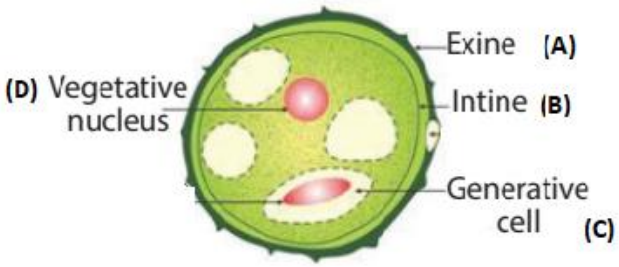
SSLC EXAMINATIONS APRIL – 2025

SCIENCE (11.04.2025)

TENTATIVE ANS KEY

PART-I **12 x 1 = 12**

1	(c) $98x10^{4}$ 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) $1x10^{-11}$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	
13	One calorie is defined as the amount of heat energy required to rise the temperature of 1 gram of water through 1°C.	2
14	Sound waves are longitudinal waves that can travel through any medium (solids, liquids, gases) with a speed that depends on the properties of the medium.	2
15	Conditions necessary for rusting of iron (i) Moist air (ii) Presence of oxygen	1 1
16	1. Functional group –OH - Alcohol. 2. Heterocyclic compounds – Furan 3. Unsaturated compounds – Ethene 4. Soap - Potassium stearate 5. Carbocyclic compounds - Benzene	2
17	The valves are the muscular flaps that **regulate the flow of blood in a single direction and prevent back flow of blood**	2
18.	The sudden shoot elongation of a plant followed by the flowering of plant is called as bolting. It can be induced artificially by treatment of gibberlins or rosette plants.	2

19		4 x ½ = 2
20	*The degenerated wings of kiwi is an example for organ of disuse. *Degeneration of wings in kiwi is due to disuse of wings over generation since they have learnt to walk on land for their needs. *This is an acquired characters in response to their habitat during their lifetime. *According to lamark's use and disuse theory. This character is passed to the off spring by inheritance.	1 1
21	When trees are cut down, It gives rise to ecological problems like floods, drought, soil erosion, loss of wild life, extinction of species, imbalance of biogeochemical cycles, alteration of climatic conditions and desertification	2
22	**Find the mass percentage composition of Methane, CH_4** molecular mass of CH_4 $= 12 + 4$ $= 16$ g Mass % of carbon $= \frac{12}{16} \times 100$ $= 75$ % Mass % of hydrogen $= \frac{4}{16} \times 100$ $= 25$ %	2
	PART-II	
23.	**Ideal Gas Equation** The ideal gas equation is an equation, which relates all the properties of an ideal gas. An ideal gas obeys Boyle's law and Charles's law and Avogadro's law. According to Boyle's law, PV = constant ..... (1) According to Charles's law, VT = constant ..... (2) According to Avogadro's law, VT = constant ..... (3) After combining equations (1), (2) and (3), you equation. can get the following VnT = constant ..... (4) The above relation is called the combined law of gases. If you consider a gas,	1 1

which contains μ moles of the gas, the number of atoms contained will be equal to μ times the Avogadro number, N_0. — 1

i.e., $n = \mu N_A$

Using equation (5), in equation (4) can be written as

$PV\mu N_A T$ = constant

The value of the constant in the above equation is taken to be K_B, which is called as Boltzmann constant (1.38×10^{-23} JK^{-1}). Hence, we have the following equation: — 1

$PV\mu N_A T = K_B$

$PV = \mu N_A K_B T$

$\mu N_A K_B = R$

which is termed as universal gas constant whose value is 8.31 $J\ mol^{-1}\ K^{-1}$.

$PV = RT$

Ideal gas equation is also called as equation of state because it gives the relation between the state variables and it is used to describe the state of any gas.

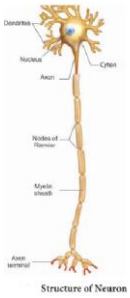
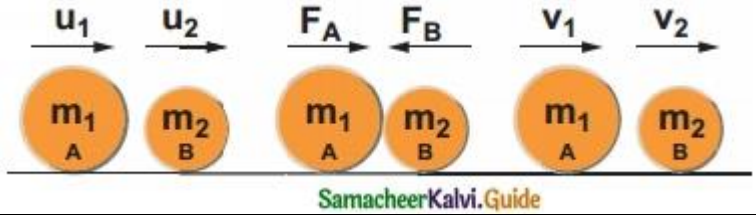
24 Differentiate the eye defects: Myopia and Hypermetropia. — Any four points 4 X 1 = 4

Myopia	Hypermetropia
It is due to the lengthening of the eye ball.	It is due to the shortening of the eye ball.
With this defect, distant objects cannot be seen clearly.	With this defect, nearly objects cannot be seen clearly.
The focal length of the eye lens is reduced.	The focal length of eye lens is increased.
The far point will not be at infinity.	The near point will not be at 25 cm.
The far point has come closer.	The near point has moved further.
The image of distant objects are formed before the retina.	The image of nearby objects are formed behind the retina.
It can be corrected by using concave lens.	It can be corrected by using convex lens.
This defect is known as myopia.	This defect is known as hypermeteropia.

25 Properties of alpha, beta and gamma rays — Any four points 4 X 1 = 4

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 electron waves consisting
Charge	Positively charged particles. Charge of each alpha particle = +2e	Negatively charged particles.Charge of each beta particle = –e	Neutral particles.
Ionising power	100 time greater than β raysand 10,000 times greaterthan γ rays	Comparatively low	Very less ionizati
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 penetrating powe that of β rays. Th

	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)	penetrate through blocks. They are not defl 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 light
26	**Applications of Avogadro's law** i.It explains Gay-Lussac's law. ii. It helps in the determination of atomicity of gases. iii. Molecular formula of gases can be derived using Avogadro's law iv. It determines the relation between molecular mass and vapour density. v. It helps to determine gram molar volume of all gases.			Any four points 4x1 = 4
27	Alloy An alloy is a homogeneous mixture of two or more metals or of one or more metals with certain non-metallic elements. **Reasons for alloying:** i. To modify appearance and colour ii. ii. To modify chemical activity. iii. iii. To lower the melting point. iv. iv. To increase hardness and tensile strength. v. v. To increase resistance to electricity			2 Any two reasons 2
28	**Cleansing action of soap** A soap molecule contains two chemically distinct parts that interact differently with water. It has one **polar end**, which is a ***short head*** with a carboxylate group (– COONa) and one **non-polar end** having the ***long tail made of the hydrocarbon chain***. The polar end is ***hydrophilic (Water loving)*** in nature and this end is attracted towards water. 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. When a soap or detergent is dissolved in water, the molecules join together as clusters called '**micelles**'. Their long hydrocarbon chains attach themselves to the oil and dirt. The dirt is thus surrounded by the non-polar end of the soap molecules .Thus, the dirt is washed away with the soap.			4
29	**Locomotion of Leech** Locomotion in leech takes place by (i) looping or crawling movement (ii) Swimming movement. **(i) Looping or Crawling movement** This type of movement is brought about by the contraction and relaxation of muscles. The two suckers serve for attachment during movement on a substratum. **(ii) Swimming movement** Leeches swim very actively and perform undulating movements in water.			2 2

30	 Structure of Neuron **Structure of Neuron** A neuron typically consists of three basic parts: Cyton, Dendrites and Axon. Cyton: Cyton is also called cell body or perikaryon. It has a central nucleus with abundant cytoplasm called neuroplasm. Dendrites: These are the numerousbranched cytoplasmic processes that project from the surface of the cell body. Axon: The axon is a single, elongated, slender projection.	4
31	**(i) consequences of soil erosion** The effects of soil erosion leads to loss of fertility of land, humus and nutrient. It leads to increased pollution, sedimentation in streams and rivers. Degraded lands able to hold water which can worsen flooding.	2
	(ii) The following are the methods to prevent 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.	2
32	**32 Solution:** When the source is moving towards the stationary listener, the expression for apparent frequency is $n' = \left(\frac{v}{v - v_s}\right) n$ $= \left(\frac{v}{v - \left(\frac{1}{10}\right)v}\right) n = \left(\frac{10}{9}\right) n$ $= \left(\frac{10}{9}\right) \times 90 = 100 \text{ Hz}$	4
	PART - IV	
33 a(i)	State and prove the law of conservation of linear momentum.  	4

	$F_B = m_2(v_2 - u_2)/t$ Force on body A due to B, $F_A = m_1(v_1 - u_1)/t$ By Newton's III law of motion, Action force = Reaction force $F_A = -F_B$ $m_1(v_1 - u_1)/t = -m_2 (v_2 - u_2)/t$ $m_1 v_1 + m_2 v_2 = m_1 u_1 + m_2 u_2$ The above equation confirms in the absence of an external force, the algebraic sum of the momentum after collision is numerically equal to the algebraic sum of the momentum before collision. Hence the law of conservation of linear momentum is proved.	
33a(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. In other words, at equilibrium, the algebraic sum of the moments of all the individual forces about any point is equal to zero. **Moment in clockwise direction = Moment in anticlockwise direction** **F1 × d1 = F2 × d2**	3
33 b	**(i)Electric current** is defined as the rate of flow of charges in a conductor.If a net charge 'Q' passes through any cross section of a conductor in time 't', then the current flowing through the conductor is I =Q/t (ii) **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. Hence, 1 ampere = 1 coulomb / 1 second. (iii) **Ammeter** is used to measure the electric current. It should be Connected in a series circuit.	3 2 2
34a	(i) Difference between hygroscopic substances and deliquescence.	3

Hygroscopic substances	Deliquescence substances
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.
Hygroscopic substances do not change its physical state on exposure to air.	Deliquescent substances change its physical state on exposure to air.
Hygroscopic substances may be amorphous solids or liquids.	Deliquescent substances are crystalline solids.

	(ii) Aquatic animals live more in cold regions because, more amount of dissolved oxygen is present in the water of cold regions.	2
	(iii).Volume percentage is defined as the percentage by volume of solute (in ml) present in the given volume of the solution. Volume Percentage = Volume of the solute x 100 --- Volume of the solution	2
34 b	**(i)** Differences between reversible and irreversible reactions **REVERSIBLE REACTION** / **IRREVERSIBLE REACTION** It can be reversed under suitable conditions. / It cannot be reversed. Both forward and backward reactions take place simultaneously. / It is unidirectional. It proceeds only in forward direction. It attains equilibrium. / Equilibrium is not attained. The reactants cannot be converted completely into products. / The reactants can be completely converted into products. It is relatively slow. / It is fast.	Any four 4
	(ii) A – $CaCO_3$, solid compound 'A' decomposes on heating into 'B' and a gas 'C'. $CaCO_{3(s)} \xrightarrow{\Delta} CaO_{(s)} + CO_{2(g)}\uparrow$ Calcium carbonate (B) (C) On passing the gas CO_2 through water, it becomes acidic. $H_2O_{(l)} + CO_{2(g)} \longrightarrow H_2CO_{3(aq)}$ SamacheerKalvi.Guide Carbonic acid Acidic A – $CaCO_3$, Calcium carbonate B – CaO, Calcium oxide C – CO_2, Carbondioxide gas	3

35 a

(i) Differences between Dicot and Monocot root

S. No.	Tissues	Dicot Root	Monocot Root
1	Number of Xylem	Tetrarch	Polyarch
2	Cambium	Present (During secondary growth only)	Absent
3	Secondary Growth	Present	Absent
4	Pith	Absent	Present
5	Conjunctive Tissue Ex.	Parenchyma Bean	Sclerenchyma Maize

Any three 3

(ii)

Aerobic Respiration	Anaerobic Respiration
It occurs in all living cells of higher organisms.	It occurs in yeast and some bacteria.
It requires oxygen for breaking the respiratory substrate. SamacheerKalvi.Guide	oxygen is not required for breaking the respiratory substrate.
The end products are CO_2 and H_2O.	The end products are alcohol and CO_2.
Glucose molecules are completely oxidised.	Glucose molecules are partially broken down.

4

35 b

(i). The chromosomes are thin, long and thread like structures consisting of two identical strands called sister chromatids. They are held together by the centromere. Each chromatid is made up of spirally coiled thin structure called chromonema. The chromonema has number of bead-like structures along its length which are called chromomeres.

A chromosome consists of the following regions
Primary constriction
Secondary constriction
Telomere
Satellite

5

(ii) Distinguish between
Somatic gene therapy:
It is the replacement of defective gene in somatic cells.

Germ line gene therapy:
It is replacement of defective gene in germ cell (egg and sperm).

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R.SOOSAIMANICKAM 9791355796
SMBM MATRIC HR. SEC.SCHOOL
DINIDIGUL.