	• Its SI unit is Newton (N) .	• It is a scalar quantity.	• It is a vector quantity.	• It is measured using physical balance .	• It is measured using spring balance .	1	1	1	1	4
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24	<p><u>Properties of light :</u></p> <ul style="list-style-type: none"> • Light is a form of energy. • Light always travels along a straight line. • Light does not need any medium for its propagation. It can even travel through vacuum. • The speed of light in vacuum or air is , c = 3 x 10⁸ ms⁻¹. • Since, light is in the form of waves, it is characterized by a wavelength (λ) and a frequency (ν), which are related by the following equation : c = ν λ (c - velocity of light). • Different coloured light has different wavelength and frequency. • Among the visible light, violet light has the lowest wavelength and red light has the highest wavelength. • When light is incident on the interface between two media, it is partly reflected and partly refracted. <p style="text-align: center;">(Any four points)</p>	1	1	1	1	4												
25	<ul style="list-style-type: none"> • When the sound waves are reflected from the curved surfaces, the intensity of the reflected waves is changed. • When sound is reflected from a concave surface, the reflected waves are converged and focused at a point. So the intensity of reflected waves is concentrated at a point. • A curved ceiling actually acts like a large concave soundboard, 	1	1	1	1	4												

	<p>which reflects sound down onto the audience, sitting in the hall.</p> <ul style="list-style-type: none"> Thus, the ceiling of concert halls are made curved so that audience can listen the sound clearly. 	1																
26	<p>(a) Alloy : An alloy is a homogeneous mixture of two or more metals or of one or more metals with certain non-metallic elements.</p>	2	4															
	<p>(b) Reasons for alloying :</p> <ul style="list-style-type: none"> To modify appearance and colour. To modify chemical activity. To lower the melting point. To increase hardness and tensile strength. To increase resistance to electricity. 	2																
27	<table border="1"> <thead> <tr> <th>Name of the Compound</th> <th>Classification</th> <th>Structural formula</th> </tr> </thead> <tbody> <tr> <td>(i) Propane</td> <td>Acyclic (or) open chain compounds</td> <td> $\begin{array}{c} \text{H} & \text{H} & \text{H} \\ & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & \\ \text{H} & \text{H} & \text{H} \end{array}$ </td> </tr> <tr> <td>(ii) Benzene</td> <td>Aromatic compound</td> <td> </td> </tr> <tr> <td>(iii) Cyclobutane</td> <td>Alicyclic compound</td> <td> </td> </tr> <tr> <td>(iv) Furan</td> <td>Heterocyclic compound</td> <td> </td> </tr> </tbody> </table>	Name of the Compound	Classification	Structural formula	(i) Propane	Acyclic (or) open chain compounds	$\begin{array}{c} \text{H} & \text{H} & \text{H} \\ & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & \\ \text{H} & \text{H} & \text{H} \end{array}$	(ii) Benzene	Aromatic compound		(iii) Cyclobutane	Alicyclic compound		(iv) Furan	Heterocyclic compound		1 1 1 1	4
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28	<p>(a) Respiratory quotient : Respiratory Quotient is the ratio of volume of carbon dioxide liberated and the volume of oxygen consumed during respiration.</p> <p>R.Q = volume of CO₂ liberated / volume of O₂ consumed</p>	1 1	4															
	<p>(b) Reaction for photosynthesis :</p> $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{Light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2 \uparrow$ <p>Carbon dioxide + Water Glucose + Water + Oxygen</p>	2																
29	<p>(a) Process of Transpiration :</p>	2																

	<p>(b) Granulocytes :</p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p style="text-align: center;">Neutrophil Eosinophil Basophil</p>	2	4
30	<p>(a) Theories on Origin of Life :</p> <ul style="list-style-type: none"> • Special creation • Spontaneous generation (Abiogenesis) • Biogenesis • Extraterrestrial or Cosmic origin • Chemical Evolution of Life 	3	4
	<p>(b) The term Ethnobotany was coined by J.W. Harshberger</p>	1	
31	<p>Pharmaceutical products developed by rDNA technique :</p> <ul style="list-style-type: none"> • Insulin used in the treatment of diabetes. • Human growth hormone used for treating children with growth deficiencies. • Blood clotting factors are developed to treat haemophilia. • Tissue plasminogen activator is used to dissolve blood clots and prevent heart attack. • Development of vaccines against various diseases like Hepatitis B and rabies <p>(Any four points)</p>	1 1 1 1	4
32	<div style="text-align: center;"> $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightleftharpoons[\text{Cooling}]{\text{Heating}} \text{CuSO}_4 + 5\text{H}_2\text{O}$ <p>(Copper sulphate pentahydrate) (Anhydrous copper sulphate)</p> <p>Blue colour colourless</p> </div> <ul style="list-style-type: none"> • A - CuSO₄·5H₂O : Copper sulphate pentahydrate • B - CuSO₄ + 5H₂O : Anhydrous copper sulphate 	2 1 1	4

PART – IV

Answer all the questions.

(7 x 3 = 21 Marks)

33 (a)	<p>(i) Electric current : Electric current is defined as the rate of flow of charges in a conductor.</p> $I = \frac{Q}{T}$	1 1	
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	<p>(ii) Ampere :</p> <ul style="list-style-type: none"> The SI unit of electric current is ampere (A). The 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. $1 \text{ ampere} = \frac{1 \text{ coulomb}}{1 \text{ second}}$	1 2	7												
	<p>(iii) Ammeter is used to measure the electric current. It should be connected in series in a circuit.</p>	1 1													
34 (a)	<p>(i) Henri Becquerel</p> <p>(ii)</p> <table border="1"> <thead> <tr> <th>Natural radioactivity</th> <th>Artificial radioactivity</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Emission of radiation is due to self- disintegration of a nucleus. </td> <td> <ul style="list-style-type: none"> Emission of radiation is due to disintegration of a nucleus through induced process. </td> </tr> <tr> <td> <ul style="list-style-type: none"> Alpha, beta and gamma radiations are emitted. </td> <td> <ul style="list-style-type: none"> Elementary particles like neutron, positron, etc., are emitted. </td> </tr> <tr> <td> <ul style="list-style-type: none"> It is a spontaneous process. </td> <td> <ul style="list-style-type: none"> It is an induced process. </td> </tr> <tr> <td> <ul style="list-style-type: none"> Exhibited by elements with atomic number more than 83. </td> <td> <ul style="list-style-type: none"> Exhibited by elements with atomic number less than 83. </td> </tr> <tr> <td> <ul style="list-style-type: none"> This cannot be controlled. </td> <td> <ul style="list-style-type: none"> This can be controlled. </td> </tr> </tbody> </table> <p>(Any 3 points)</p>	Natural radioactivity	Artificial radioactivity	<ul style="list-style-type: none"> Emission of radiation is due to self- disintegration of a nucleus. 	<ul style="list-style-type: none"> Emission of radiation is due to disintegration of a nucleus through induced process. 	<ul style="list-style-type: none"> Alpha, beta and gamma radiations are emitted. 	<ul style="list-style-type: none"> Elementary particles like neutron, positron, etc., are emitted. 	<ul style="list-style-type: none"> It is a spontaneous process. 	<ul style="list-style-type: none"> It is an induced process. 	<ul style="list-style-type: none"> Exhibited by elements with atomic number more than 83. 	<ul style="list-style-type: none"> Exhibited by elements with atomic number less than 83. 	<ul style="list-style-type: none"> This cannot be controlled. 	<ul style="list-style-type: none"> This can be controlled. 	1 3	7
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	<p>(iii) Uses of radio isotopes in Agriculture :</p> <ul style="list-style-type: none"> The radio isotope of phosphorous (P-32) helps to increase the productivity of crops. The radiations from the radio isotopes can be used to kill the insects and parasites and prevent the wastage of agricultural products. Certain perishable cereals exposed to radiations remain fresh beyond their normal life, enhancing the storage time. Very small doses of radiation prevent sprouting and spoilage of onions, potatoes and gram. 	3													
	<p>(i) Atomicity : The number of atoms present in the molecule is called its atomicity.</p> <p>Example : Atomicity of Phosphorus – 4, Atomicity of Hydrogen chloride – 2</p>	2 1													

	<p>(ii)</p> <table border="1"> <thead> <tr> <th>Atom</th> <th>Molecule</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> An atom is the smallest particle of an element </td> <td> <ul style="list-style-type: none"> A molecule is the smallest particle of an element or compound. </td> </tr> <tr> <td> <ul style="list-style-type: none"> Atom does not exist in free state except in noble gas </td> <td> <ul style="list-style-type: none"> Molecule exists in a free a state </td> </tr> <tr> <td> <ul style="list-style-type: none"> Except some of noble gas, other atoms are highly reactive </td> <td> <ul style="list-style-type: none"> Molecules are less reactive </td> </tr> <tr> <td> <ul style="list-style-type: none"> Atom does not have a chemical bond </td> <td> <ul style="list-style-type: none"> Atoms in a molecule are held by chemical bonds </td> </tr> </tbody> </table>	Atom	Molecule	<ul style="list-style-type: none"> An atom is the smallest particle of an element 	<ul style="list-style-type: none"> A molecule is the smallest particle of an element or compound. 	<ul style="list-style-type: none"> Atom does not exist in free state except in noble gas 	<ul style="list-style-type: none"> Molecule exists in a free a state 	<ul style="list-style-type: none"> Except some of noble gas, other atoms are highly reactive 	<ul style="list-style-type: none"> Molecules are less reactive 	<ul style="list-style-type: none"> Atom does not have a chemical bond 	<ul style="list-style-type: none"> Atoms in a molecule are held by chemical bonds 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>
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(b)	<p>(i) <u>Combination reaction</u> :</p> <ul style="list-style-type: none"> A combination reaction is a reaction in which two or more reactants combine to form a compound. It is otherwise called as Synthesis reaction (or) Composition reaction. 	<p>2</p>											
	<p>(ii) <u>Example for combination reaction</u> :</p> <ul style="list-style-type: none"> $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$ $SiO_{2(s)} + CaO_{(s)} \rightarrow CaSiO_{3(s)}$ 	<p>1</p>											
	<p>(iii)</p> <table border="1"> <thead> <tr> <th>Reversible reaction</th> <th>Irreversible reaction</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> It can be reversed under suitable condition. Both forward and backward reactions take place simultaneously. It attains equilibrium. The reactants cannot be converted completely into products. It is relatively slow. </td> <td> <ul style="list-style-type: none"> It cannot be reversed. It is unidirectional. It proceeds only in forward direction. Equilibrium is not attained. The reactants can be completely converted into products. It is fast. </td> </tr> </tbody> </table> <p>(Any 4 points)</p>	Reversible reaction	Irreversible reaction	<ul style="list-style-type: none"> It can be reversed under suitable condition. Both forward and backward reactions take place simultaneously. It attains equilibrium. The reactants cannot be converted completely into products. It is relatively slow. 	<ul style="list-style-type: none"> It cannot be reversed. It is unidirectional. It proceeds only in forward direction. Equilibrium is not attained. The reactants can be completely converted into products. It is fast. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>						
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35 (a)	<p>(i) <u>Synthetic Auxins</u> : Artificially synthesized auxins that have properties like auxins are called as synthetic auxins.</p> <p>Example : 2,4 D (2,4 Dichlorophenoxy Acetic Acid).</p>	<p>2</p> <p>1</p>											
	<p>(ii) <u>Triple fusion</u> : The fusion of one sperm from pollen grain with the secondary nucleus to form triploid primary endosperm nucleus is called triple fusion.</p>	<p>2</p>	<p>7</p>										

	<p>(iii) <u>Secondary sex organs in male :</u></p> <ul style="list-style-type: none"> • Vas deferens • Epididymis • Seminal vesicle • Prostate gland • Penis 	2	
(b)	<p>(i) <u>Mendel selected pea plant for his experiments :</u></p> <ul style="list-style-type: none"> • It is naturally self pollinating and easy to raise pure breeding individuals. • It has a short life span (or) it is an annual plant and possible to follow several generations. • It is easy to cross-pollinate. • It has deeply defined contrasting characters. • The flowers are bisexual. 	3	
	<p>(ii) <u>Measures to overcome the problems of an alcoholic :</u></p> <p>Education and counseling : It will help the alcoholics to overcome their problems and stress, to accept failures in their life.</p> <p>Physical activity : Rehabilitation Individuals should perform healthy activities like music, sports, yoga, etc.,</p> <p>Seeking help from parents and peer groups :</p> <ul style="list-style-type: none"> • Under problematic situations, the affected individuals should seek help and guidance from parents and peers. • This would help them to share their feeling of anxiety, wrong doing and get rid of the habit. <p>Medical assistance :</p> <ul style="list-style-type: none"> • Individuals should seek help from psychologists and psychiatrists to get relieved from this condition and to lead a relaxed and peaceful life. • Alcohol de-addiction and rehabilitation programs are helpful to the individual so that they could get rid of the problem completely and can lead a normal and healthy life. 	1 1 1 1	7

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