

DIRECTORATE OF GOVERNMENT EXAMINATIONS
S.S.L.C. PUBLIC EXAM- APRIL 2024
SCIENCE
ANSWER KEY
Part - I

Answer all the Questions:

12 x 1 = 12

1.	(b)	Stem	1
2.	(c)	Fatty matter	1
3.	(d)	8.31 J Mol ⁻¹ K ⁻¹	1
4.	(c)	Electrical Energy	1
5.	(b)	Restriction endonucleus	1
6.	(a)	6.023x10 ²³	1
7.	(b)	Pituitary Gland	1
8.	(c)	The flowers are brightly coloured have smell and nectar	1
9.	(c)	Mass of the object	1
10.	(c)	Atrium → Ventricle → Arteries → Vein	1

11.	(c)	$2\text{CO}_2 + \text{O}_{2(g)} \rightarrow 2\text{CO}_2 (g)$	1
12.	(c)	Carcinoma	1

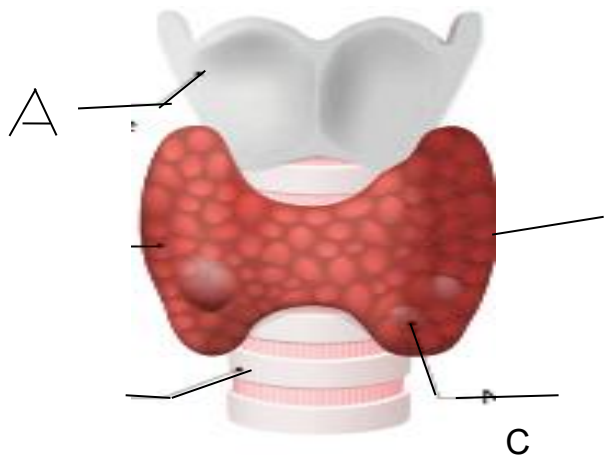
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Part – II

Answer any Six questions. Question No.24 is compulsory.

7 x 2 = 14

13	<p><u>Coefficient of apparent expansion:</u></p> <p>Coefficient of apparent expansion is defined as the ratio of the apparent rise in the volume of the liquid per degree rise in temperature to its unit volume</p> <p>Its SI unit is K^{-1}</p>	<p>1 1/2</p> <p>1/2</p>
14	<ul style="list-style-type: none"> ❖ Tungsten has a very high melting point. ❖ If it is used in fuse wire, it will not melt when large current passes through it ❖ The appliances will get damaged 	2
15	<p><u>Rust :</u></p> <ul style="list-style-type: none"> ❖ Rust is brown coloured hydrated ferric oxide. ❖ $4Fe + 3O_2 + X.H_2O \rightarrow 2Fe_2O_3.XH_2O$ 	2
16	<p><u>Stage :</u></p> <ul style="list-style-type: none"> ❖ Stage is the background appearing when we open the scratch window. ❖ The background will most often be white. ❖ We can change the background colour as we like 	2
17	<ul style="list-style-type: none"> ❖ SA node acts as the pacemaker of the heart. ❖ It is capable of initiating impulse which can stimulate the heart muscles to contract 	1 1
18	<p><u>Parts of hind brain:</u></p> <ul style="list-style-type: none"> ❖ Cerebellum ❖ Pons ❖ Medulla Oblangata 	2

19	 <p>A – Thyroid Cartilage B – Thyroid gland C – Nodule D - Trachea</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
20	<ul style="list-style-type: none"> ❖ The milk produced from the breast during the first 2 to 3 days after child birth is called colostrums. ❖ Milk production is stimulated by prolactin hormone ❖ The ejection of milk is stimulated by oxytocin hormone 	2
21	<p><u>Metastasis:</u></p> <ul style="list-style-type: none"> ❖ The cancerous cells migrate to parts of the body and affect new tissues. ❖ This process is called metastasis 	2

22	Given: $P^H = 4.5$ $P^{OH} = ?$	1
	Solution : $P^H + P^{OH} = 14$ $P^{OH} = 14 - 4.5$ $P^{OH} = 9.5$	1

Part - III

Answer **any Seven** questions. Question No. **32** is **compulsory**. **7x 4 = 28**

23	<p><u>Types of Inertia</u> :</p> <ul style="list-style-type: none"> ❖ Inertia of rest ❖ Inertia of motion ❖ Inertia of direction <p>a) Inertia of rest :</p> <ul style="list-style-type: none"> ❖ To resist a body to change its state of rest. <p style="margin-left: 20px;">Ex: After shaking leaves fall down.</p> <p>b) Inertia of motion :</p> <ul style="list-style-type: none"> ❖ To resist a body to change its state of motion. <p style="margin-left: 20px;">Ex: An athlete runs some distance before jumping.</p> <p>c) Inertia of direction :</p> <ul style="list-style-type: none"> ❖ To resist a body to change its direction. <p style="margin-left: 20px;">Ex : A sharp turn while driving a car you tend to lean side way.</p>	1								
24	<p>a)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Natural Radioactivity</th> <th style="text-align: center;">Artificial Radioactivity</th> </tr> </thead> <tbody> <tr> <td>❖ It cannot be controlled</td> <td>❖ It can be controlled</td> </tr> <tr> <td>❖ Spontaneous process</td> <td>❖ Induced process</td> </tr> <tr> <td>❖ Alpha, Beta and gamma radiations are emitted</td> <td>❖ Neutron, Positrons are emitted</td> </tr> </tbody> </table> <p>b) Electric Heater, Electric Iron (Iron Box)</p>	Natural Radioactivity	Artificial Radioactivity	❖ It cannot be controlled	❖ It can be controlled	❖ Spontaneous process	❖ Induced process	❖ Alpha, Beta and gamma radiations are emitted	❖ Neutron, Positrons are emitted	<p>1</p> <p>1</p> <p>1</p>
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		1
25	<p>a) When magnesium sulphate heptahydrate crystals are gently heated, it loses seven water molecules, and becomes anhydrous magnesium sulphate</p> <p style="text-align: center;">Heating</p> $\text{MgSO}_4 \cdot 7\text{H}_2\text{O} \xrightleftharpoons[\text{Cooling}]{\text{Heating}} \text{MgSO}_4 + 7\text{H}_2\text{O}$ <p>(Magnesium Sulphate heptahydrate) (Anhydrous Magnesium sulphate)</p> <p>b) 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</p>	2
26	<p>a) $\text{RQ} = \frac{\text{Volume of CO}_2 \text{ liberated}}{\text{Volume of O}_2 \text{ consumed}}$</p> <p>b)</p> <ul style="list-style-type: none"> ❖ During light independent reaction, CO₂ is reduced into carbohydrates with the help of ATP and NADPH₂ ❖ So light dependent reaction occur before the light independent reaction. 	2
27	<p><u>Dental formula of rabbit :</u></p> <p>I = 2</p>	2

	$C = \frac{1}{0}$ $PM = \frac{3}{2}$ $M = \frac{3}{3}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p>
28	<p>a)</p> <ul style="list-style-type: none"> ❖ Euploid considered to be advantageous to both plants and animals, as they often result in increase fruit and flower size. <p>b) i) Unipolar neuron:</p> <ul style="list-style-type: none"> ❖ Only one nerve process arises from the cyton. <p>ii) Bipolar neuron:</p> <ul style="list-style-type: none"> ❖ Cyton gives rise to two nerve processes <p>iii) Multipolar neuron :</p> <ul style="list-style-type: none"> ❖ The cyton gives rise to many dendrons and an axon found in cerebral cortex of brain. 	<p>2</p> <p>2</p>

29	<p>(Any 4 points)</p> <table border="1" data-bbox="248 275 1281 741"> <thead> <tr> <th data-bbox="248 275 764 342">Artery</th> <th data-bbox="764 275 1281 342">Vein</th> </tr> </thead> <tbody> <tr> <td data-bbox="248 342 764 398">❖ Distributing vessels</td> <td data-bbox="764 342 1281 398">❖ Collecting vessel</td> </tr> <tr> <td data-bbox="248 398 764 454">❖ Deep location</td> <td data-bbox="764 398 1281 454">❖ Superficial in location</td> </tr> <tr> <td data-bbox="248 454 764 533">❖ Blood flow with high pressure</td> <td data-bbox="764 454 1281 533">❖ Blood flow with low pressure</td> </tr> <tr> <td data-bbox="248 533 764 611">❖ Wall of artery is strong thick and elastic</td> <td data-bbox="764 533 1281 611">❖ Wall of vein is weak thin and non-elastic</td> </tr> <tr> <td data-bbox="248 611 764 741">❖ All arteries carry oxygenated blood except pulmonary arteries</td> <td data-bbox="764 611 1281 741">❖ All veins carry deoxygenated blood except pulmonary veins</td> </tr> </tbody> </table>	Artery	Vein	❖ Distributing vessels	❖ Collecting vessel	❖ 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 arteries	❖ All veins carry deoxygenated blood except pulmonary veins	4
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30	<p><u>Ethnobotany:</u></p> <p>Ethnobotany is the study of regions plants and their practical uses through the traditional knowledge of the local culture of people.</p> <p><u>Importance :</u></p> <ul style="list-style-type: none"> ❖ It provides traditional uses of plant. ❖ It gives information about certain unknown and known useful plants. 	2												
31	<p>a) <u>Consequences of deforestation</u> : (Any 4 points)</p> <ul style="list-style-type: none"> ❖ Flood ❖ Drought ❖ Soil erosion ❖ Loss of wild life ❖ Extinction of species ❖ Imbalance of biogeochemical cycles ❖ Alteration of climate condition. ❖ Desertification <p>b) Applications of DNA finger printing technique: (Any 2 points)</p> <ul style="list-style-type: none"> ❖ DNA finger printing technique is widely used in forensic applications like crime investigation such as identifying the culprit ❖ It is used in paternity testing incase of disputes. 	2												

	❖ It helps in the study of genetic diversity of population, evolution and speciation.	
32	<p>a) 1. The acid that renders aluminium passive is dilute or concentrated nitric acid.</p> <p>2. Aluminium becomes passive due to the formation of an oxide film on its surface.</p> <p>b) Number of moles = $\frac{\text{Number of molecules of NH}_4\text{Cl}}{\text{Avagadro Number}}$</p> $= \frac{1.51 \times 10^{23}}{6.023 \times 10^{23}}$ $= 1 / 4$ $= 0.25 \text{ moles of NH}_4\text{Cl}$	<p>1</p> <p>1</p> <p>1</p>

Part - IV

Answer all the question:


3 x 7 = 21

33	<p>a) (Any 2 points)</p> <p>i)</p> <ul style="list-style-type: none"> ❖ Convex lens is used in camera lenses and magnifying lenses. ❖ Used in making microscope, telescope and slide projectors. ❖ Used to correct the object of vision called hyper metropia. <p>ii)</p> <ul style="list-style-type: none"> ❖ When a beam of white light or composite light is refracted 	
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	<p>through any transparent media such as glass or water, it splits into its component colours.</p> <ul style="list-style-type: none"> ❖ This phenomenon is called as dispersion of light. <p>iii)</p> <ul style="list-style-type: none"> ❖ As the red light has highest wavelength among all the colours, it is scattered least. ❖ It travels a longer distance in the atmosphere. <p>iv) Least count of travelling microscope : 0.01 mm</p>	<p>2</p> <p>2</p> <p>1</p>
	<p>b)</p> <p>i) Echo:</p> <p>An Echo is the sound reproduced due to the reflection of the original sound from various rigid surfaces.</p> <p>ii)</p> <ul style="list-style-type: none"> ❖ Minimum time gap between the original sound and an echo must be 0.1 s. ❖ Minimum distance required to hear an echo is 17.2 m. <p>iii)</p> <ul style="list-style-type: none"> ❖ Used in obstetric ultrasonography ❖ Safe testing tool. <p>iv) Speed of sound = $\frac{\text{Distance travelled}}{\text{Time taken}}$</p> <p style="text-align: center;">$= \frac{2d}{t}$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

		2
34 (a)	<p>i) Number of Moles of O_2 = $\frac{\text{Volume of S.T.P}}{\text{Molar Volume}}$ $= 3 / 22.4$ $= 0.1339$ moles</p> <p>Number of Molecules = Number of moles x Avagadro number $= 0.1339 \times 6.023 \times 10^{23}$ $= 0.8064 \times 10^{23}$ $= 8.064 \times 10^{22}$ O_2 molecules</p> <p>Number of moles of Cl_2 = $5 / 22.4 = 0.2232$ moles Number of molecules = $0.2232 \times 6.023 \times 10^{23}$ $= 1.344 \times 10^{23}$ molecules</p> <p>Number of moles of H_2 = $6 / 22.4 = 0.2678$ moles Number of molecules = $0.2678 \times 6.023 \times 10^{23}$ $= 1.6129 \times 10^{23}$ molecules</p> <p>1) 6 litre of H_2 has the highest number of molecules 2) 3 litre of O_2 has the lowest number of molecules</p>	
	<p>ii)</p> <ul style="list-style-type: none"> ❖ An atom is no longer indivisible. ❖ Atoms of the same element may have different atomic mass. ❖ Atoms of different element can be transmuted into atoms of other elements ❖ Atom is no longer indestructible. ❖ Atoms may not always combine in a simple whole number ratio. 	

	<ul style="list-style-type: none"> ❖ Atom is the smallest particle that takes part in a chemical reaction. ❖ The mass of an atom can be converted into energy ($E=mc^2$) 	5
34 (b)	<p>i)</p> <ul style="list-style-type: none"> ❖ Some detergents having a branched hydro carbons chain are not fully biodegradable by micro-organisms present in water. ❖ So they cause water pollution. <p>ii)</p> <ul style="list-style-type: none"> ❖ A → Ethanoic acid CH₃ COOH ❖ $C_2H_5OH + CH_3COOH \rightarrow CH_3COOC_2H_5 + H_2O$ ❖ Esterification 	<p>2</p> <p>2</p> <p>2</p> <p>1</p>
35 a)	<p>i) Synthetic auxin :</p> <ul style="list-style-type: none"> ❖ Artificially synthesized auxin that have properties like auxins are called synthetic auxins. Eg : 2-4-D <p>ii) Structure of Ovule:</p> <ul style="list-style-type: none"> ❖ Nucleus is enclosed by two integuments leaving an opening called as micropyle. ❖ The ovule is attached to ovary wall by a stalk known as funiculus. ❖ Chalaza is the basal part ❖ The embryo sac contains seven cells and the eighth nuclei located within the nucleus ❖ Three cells at the micropylar end form the egg apparatus. 	<p>1</p> <p>1</p>

	<p>❖ 'The three cells at the chalaza end are the antipodal cells.</p> 	<p>3</p> <p>2</p>												
<p>35 b)</p>	<p>i) Father of Indian Green Revolution: Dr.M.S.Swaminathan</p> <p>ii)</p> <table border="1" data-bbox="248 1075 1279 1536"> <thead> <tr> <th>Out breeding</th> <th>Inbreeding</th> </tr> </thead> <tbody> <tr> <td>❖ Cross between two different species with desirable features of economic value are mated.</td> <td>Mating of closely related animals within the same breed for about 4-6 generation</td> </tr> <tr> <td>❖ The hybrids are stronger and vigorous than their parents</td> <td>It helps in the accumulation of superior genes and eliminate undesirable genes.</td> </tr> <tr> <td>❖ Eg: Mute</td> <td>Eg : Sheep Hissardale</td> </tr> </tbody> </table>	Out breeding	Inbreeding	❖ Cross between two different species with desirable features of economic value are mated.	Mating of closely related animals within the same breed for about 4-6 generation	❖ The hybrids are stronger and vigorous than their parents	It helps in the accumulation of superior genes and eliminate undesirable genes.	❖ Eg: Mute	Eg : Sheep Hissardale	<p>1</p> <p>1</p> <p>1</p>				
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	Defect	Insulin deficiency due to destruction of β cells	Target cells do respond to insulin	
	Treatment	Insulin administration in necessary	Can be controlled by diet, exercise and medicine	

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