DIRECTORATE OF GOVERNMENT EXAMINATION, CHENNAI- 6
S.S.L.C PUBLIC EXAM – MARCH/APRIL - 2025

SCIENCE
ANSWER KEY

MAXIMUM MARKS: 75

Part I

Choose the Most Appropriate Answer. **12 x 1 = 12**

Q.No.	Option	Answer	Mark
1.	(c)	98×10^4 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)	1×10^{-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

Part - II

Answer any SEVEN questions.
Question **No.22** is compulsory **7×2 = 14**

Q.No.	Answer	Mark
13.	One calorie is defined as the amount of heat energy required to rise the temperature of 1 gram of water through 1^0 C.	2
14.	As sound travels through a medium the particles of the medium vibrate along the direction of propagation of the wave.	2
15.	• Moist Air • Water • Oxygen **(Any two)**	2

16.	Match the Following 1 Functional group –OH – Alcohol 2 Heterocyclic compounds – Furan 3 Unsaturated compounds – Ethene 4 Soap – Potassium stearate 5 Carbocyclic compounds – Benzene **(Any Four)**	2
17.	• They regulate the flow of blood. • They allow blood in a single direction, prevent back flow of blood.	1 1
18.	• Sudden shoot elongation followed by flowering is known as bolting. • Bolting can be induced artificially on plants by the treatment of Gibberellins. (or) Sudden shoot elongation followed by flowering on treatment of rosette plants with gibberellins is called bolting.	1 1 2
19.	A – Exine (or) Outer layer B –Intine (or) Inner layer C – Generative cell D – Vegetative nucleus	4x ½=2
20.	• The kiwi did not use its wings for a long time. • According to use and disuse theory, the wing of kiwi is degenerated.	1 1
21.	• Floods. • Drought. • Soil erosion. • Loss of wild life. • Extinction of species. • Imbalance of biogeochemical cycles. • Alteration of climatic conditions. • Desertification . **(Any Two)**	2
22.	Molecular mass of Methane(CH_4) = 12+4 = 16g Mass % of carbon (C) $= \frac{12}{16} \times 100 = 75\%$ Mass % of hydrogen (H) $= \frac{4}{16} \times 100 = 25\%$	1 ½ ½

Part – III

Answer any SEVEN questions.
Question **No.32** is compulsory **7x4=28**

<table>
<tr><th>Q.No</th><th>Answer</th><th>Mark</th></tr>
<tr><td>23.</td><td>An ideal gas obeys Boyle's law, Charles's law and Avogadro's law.
According Boyle's law
PV= constant ⟶ (1)
According Charles's law
V/T = constant ⟶ (2)
According Avogadro's law
V/n = constant ⟶ (3)
After combining three equations PV/nT = constant ⟶ (4)
$n = \mu N_A$ ⟶ (5)
Using equation 5,4 can be written as
$PV/\mu N_A T$ = Constant
Constant = k_B, Boltzmann constant (1.38×10^{-23} JK^{-1})
$PV/\mu N_A T = k_B$
$PV = \mu N_A k_B T$
Here μN_A K_B= R, which is termed as universal gas constant whose value is 8.31 $JMol^{-1}k^{-1}$

PV = RT
Ideal gas equation is also called as equation of state.</td><td>2
(3 laws)

1
(substituting)

1
(result)</td></tr>
<tr><td>24.</td><td>
<table>
<tr><th></th><th>Myopia</th><th>Hypermetropia</th></tr>
<tr><td>i)</td><td>Myopia is short sightedness.</td><td>Hypermetropia is long sightedness .</td></tr>
<tr><td>ii)</td><td>It is due to the lengthening of eye ball.</td><td>It is due to the shortening of eye ball.</td></tr>
<tr><td>iii)</td><td>Nearby objects can be seen clearly .</td><td>Distant objects can be seen clearly .</td></tr>
<tr><td>iv)</td><td>Distant objects cannot be seen clearly .</td><td>Nearby objects cannot be seen clearly .</td></tr>
<tr><td>v)</td><td>Focal length of eye lens is reduced.</td><td>Focal length of eye lens is increased.</td></tr>
<tr><td>vi)</td><td>Distance between eyelens and retina increases.</td><td>Distance between eyelens and retina decreases.</td></tr>
<tr><td>vii)</td><td>Image of distant objects are formed before retina.</td><td>Image of nearby objects are formed behind retina.</td></tr>
<tr><td>viii)</td><td>To correct myopia, Concave lens is used.</td><td>To correct Hypermetropia Convex lens is used.</td></tr>
</table>
(Any Four)
</td><td>4</td></tr>
</table>

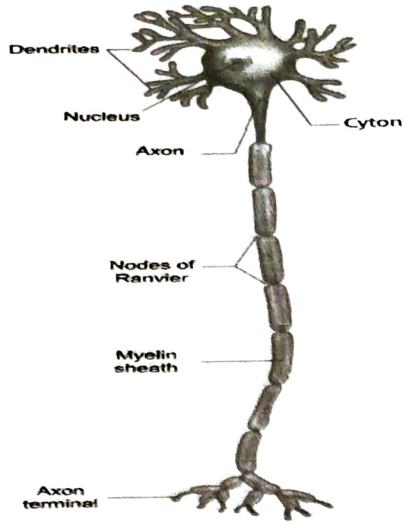
25.

Properties	Alpha rays (α)	Beta rays (β)	Gamma rays (γ)
What are they?	Helium nucleus ($_2He^4$) consisting of two protons and two neutrons	They are electrons ($_{-1}e^0$), basic elementary particle in all atoms.	They are electromagnetic waves consisting of photons.
Charge	Positively charged particles. Charge of each alpha particle = +2e	Negatively charged particles. Charge of each beta particle = -e	Neutral particles. Charge of each gamma particles = zero
Ionising power	100 times greater than beta rays and 10,000 times greater than γ rays	Comparatively low	Very less ionization power
Penetrating power	Low penetrating power (even stopped by a thick paper)	Penetrating power is greater than that of (α) rays. They can penetrate through a thin metal foil.	They have a very high penetrating power greater than that of β rays. They can penetrate through thick metal blocks.
Effect of electric and magnetic field	Deflected by both the fields. (in accordance with Fleming's left hand rule)	Deflected by both the fields; but the direction of deflection is opposite to that for alpha rays. (in accordance with Fleming's left hand rule)	They are not deflected by both the fields.
Speed	Their speed ranges from 1/10 to 1/20 times the speed of light.	Their speed can go up to 9/10 times the speed of light.	They travel with the speed of light.

(Any four) 4

26.	**Applications of Avogadro's Law** • It explains Gay-Lussac's law. • It helps in the determination of atomicity of gases. • Molecular formula of gases can be derived using Avogadro's law. • It determines the relation between molecular mass and vapour density. • It helps to determine gram molar volume of all gases. **(Any four)**	4
27 (i)	**Alloy** An alloy is a homogeneous mixture of two or more metals or of one or more metals with certain non-metallic elements.	2
(ii)	**Reasons for alloying** • 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. **(Any two Reasons)**	2
28.	A soap molecule contains two chemically distinct ends • One polar end with short head with carboxylate group (-COONa) (water loving) • One non polar end with long tail made of the hydro carbon chain (water hating) **Cleansing action** • The hydrophobic part traps the dirt. • The hydrophilic part makes the entire molecules soluble in water. • When a soap or detergent is dissolved in water, the molecules join together as clusters called 'micelles'. • Their long hydrocarbon chain attach themselves to the oil and dirt . • The charged Carboxylate end of the Soap makes micelles soluble in water. Thus the dirt is washed away with soap.	2 2
29.	**Locomotion takes place by two methods.** 1) Looping or crawling movement 2) Swimming movement **1) Looping or crawling movement** • It is brought about by the contraction and relaxation of muscles • The two suckers serve for attachment during movement on a substratum. **2) Swimming Movement.** • Leaches swim actively and perform undulating movements in water	2 2

30. **Structure Of Neuron** — 2



A neuron consists of three basic parts- cyton, dendrites, axon

Cyton

- Cyton is also called cell body or Perikaryon. It has a central nucleus with abundant cytoplasm called neuroplasm.
- The cytoplasm has large granular body called Nissl's granules and the other cell organelles like mitochondria ribosomes, lysosomes and endoplasmic reticulum.
- Neurons do not have the ability to divide.
- Neurofibrils help in transmission of nerve implulses.

Dendrites — 2

- These are the numerous branched cytoplasmic processes.
- They project from the surface of the cell body.
- They conduct nerve impulses towards the cyton.
- The branched projections increase the surface area for receiving the signals from other nerve cells.

Axon

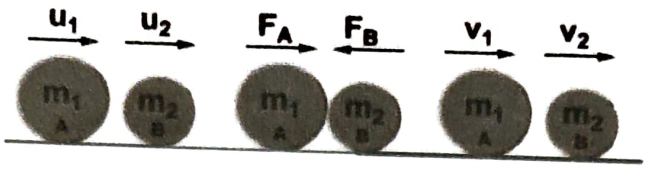
- The axon is a single elongated slender projection.
- The end of axon has synaptic knob.
- Axolemma: The plasma membrane of axon
- Axoplasm: The cytoplasm of axon
- It carries impulses away from the cyton.
- The Axons may be covered by Protective sheath called Myelin Sheath.
- It is further covered by a layer of Schwann cells called Neurilemma.
- Myelin sheath breaks at intervals by depressions called Nodes of Ranvier.
- The region between the nodes is called as Internode.
- Myelin sheath acts as insulator and ensures rapid transmission of nerve impulses.

31	(i)	**Consequences of Soil Erosion** • Soil erosion causes a significant loss of humus, nutrients • Decrease the fertility of soil	2
	(ii)	**Prevention of Soil Erosion** • Retain vegetation cover, so that soil is not exposed • Cattle grazing should be controlled • Crop rotation and soil management improve soil organic matter • Runoff water should be stored in the catchment • Reforestation, terracing and contour ploughing • Wind speed can be controlled by planting trees in form of a shelter belt. **(Any two preventive measures)**	2
32.		$n^{l} = \left(\frac{V}{V-V_s}\right) n$ $= \left(\frac{V}{V-(1/10)v}\right) n$ $= \left(\frac{10}{9}\right) n$ $= \frac{10}{9} \times 90$ $n^{l} = 100$ Hz	1 2 1

Part – IV

Answer all the Questions.

Draw diagrams wherever necessary 3x7= 21

Q.No.	Answer	Mark
33 (a) (i)	**Law of conservation of Linear Momentum** There is no change is the linear momentum of a system of bodies as long as no net external force acts on them	2
		1
	Proof • Let two bodies A and B having masses m_1 and m_2 move with initial velocity u_1 and u_2 in a straight line. • Let the velocity of the first body be higher than that of the second body. ie. $u_1 > u_2$ • During an interval of time t second they tend to have a collision. • After the impact both of the bodies move along the same straight line with a velocity v_1 and v_2 respectively	2
	Force on body B due to A $F_A = m_2 \frac{(v_2-u_2)}{t}$ Force on body A due to B $F_B = m_1 \frac{(v_1-u_1)}{t}$ By Newton's III Law of motion Action Force = Reaction Force $F_B = - F_A$ $m_1 \frac{(v_1-u_1)}{t} = - m_2 \frac{(v_2-u_2)}{t}$ $m_1v_1 + m_2v_2 = m_1u_1 + m_2 u_2$	
(ii)	**Principle of Moments :** When a number of like or unlike parallel forces act on a rigid body and the body is in equilibrium, then the algebraic sum of the moments in the clockwise direction is equal to the algebraic sum of the moments in the anticlockwise direction. (or) Moment in clockwise direction = Moment in anticlockwise direction $F_1 x d_1 = F_2 x d_2$	2

(OR)

33 (b) **(i)** Electric current is defined as the rate of flow of charges in a conductor. — 2

(or)

$I = Q/t$

(ii) The S.I unit of electric current is ampere (A). — 1

When a charge of one coulomb flows across any cross section of a conductor in one second — 2

(or)

$$1 \text{ ampere} = \frac{1 \text{ coulomb}}{1 \text{ second}}$$

(iii) Ammeter — 1

It is connected in a circuit by series connection. — 1

34 (a) **(i)**

	Hygroscopic substances	**Deliquescence substance**
1)	They absorb moisture and do not dissolve	They absorb moisture and dissolve
2)	They do not change its physical state on exposure to air	They change their physical state on exposure to air
3)	They may be amorphous solids or liquids	They are crystalline solids
4)	Any one of Hygroscopic substances Ex:Silica gel	Any one of Deliquescence substances Ex: NaOH, KOH

(Any three) — 3

(ii) Aquatic animals live more in cold regions because, more amount of dissolved oxygen is present in the water of cold regions. This shows that the solubility of oxygen in water is more at low temperatures. — 2

(iii) Volume percentage is defined as the percentage by volume of solute (in ml) present in the given volume of the solution.

(or)

$$\text{Volume Percentage} = \frac{\text{Volume of the solute}}{\text{Volume of the Solution}} \times 100$$

(or) — 2

$$\text{Volume Percentage} = \frac{\text{Volume of the solute}}{\text{Volume of the Solute+ Volume of the solvent}} \times 100$$

(OR)

34(b) (i)

	Reversible Reaction	Irreversible Reaction
1)	It is relatively slow	It is fast
2)	It attains equilibrium	Equilibrium is not attained
3)	It can be reversed under suitable conditions	It cannot be reversed
4)	Both forward and backward reactions take place simultaneously	It is unidirectional. it proceeds only in forward direction.
5)	The reactants cannot be converted completely into products	The reactants can be completely converted into products.

(Any four) — 4

(ii) A – Calcium Carbonate (or) $CaCO_3$
B – Calcium Oxide (or) CaO
C – Carbon di oxide (or) CO_2
***Note: (If 'B' is written as either solid or gas, give one mark)** — 3

35(a) **(i)**

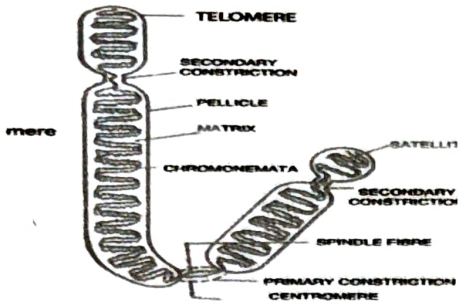
Sl.No	Tissues	Monocot	Dicot
1	Number of xylem	Polyarch	Tetrarch
2	Cambium	Absent	Present (During secondary growth only)
3	Secondary Growth	Absent	Present
4	Pith	Present	Absent
5	Conjunctive tissue	Made up of Sclerenchyma	Made up of Parenchyma
6	*Example*	*Maize*	*Bean*

(Any four) — 4

(ii)

AEROBIC RESPIRATION	ANAEROBIC RESPIRATION
It takes place with the help of oxygen	It takes place without oxygen
Glucose is broken down into CO_2 ,H_2O and energy	Glucose is converted into ethanol or lactic acid
Takes place in Plants and animals	Takes Place in Bacteria and yeast
It occurs in three steps	It is a simpler process
$C_6H_{12}O_6+6O_2 \longrightarrow 6CO_2+6H_2O+ATP$	$C_6H_{12}O_6 \longrightarrow 2CO_2 +2C_2H_5OH+Energy\ (ATP)$

(Any Three) — 3

	(OR)	
35(b) **(i)**	 Structure of chromosome The Chromosomes are thin, long and thread like structures. ❖ It consists of two identical strands called sister chromatids held together by the centromere. ❖ Each chromatid is made up of spirally coiled chromonema ❖ The Chromonema has number of bead like structures called Chromomeres. ❖ The chromosomes are made up of DNA, RNA chromosomal proteins and certain metallic icons **Primary Constriction** • The two arms of chromosome meet at a point called primary constriction (or) centromere. • The Spindle fibres attach to the chromosomes during cell division. **Secondary constriction** • Some chromosomes possess secondary constriction • These occur at any point of the chromosome and are known as the nuclear zone or nucleolar organizer **Telomere** • It is the end of the chromosome • It prevents from joining the adjacent chromosome • It maintains and provides stability to the chromosomes. **Satellite** • It is an elongated knob – like appendage at one end of the choromosome. • The chromosomes with satellites are called as the sat-chromosomes.	2 3
35.(b) (ii)	**Somatic Gene Therapy** Somatic Gene Therapy is the replacement of defective gene in somatic cells. Correction of genetic defects in somatic cell may be beneficial to the patient but the corrected gene may not be carried to the next generation. **Germ line Gene Therapy** Germ line gene theraphy is the replacement of defective gene in germ cell (egg and sperm)	2