

**Comprehensive Marking Scheme**  
**Pre-Board Examination (2023-24)**  
**Class: - X**  
**Subject: Science (086) (Morning)**

Time allowed: 3 hours

M.M:80

<b>Section A</b>		
Q. no.	Assessment	Marks
1	<p>Correct response : a (Addition or gain of oxygen is oxidation).</p> <p>Option b: Addition or gain of hydrogen to the reactant is <i>reduction</i>, not oxidation.</p> <p>Option c: removal or loss of oxygen is also <i>reduction</i>, not oxidation.</p> <p><b>Suggestive measures:</b> The student needs to differentiate between oxidation and reduction with suitable examples.</p>	1
2	<p>Correct response : b aluminium is 8.1%</p> <p>Option a: iron is 5%</p> <p>Option c: calcium is 3.6%</p> <p>Option d: sodium is 2.8%</p> <p><b>Suggestive measures:</b> The student needs to know about minerals found in the earth crust and correlate these with the metallurgical process.</p>	1
3	<p>Correct response : a (washing soda <math>\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}</math>)</p> <p>Option b: Baking soda is <math>\text{Na}_2\text{HCO}_3</math> (sodium hydrogen carbonate or sodium bicarbonate);</p> <p>Option c: Bleaching powder is <math>\text{CaOCl}_2</math>; (calcium oxychloride or chloride of lime)</p> <p>Option d: Tartaric acid is <math>\text{C}_4\text{H}_6\text{O}_6</math></p> <p><b>Suggestive measures:</b> The student needs to correlate the common name with chemical formulas of given compounds.</p>	1
4	<p>Correct response : d (<math>\text{Na} &gt; \text{Mg} &gt; \text{Zn} &gt; \text{Fe}</math>)</p> <p>Option a: wrong sequence, sodium is more reactive than magnesium.</p> <p>Option b: wrong sequence, zinc is more reactive than iron.</p> <p>Option c: wrong sequence, magnesium is more reactive than zinc.</p> <p><b>Suggestive measures:</b> The student needs to understand the reactivity series thoroughly. In reactivity series, the metals are arranged in the decreasing order of their reactivity.</p>	1

K	Potassium	Most reactive
Na	Sodium	
Ca	Calcium	↑
Mg	Magnesium	
Al	Aluminium	
Zn	Zinc	↑
Fe	Ferum	↑
Sn	Tin	↑
Pb	Lead	↑
Cu	Copper	↑
Hg	Mercury	↑
Ag	Silver	↑
Au	Gold	Least reactive

	The most reactive are placed on the top and the least reactive at the bottom.	
5	<p>Correct response : c (aluminium and zinc reacts with base as well as acid)</p> <p>Option a: <math>\text{Na}_2\text{O}</math> is a metal oxide which is basic in nature.</p> <p>Option b: <math>\text{K}_2\text{O}</math> is a metal oxide which is basic in nature.</p> <p>Option d: <math>\text{MgO}</math> is a metal oxide which is basic in nature.</p> <p><b>Suggestive measures:</b> The student needs to go through the reactions of metal oxides with acids and bases. Metal oxide are generally basic in nature and they reacts with acids to form salts whereas oxide of aluminium and zinc reacts with base as well as acid, thus are amphoteric oxide.</p>	1
6	<p>Correct response : b (In reaction between <math>\text{AgNO}_3</math> solution and copper metal, Cu is more reactive than Ag therefore Cu displaces Ag from its salt solution)</p> <p>Option a: In reaction between <math>\text{FeSO}_4</math> solution and copper metal, Fe is more reactive than copper therefore no reaction will takes place.</p> <p>Option c: In reaction between <math>\text{CuSO}_4</math> and silver metal, Cu is more reactive than silver therefore no reaction will takes place.</p> <p>Option d: In reaction between <math>\text{NaCl}</math> and copper metal, Na is more reactive than copper therefore no reaction will takes place.</p> <p><b>Suggestive measures:</b> The student needs to go through the reactivity series and displacement reactions. Based on reactivity series salt solution of less reactive metal will be displaced by more reactive metal.</p>	1
7	<p>Correct response : a (when aluminium reacts with ferrous sulphate solution, aluminium sulphate is form which is a colourless compound where as ferrous sulphate solution is a light green solution)</p> <p>Option b: No noticeable change in temperature observed in a displacement reaction.</p> <p>Option c: No gas is formed in this reaction.</p> <p>Option d: light green colour of ferrous sulphate solution changes to colourless not blue which usually observed with copper sulphate.</p> <p><b>Suggestive measures:</b></p>	1

	<p>The student need to understand the reactivity series and displacement reaction. they also need to observe the colour of different salts present in the laboratory.</p> <p>Aluminium is more reactive than iron hence will displace iron from its salt solution. Aluminium displaces iron from iron sulphate and forms colorless aluminium sulphate solution.</p> $2\text{Al(s)} + 3\text{FeSO}_4(\text{aq}) \rightarrow \text{Al}_2(\text{SO}_4)_3(\text{aq}) + 3\text{Fe(s)}$	
8	<p>Correct response : a (digestive enzymes are present in food vacuole)</p> <p>Option b: mitochondria only provide energy in the form of ATP.</p> <p>Option c: pseudopodia in amoeba help in capturing food particles and its motion from one place to another.</p> <p>Option d: chloroplast is part of plant cell only.</p> <p><b>Suggestive measures:</b> The student needs to understand nutrition in amoeba in detail. Nutrition in amoeba is holozoic. The solid food particles are ingested with the help of pseudopodia and enclosed into a food vacuole. Enzymes in it act on the enclosed food particles and digest it.</p>	1
9	<p>Correct response : c (during anaerobic respiration in yeast the glucose is breaks down into ethanol, CO<sub>2</sub>, and energy)</p> <p>Option a: In muscle cells when supply of oxygen is insufficient the glucose is beaks down Lactic acid and energy.</p> <p>Option b: During aerobic respiration carbon dioxide, water and energy are produced.</p> <p>Option d: pyruvate is the initial product formed when glucose is breakdown in the cytoplasm in the respiration process.</p> <p><b>Suggestive measures:</b> The student needs to go through the break down of glucose by various pathways during respiration process. In yeast, the end products of anaerobic respiration are ethyl alcohol, carbon dioxide and ATP (Adenosine triphosphate).</p>	1
10	<p>Correct response : b (<i>plasmodium</i> reproduces by multiple fission )</p> <p>Option a: budding is a asexual mode of reproduction in which the specialised cell on parent body develop into a bud and transform into a new individual on separation.e.g. yeast and hydra.</p> <p>Option c: asexual mode of reproduction where the parent cell divided into two daughter cell.</p>	1

	<p>Option d: Reduction division is also known as meiosis, which takes place in multicellular organisms, where the specialised cell present in the gonads divided and produces gametes.</p> <p><b>Suggestive measures:</b></p> <p>The student need to know the different mode of asexual reproduction in unicellular organisms.</p> <p>Plasmodium does follow the asexual method of reproduction. Plasmodium reproduces by multiple fissions. The nucleus produces many nuclei by undergoing division. The nuclei result in the formation of many daughter cells into the cyst.</p>	
11	<p>Correct response : b (traits that are genetically determined can only transmit from parents to offspring like Big nose, colour of eye, hair etc.)</p> <p>Option a: swimming technique is a acquired trait that donot changes the genetic make up of the individual parent thus can not inherited.</p> <p>Option c: Sculpted body is also a acquired trait.</p> <p>Option d: Archery is also a acquired trait.</p> <p><b>Suggestive measures:</b></p> <p>The student needs to understand how genes expressed himself and responsible for the inheritance of the traits.</p> <p>Swimming, Sculpted body Archery are acquired traits. such traits do not change genetic makeup of the individual thus are not inherited to the offspring.</p>	1
12	<p>Correct response : a (saliva have salivary amylase enzyme that breakdown carbohydrates into sugars)</p> <p>Option b: Breakdown or digestion of protein only starts in Stomach.</p> <p>Option c: Absorption of digested nutrients only takes place in the small intestine.</p> <p>Option d: Lipase is an enzyme that degrades lipids found in emulsified fat and transforms them into fatty acids and glycerol.</p> <p><b>Suggestive measures:</b></p> <p>The student needs to understand the role of different enzyme in the digestion process.</p> <p>Amylase is an enzyme that breaks down starch into simple sugars. Digestion of starch begins in mouth. As a result, if salivary amylase is deficient, starch digestion is affected.</p>	1

13 Correct response : b ( concave mirror converge the reflected rays which intersect each other and forms the real image)

Option a: Parallel rays never intersect each other thus no real image will be formed.

Option c: convex mirror will diverge reflected rays which seems to be intersect virtually and forms virtual image.

**Suggestive measures:**

The student needs to practice and understand the concept of image formation by mirror and lens.

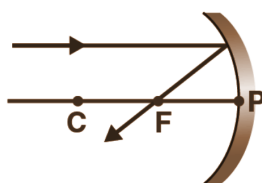
All the light rays which are parallel to the principal axis of a concave mirror, converge at the principal focus (F) after reflection and appear to intersect each other to form a real image.

- The Rays parallel to the principal axis after reflection will pass through the principal focus in case of concave mirror or appear to diverge from the principal focus in case of a convex mirror.
- A ray passing through the principal focus of a concave mirror or a ray which is directed towards the principal focus of a convex mirror after reflection will emerge parallel to the principal axis.
- A ray passing through the centre of curvature of a concave mirror or directed in the direction of the centre of curvature of a convex mirror, after reflection is reflected back along the same path.

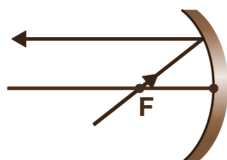
**A ray incident obliquely to the principal axis, towards a point P on the concave mirror or a convex mirror is reflected obliquely.**

For a concave mirror, any of the following four ray diagrams can be used for locating the image formed:

a) A ray parallel to the principal axis, after reflection, will pass through the principal focus of a concave mirror.



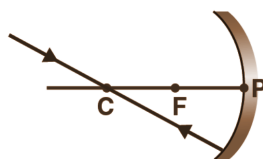
b) A ray which is passing through the principal focus of a concave mirror, after reflection, will emerge parallel to the principal axis.



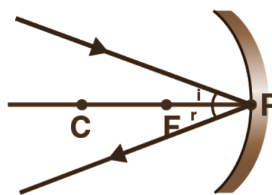
c) A ray passing through the centre of curvature of a concave mirror, after reflection, is reflected along the same path. The light rays come

1

back along the same path because the incident rays fall on the mirror along the normal to the reflecting surface.



d) A ray incident obliquely to the principal axis, towards the point P (pole of the mirror), on the concave mirror, is reflected obliquely. The incident and reflected rays follow the laws of reflection at point P, making equal angles with the principal axis.



- 14 Correct response : b (Wavelength of red light is longest thus get least scattered by particle in the atmosphere)  
 Option a: Wavelength of violet light is short in the spectrum of light thus it scattered the most by smoke or fog.  
 Option c: light is not absorbed by smoke or fog

**Suggestive measures:**

The student needs to understand the phenomena of scattering of light. The light of a shorter wavelength is scattered much more than the light of a longer wavelength. The wavelength of red light is longest in white light so it will scatter the least. violet is most scattered by fog or smoke particles.

- 15 Correct response : d (decomposers are the cleaners of the nature)  
 Option a: plants are the producer in the ecosystem.  
 Option b: animals are the consumers in the ecosystem.  
 Option c: Herbivores are the animal which consume vegetation.

**Suggestive measures:**

The student needs to understand the role of different components of the ecosystem. Plants are producer in the ecosystem. The herbivores are primary consumers and carnivores are secondary consumers. Decomposers and scavengers are those which decompose the waste organic matter. Hence, they are also called nature's cleaner.

- 16 Correct response : d (wood shaving can be decompose by microbes)

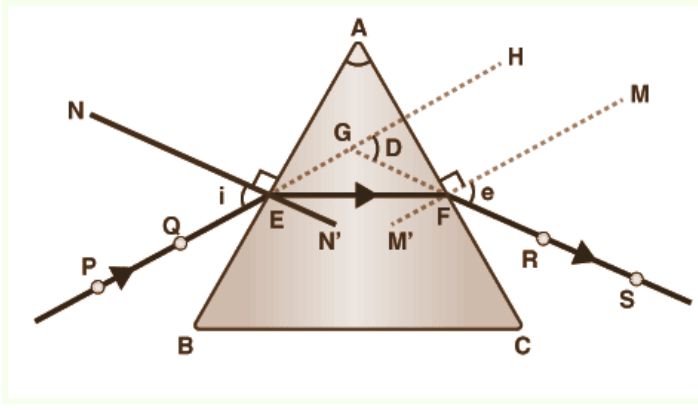
	<p>Option a: microbes can not digest aluminium folis, but it rusted and decomposed by abiotic factors.</p> <p>Option b: Glass bottles are non biodegradable.</p> <p>Option c: Pesticides are non biodegradable.</p> <p><b>Suggestive measures:</b> Student needs to understand the biodegradable and non biodegradable substances. Biodegradable waste is the waste which can be broken down by microorganisms and other living things. There is no organism which can break or digest aluminium foils, glass or pesticides.</p>	
17	<p>The correct answer is Option 'a' where both assertion (A) and Reason(R) are true and reason(R) is the correct explanation of assertion(A).</p> <p>During a chemical change a new product with different chemical and physical composition is formed.</p> <p>Incorrect responses: Option 'b': This option is incorrect as During a chemical change a new product with different chemical and physical composition is formed which correctly explain the assertion. Option 'c': This option is incorrect as both the statments are true and none of them are false. Option 'd': This option is incorrect as both the statments are true.</p> <p><b>Suggestive measures:</b> The student needs to understand the types of different changes taking place in the surrounding and the type of chemical reactions.</p>	1
18	<p>The correct answer is option 'c' where assertion (A) is true but reason(R) is not true as there are some fish which reproduce by internal fertilization and some fish reproduce by externally.</p> <p>Incorrect responses: Option a-This option is incorrect which states that 'Both Assertion (A) and Reason (R)are true and Reason (R) is the correct explanation of Assertion (A)', because reason(R) is not true as some fishes reproduce by external fertilization. Option 'b':This option is incorrect as assertion (A) is true but Reason(R) is not true. Option d-Which states that'Assertion (A) is false but Reason ( R) is true'- is also incorrect as Assertion (A) is correct statement, so it can not be false.</p> <p><b>Suggestive measures:</b> The Student needs to understand different type of fertilization. Internal fertilization is the process of fertilization that occurs inside the body of an individual. In fish, fertilisation of eggs can be either external or</p>	1



	internal. In many species of fish, fins have been modified to allow internal fertilisation.	
19	<p>The correct answer is option 'c' where Assertion (A) is true but Reason(R) is false. because The direction of magnetic field around a conductor can be given in accordance with Right hand thumb rule not by left hand thumb rule.</p> <p>Option 'a': This option is incorrect which states that 'Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)', because The direction of magnetic field around a conductor can be given in accordance with Right hand thumb rule not by left hand thumb rule.</p> <p>Option 'b': This option is incorrect as from assertion (A) and Reason(R) assertion is true but reason(R) is false due to left hand thumb rule instead of right hand thumb rule.</p> <p>Option 'd': This option is incorrect as assertion is true but reason is false due to left hand thumb rule instead of right hand thumb rule.</p> <p><b>Suggestive measures:</b> The student needs to observe the right hand rule to find out the direction of the magnetic field around a current carrying conductor. Direction of the magnetic field around a conductor can be given in accordance with the <i>right hand thumb rule</i>.</p>	1
20	<p>The correct answer is option 'b'- Both 'A' and 'R' are true but 'R' is <u>not</u> the correct explanation of the assertion. The correct explanation of this assertion as UV rays has the energy required to fuse three molecule of the oxygen.</p> <p>Option a : This option is incorrect which states that 'Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)'. Reason(R) is true but not correct explanation of the assertion.</p> <p>Option c: This option is incorrect as both the statement are true. Option d: This option is incorrect as both the statement are true.</p> <p><b>Suggestive measures</b> The student needs to practice assertion and reason questions.</p>	1
<b>Section-B</b>		
	Correct Response	
21	<ul style="list-style-type: none"> <li>When an aqueous solution of potassium chloride(KCl) mixed with silver nitrate(AgNO<sub>3</sub>) solution an insoluble white substance of silver chloride(AgCl) is formed.</li> </ul>	1



	<p>The chemical reaction is as follows :</p> $\text{KCl(aq)} + \text{AgNO}_3\text{(aq)} \rightarrow \text{KNO}_3\text{(aq)} + \text{AgCl (s)}.$ <ul style="list-style-type: none"> <li>It is an example of a double displacement reaction.</li> </ul> <p><b>Suggestive measures</b> The student needs to observe and understand the compound formed in different chemical reactions.</p>	1
22	<ul style="list-style-type: none"> <li>Muscle cells have <i>special proteins</i>(actin and myosin) that change both their shape and their arrangement in the cell in response to <i>nervous electrical impulses/stimuli</i>.</li> <li>Muscle contraction is initiated by the signal sent by the CNS to the muscle fibres in response to a stimulus.</li> </ul> <p><b>Suggestive measures</b> The student needs to understand the concept of reflex action.</p>	1 1
23	<ul style="list-style-type: none"> <li>ATP =Adenosine triphosphate</li> <li>DNA=Deoxyribonucleic acid</li> </ul> <p><b>Suggestive measures</b> The student needs to understand full forms of different abbreviations used in the textbook. (i.e.IUPAC,RBC and WBC etc.)</p> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>Diffusion is insufficient to meet the oxygen requirement of multicellular organisms like human because :</li> </ul> <p>i. <u>all the cells are not in direct contact with the environment and</u></p> <p>ii. <u>diffusion is a slow process.</u></p> <p>(Diffusion is too slow to cover the distance between the gas exchange surface and the sites where the oxygen is required. That is why we need a gas transport system - the bloodstream. Due to higher metabolic rate and the volume of human body is so large that oxygen cannot diffuse into all cells of the body quickly as oxygen will have to travel large distances to reach each and every cell)</p> <p><b>Suggestive measures</b> The student needs to understand the concepts of respiration in complex organisms.</p>	1 1 1 1

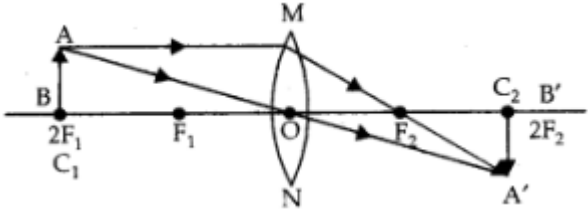
<p>24</p> <p>a.</p>	 <div data-bbox="965 297 1289 577" style="border: 1px solid black; padding: 5px;"> <p>PE - Incident ray  EF - Refracted ray  FS - Emergent ray  A - Angle of the prism  <math>\angle i</math> - Angle of incidence  <math>\angle r</math> - Angle of refraction  <math>\angle e</math> - Angle of emergence  <math>\angle D</math> - Angle of deviation</p> </div>	<p>1</p>
<p>b.</p>	<p><b>Observation</b></p> <p>At surface AB, the light ray enters obliquely and bends towards the normal on refraction. A spectrum will be observed on the screen placed near it (due to dispersion of light) consisting of seven colours.</p> <p><b>Suggestive measures</b></p> <p>The student needs to practice the ray diagram of the dispersion of light, rainbow formation and image formation by different mirror and lens.</p>	<p>1</p>
<p>25</p>	<ul style="list-style-type: none"> <li>The device that helps to maintain the potential difference across a conductor is <u>a battery or a cell</u>.</li> <li>The chemical reaction within a cell generates the potential difference across the terminals of the cell, even when no current is drawn from it. When it is connected to a conductor, it produces electric current and, maintain the potential difference across the ends of the conductor.</li> </ul> <p><b>Suggestive measures:</b></p> <p>The student needs to understand the concept of potential difference and role of battery and other devices like ammeter, voltmeter etc. in the electric circuit.</p> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>Refractive index of alcohol &gt; refractive index of water. So alcohol is optically denser than water.</li> <li>Alcohol is optically denser medium as its refractive index is higher than that of water. When we compare the two media, the one with larger refractive index is called the optically denser medium than the other as the speed of light is lower in this medium.</li> </ul> <p><b>Suggestive measures:</b></p> <p>The student needs to understand the concept of refractive index, absolute refractive index and optical mediums.</p>	<p>1</p> <p>1</p> <p>1</p>

26	<ul style="list-style-type: none"> <li>• In the given food chain: If 100 J of energy is available to lion, the plants or producers have 10,000 J of energy available to them.</li> <li>• As per 10% law of flow of energy in an ecosystem only 10% of energy is received by the next trophic level and 90% of energy is always used up by the organism itself for daily works i.e, body heat, reproduction, etc.</li> </ul> <p><b>Suggestive measures:</b> The student needs to understand the concept of transfer of energy in different trophic levels in an ecosystem. 10% of x = 100 x = 1000 J in deer 10% of y = 1000 y = 10,000 J in Plant (producer)</p>	1  1
<b>Section C</b>		
27	<p>(i) X → Plaster of Paris → <math>\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}</math></p> <p>Y → Gypsum → <math>\text{CaSO}_4 \cdot 2\text{H}_2\text{O}</math></p> <p>(ii) <math>\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + 1\frac{1}{2} \text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}</math> (POP) (Gypsum)</p> <p><b>Suggestive measures:</b> The student needs to relate the chemical reaction involved in the formation of common salt and the uses of salt mentioned in the chapter.</p>	1  1  1
28	<p>(i) Hydrogen gas is not evolved when most metals react with nitric acid. It is because <math>\text{HNO}_3</math> is a strong oxidising agent. It oxidises the <math>\text{H}_2</math> produced to water and itself gets reduced to any of the nitrogen oxides.</p> <p>(ii) ZnO reacts both with acids as well as bases to form salt and water. Thus, ZnO is an amphoteric oxide. / <math>\text{ZnO} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2\text{O}</math> ; <math>\text{ZnO} + 2\text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2\text{O}</math></p> <p>(iii) Calcium reacts with water and release hydrogen gas. The bubbles of <math>\text{H}_2</math> gas sticks to the surfaces and decreases its density to float.</p> <p><b>Suggestive measures:</b> The student needs to understand the chemical properties of metals.</p> <p style="text-align: center;">OR</p> <p>(i) The chemical bond formed by the transfer of electrons from one atom to another is known as an ionic bond.</p> <p>(ii) Compound Z is a ionic compound which are solid but brittle.</p> <p>(iii) Ionic compounds are insoluble in solvents such as kerosene or petrol they are soluble in water.</p> <p><b>Suggestive measures:</b></p>	1  1  1  1  1  1

	The student needs to differentiate between ionic compound and covalent compound and their physical properties.	
29	<p>(a) Growth hormone (GH) is secreted by pituitary gland.</p> <p>(b) Effect of the following on a person:</p> <p>(i) Deficiency of growth hormone (hypoactivity) causes dwarfness.</p> <p>(ii) Excess secretion of growth hormone (hyperactivity) causes excessive growth of bones making the person very tall (gigantism).</p> <p><b>Suggestive measures:</b> The student needs to correlate different types of hormone and their specific role in the organism.</p>	<p>1</p> <p>1</p> <p>1</p>
30	<p>(a) In F1 generation, all plants are with round shaped yellow seeds. But in F2 generation he observed new combination of different trait. He observed all types of plants: Round yellow, Round green, Wrinkled yellow, Wrinkled green. (any other)</p> <p>(b) F2 generation ratio: Round-yellow = 9: Round-green = 3: Colour of stem in F1 progeny Wrinkled- yellow = 3: Wrinkled-green = 1 (9:3:3:1)</p> <p><b>Suggestive measures:</b> The student needs to understand the ratios of different traits obtained in monohybrid and dihybrid cross.</p>	<p>1</p> <p>1</p> <p>1</p>
31	<p>(a) A phenomena, where light travelling obliquely from one medium to another the direction of propagation of light in second medium changes.</p> <p>(b) <math>\mu_w = 4/3</math>, and <math>\mu_g = 3/2</math> Refractive index of glass w.r.t. water (<math>w\mu_g</math>)  <math>= \mu_{wg} / \mu_{ww}</math>  <math>= 3/2 / 4/3</math>  <math>= 3/2 \times 3/4 w\mu_g</math>  <math>= 9/8</math></p> <p><b>Suggestive measures:</b> The student needs to practice more numerical related problems.</p>	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
32	<p>Let resistance of each resistor be R.</p> $R_s = R_1 + R_2$ <p>So, <math>R_s = R + R = 2R</math></p> <p>For parallel combination,</p> $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} \text{ OR } R_p = \frac{R_1 R_2}{R_1 + R_2}$ <p>So, <math>R_p = \frac{R \times R}{R + R} = \frac{R}{2}</math></p> <p>Required ratio = <math>\frac{R_s}{R_p} = \frac{2R}{R/2} = 4:1</math></p>	<p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p>

	<p><b>Suggestive measures:</b> The student needs to calculate and differentiate between the equivalent resistance of series and parallel combinations in an electric circuit.</p>	
33	<p>(a) 1-C, 2-D, 3-a, 4-B (b) <math>R = 600</math>; <math>V = 110V</math> <math>V=IR</math> <math>I = V/R = 110/600 = 0.18A</math></p> <p><b>Suggestive measures:</b> The student needs to understand the Ohm's law and its application. And practice numerical problems.</p>	<p><math>\frac{1}{2} * 4</math>  <math>\frac{1}{2}</math> <math>\frac{1}{2}</math></p>
<b>SECTION D</b>		
34	<p>(a) (i) Carboxylic acid./Ethanoic acid.</p> <p>(ii)</p> $\underset{\text{Ethanol}}{\text{CH}_3\text{CH}_2\text{OH}} \xrightarrow[\text{Heat}]{\text{Alkaline KMnO}_4} \underset{\text{Ethanoic acid}}{\text{CH}_3\text{COOH}}$ <p>(iii) Here alkaline <math>\text{KMnO}_4</math> acts as an oxidising agent. It oxidizes ethanol to ethanoic acid by donating nascent oxygen.</p> <p>(b) The melting point of pure ethanoic acid is <math>290K</math> and hence it often freezes during winter in cold climates.</p> <p style="text-align: center;">OR</p> <p>(i) X = Ethanol;      Y = Ethene;      Z = Hydrogen</p> <p>(ii)</p> $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[443K]{\text{conc. H}_2\text{SO}_4} \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O}$ <p>(iii) Here, conc. <math>\text{H}_2\text{SO}_4</math> acts as a dehydrating agent i.e. helps in the removal of water.</p> <p><b>Suggestive measures:</b> The student needs to understand the physical and chemical properties of carbon compounds along with their uses.</p>	<p>1  1  1  2    1+1+ 1  1  1</p>

35	<p>(a) When Planaria accidentally gets cut into many pieces then its each piece grows into a complete organism. This is known as regeneration.</p> <p>(b) When the Bryophyllum leaf falls on the wet soil, the buds present in the notches along the leaf margin develop into new plants. This is known as vegetative propagation.</p> <p>(c) The sporangia of Rhizopus contain cells or spores that can eventually develop into new Rhizopus individuals when it bursts on maturation.</p> <p>(d) It simply breaks into two or more fragments and each fragment then grows into a new Spirogyra.</p> <p>(e) When the female gamete/egg is not fertilised, uterus lining is not needed any longer. So, the lining slowly breaks and comes out through vagina as blood and mucus.</p> <p><b>Suggestive measures:</b> The student needs to understand and differentiate between different modes of asexual reproduction.</p> <p style="text-align: center;">OR</p> <p>(a) Develop new plant from vegetative part such as root, stem and leaves of the plant under appropriate condition. Eg. cutting / grafting/layering.(any other)</p> <p>(b) (i) Such plant can bear flowers and fruits earlier than those produced from seeds.</p> <p>(ii) Plants that lost the capacity to produce seed can also grow.</p> <p>(iii) All plant produced are genetically similar so no effect on the yield.</p> <p>(iv) No experties is required to grow such plant.</p> <p style="text-align: right;">(any three)</p> <p><b>Suggestive measures:</b> The student needs understand the importance, conditions and meaning of vegetative propagation.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1 ½</p> <p>½</p> <p>1</p> <p>1</p> <p>1</p>
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36	<p><math>v = ?; f = +10 \text{ cm}; u = 20 \text{ cm}; h = +2 \text{ cm}</math></p> $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}; \frac{1}{v} = \frac{1}{u} + \frac{1}{f}$ $\frac{1}{v} = \frac{1}{-20} + \frac{1}{10} = \frac{-1}{20} + \frac{1}{10} = \frac{1+2}{20} = \frac{1}{20}$ <p>(a) <math>v = +20 \text{ cm}</math>            Nature : Real; position – at 20 cm on other side of optical centre.</p> <p>(b)</p>  <p>OR</p> <p>(i) This is a concave mirror.            (ii) The image is real and inverted and of same size.            (iii) As <math>m = -1</math>  <math>m = -v/u</math>  <math>-1 = -v/u</math>  <math>u = v</math>            Hence, object is located at centre of curvature i.e., at distance of 40 cm from the pole of the mirror. (any other)</p> <p><b>Suggestive measures:</b>            The student needs to practice ray diagrams and the related numericals. While drawing a ray diagram the direction of the light ray must be shown and must be drawn by the pencil only.</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p> <p>1 (for direction)</p> <p>1</p> <p>1+1</p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>
<b>SECTION E</b>		
37	<p>(a) <math>\text{CH}_3\text{CH}_2\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{heat and light}</math>            (b) It is an oxidation type of reaction as oxygen get added to reactant.            Eg: <math>\text{C} + \text{O}_2 \rightarrow \text{CO}_2 + \text{heat and light}</math>            (c) When the supply of air is limited for combustion, then the fuel goes partial combustion which results in sooty flame. LPG/CNG.</p>	<p>1</p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p> <p>1</p>



	OR	
	$C_4H_6$  $\begin{array}{c} \text{H} \quad \quad \text{H} \\   \quad \quad   \\ \text{H}-\text{C}-\text{C}\equiv\text{C}-\text{C}-\text{H} \\   \quad \quad   \\ \text{H} \quad \quad \text{H} \end{array}$	1  1
	<b>Suggestive measures:</b> In such questions student need to read the case and do not search for answer in the given para. The paragraph is for the context purpose and for using data if any available in the paragraph.	
38	<p>(a) The possibility of having a girl or boy child is equal i.e., 50%, as 50% male gametes are Y type and 50% are X type. Fusion of egg with X type sperm will produce a girl child.</p> <p>(b) In humans, number of autosomes are <math>2n = 44</math> or 22 pairs regardless of the sex.</p> <p>(c) (i) XX-Female child (ii) XY-Male child</p> <p style="text-align: center;">OR</p> <p>(c) Asexual reproduction: Gametes are not formed hence fertilisation does not take place.</p> <p>Sexual reproduction: Gametes are always formed and fertilisation takes place to form a zygote.</p> <p><b>Suggestive measures:</b> In such questions student need to read the case and do not search for answer in the given para. The paragraph is for the context purpose and for using data if any available in the paragraph.</p>	1  1  1 1 1 1
39	<p>(a) Power consumed is minimum when current through the circuit is minimum, so the 3 bulbs, are connected in series.</p> <p>(b) kilowatt is unit of power and kilowatt hour is a unit of energy.</p> <p>(c) Power of each bulb <math>P = 100</math> watt Total power of 3 bulbs,  <math>P = 3 \times 100 = 300</math> watt  Energy consumed by bulbs in 1 day  <math>E_1 = P_1 \times t</math>  <math>= 300 \text{ watt} \times 5 \text{ hours.}</math>  <math>= 1500 \text{ Wh} = 1.5 \text{ kWh}</math></p> <p>Power of each fan = 50 watt  Total power of 2 fans = <math>2 \times 50</math> watt  <math>P_2 = 100</math> watt  Energy consumed by fans in 1 day</p>	1  1  $\frac{1}{2}$  $\frac{1}{2}$

$E_2 = P_2 \times t$ $= 100 \text{ watt} \times 10 \text{ hours}$ $= 1000 \text{ watt hour} = 1 \text{ kWh}$ <p>Total energy consumed in one day  <math>= 1.5 \text{ kWh} + 1 \text{ kWh} = 2.5 \text{ kWh}</math></p> <p style="text-align: center;">OR</p>	1/2
<p>(c) <math>H = I^2 Rt /</math></p> <p>When current flows through a conductor, heat energy is generated in the conductor. The heating effect of an electric current depends on three factors:</p> <ul style="list-style-type: none"> <li>● The resistance, R of the conductor. A higher resistance produces more heat.</li> <li>● The time, t for which current flows. The longer the time the larger the amount of heat produced</li> <li>● The amount of current, I. the higher the current the larger the amount of heat generated.</li> </ul>	1
<p>The electric laundry iron, electric toaster, electric oven, electric kettle and electric heater. (any other)</p> <p><b>Suggestive measures:</b>          In such questions student need to read the case and do not search for answer in the given para. The paragraph is for the context purpose and for using data if any available in the paragraph.</p>	1/2 + 1/2