

MT

2014 ___ ___ 1100

Seat No.

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MT - SCIENCE & TECHNOLOGY (72) - PRELIM II - PAPER - 4

Time : 3 Hours

(Pages 5)

Max. Marks : 80

Note :

- (i) All questions are compulsory.
- (ii) All questions carry equal marks.
- (iii) Draw neat and labelled diagrams wherever necessary.

SECTION - A

Q.1. (A) Answer the following sub-questions : 5

(1) **Find the odd man out :**

Myopia, Hypermetropia, Colour blindness, Presbyopia.

(2) **Fill in the blank :**

The element eka-Aluminium is called as

(3) **Write the correlated terms :**

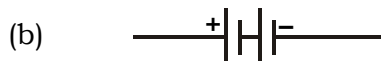
Fifth period : 18 elements :: Sixth period :

(4) **State whether the following statements are true or false.**

- (i) Global warming is the desirable aspect of the intensified greenhouse effect.
- (ii) Convex lens is called a diverging lens.

Q.1. (B) Rewrite the following statements by selecting the correct options : 5

(1) Which symbol is used to represent electric cell in a circuit diagram?



(2) Which colour of light deviates the least in the spectrum obtained with a prism ?

(a) Red

(b) Yellow

(c) Violet

(d) Blue

(3) Which one of the following is true according to Ohm's law ?

(a) Resistance increases as current increases

(b) Current increases as resistance increases

(c) Resistance increases as voltage increases

(d) $I \rightarrow V$ graph is linear

(4) The elements in the atoms of which the last three shells are incomplete are called

(a) normal elements

(b) inner transition elements

(c) transition elements

(d) inert elements

(5) is bitter to taste.

(a) An acid

(b) A salt

(c) An alkali

(d) Alcohol

Q.2. Attempt any FIVE of the following : 10

(1) Draw a ray diagram for object position between $2F_1$ and F_1 for a convex lens.

(2) Distinguish between : Convex mirror and Concave mirror.

(3) Resistors of 10Ω and 2.5Ω are connected in parallel combination and a 3Ω resistance is connected in series combination with them. Find the combined resistance.

- (4) The sun appears reddish early in morning. Why?
- (5) Distinguish between : Alkali metals and Alkaline earth metals.
- (6) Explain the following chemical reaction with the help of balanced equation : Silver nitrate reacts with sodium chloride solution.

Q.3. Attempt any FIVE of the subquestions : 15

- (1) Distinguish between : Primary and secondary pollutants.
- (2) Explain the sign conventions for reflection by spherical mirrors.
- (3) (a) State any two applications of magnetic effect of current.
(b) We should not use many electrical appliances simultaneously.
Why?
- (4) Write a note on refraction observed in the atmosphere.
- (5) Explain the zig-zag line in the periodic table.
- (6) Write a short note on neutralization reaction.

Q.4. Attempt any ONE of the following : 5

- (1) Define magnetic field and state the characteristics of magnetic lines of force.
- (2) What are the steps of writing a chemical reaction also explain the importance of chemical equation.

SECTION - B

Q.5. (A) Answer the following sub-questions : 5

- (1) **State whether the following statement is true or false :**
Ethene is an unsaturated hydrocarbon.
- (2) **Fill in the blanks :**
 - (i) artery takes the blood to the lungs for oxygenation.
 - (ii) The nerves are composed of neurons and

(3) **Write the correlated terms :**

(i) Amoeba : Simple binary fission :: Paramoecium :

(ii) Ionic bond : Transfer of electrons from one atom to another ::

Covalent bond :

Q.5. (B) Rewrite the following statements by selecting the correct options : 5

(1) The kidney shaped cells which regulate the closing and opening of stomata are called

(a) kidney cells (b) guard cells

(c) guarding cells (d) water cells

(2) Excess of carbohydrates stored in the plant body is in the form of

(a) salt (b) nitrogenous substances

(c) starch (d) lipid

(3) Light energy splits the water molecule into hydrogen and oxygen, releasing energy in the form of

(a) carbohydrates (b) ATP

(c) ADP (d) starch

(4) Ankita wanted to test glucose bought by her to see whether it was adulterated with starch or not. She tested it by

(a) sieving (b) dissolving it in water

(c) iodine (d) all of these

(5) A solution of in water is green in colour.

(a) CuSO_4 (b) FeSO_4

(c) ZnSO_4 (d) $\text{Al}_2(\text{SO}_4)_3$

Q.6. Attempt any FIVE of the following : 10

- (1) Write balanced chemical reaction : Magnesium reacts with dilute sulphuric acid.
- (2) Why does menstruation occur ?
- (3) What are homologous organs ? Give examples.
- (4) Write the salient features of The Biomedical Waste Rules.
- (5) Distinguish between : Calcination and Roasting.
- (6) Elements like gold, silver are used to make jewellery, Why?

Q.7. Attempt any FIVE of the following : 15

- (1) What are the powers of MPCB to control water and air pollution?
- (2) Which are the different parts of the human nervous system?
- (3) What is corrosion and explain the methods to prevent corrosion.
- (4) Describe the growth dependent movements in plants.
- (5) Give IUPAC Name for the following :
 - (a) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$.
 - (b) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$
 - (c) Name the first member of alkyne family.
- (6) What happens to the food in the mouth ?

Q.8. Attempt any ONE of the following : 5

- (1) Describe the structure of human heart with the help of a neat labelled diagram.
- (2) With the help of a diagram (Punnett square) show a Mendelian experiment where tall pea plant bearing red flowers is crossed with a short pea plant bearing white flowers. Write both the phenotypic and genotypic ratio for F_2 generation.

Best Of Luck 🍀

MT

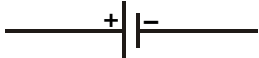
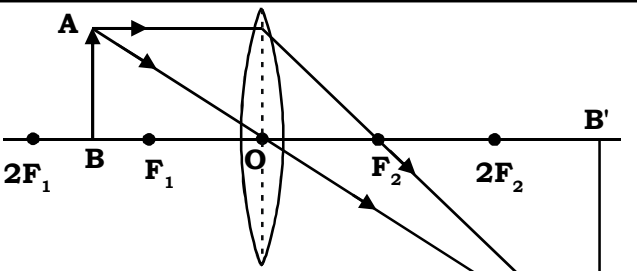
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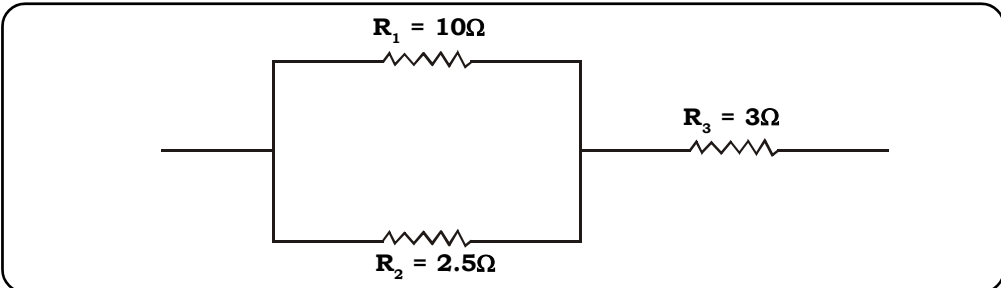
MT - SCIENCE & TECHNOLOGY (72) - PRELIM II - PAPER - 4

Time : 3 Hours

Prelim II Model Answer Paper

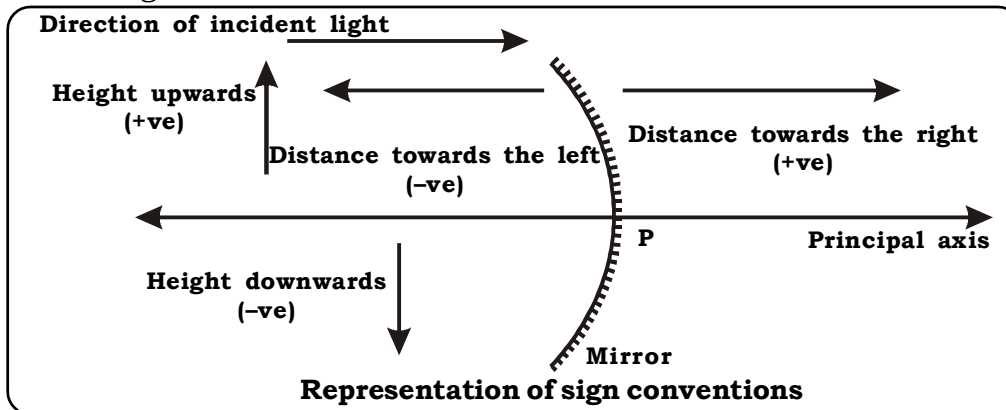
Max. Marks : 80

SECTION - A		
Q.1. (A) Answer the following sub-questions :		
(1) Colour blindness. It cannot be corrected, whereas the rest can be corrected.		1
(2) The element eka-Aluminium is called as gallium.		1
(3) 32 elements.		1
(4) (i) False. Global warming is the most undesirable aspect of the intensified green house effect.		1
(ii) False. Convex lens is called a converging lens.		1
Q.1. (B) Rewrite the following statements by selecting the correct options :		
(1) Which symbol is used to represent electric cell in a circuit diagram? 		1
(2) Which colour of light deviates the least in the spectrum obtained with a prism ? Red		1
(3) Which one of the following is true according to Ohm's law ? I → V graph is linear		1
(4) The elements in the atoms of which the last three shells are incomplete are called inner transition elements.		1
(5) An alkali is bitter to taste.		1
Q.2. Attempt any FIVE of the following :		2
(1)	<div style="border: 1px solid black; padding: 10px;"><p style="text-align: center;">Image position : Beyond $2F_2$. Nature : Real, inverted and magnified.</p></div>	

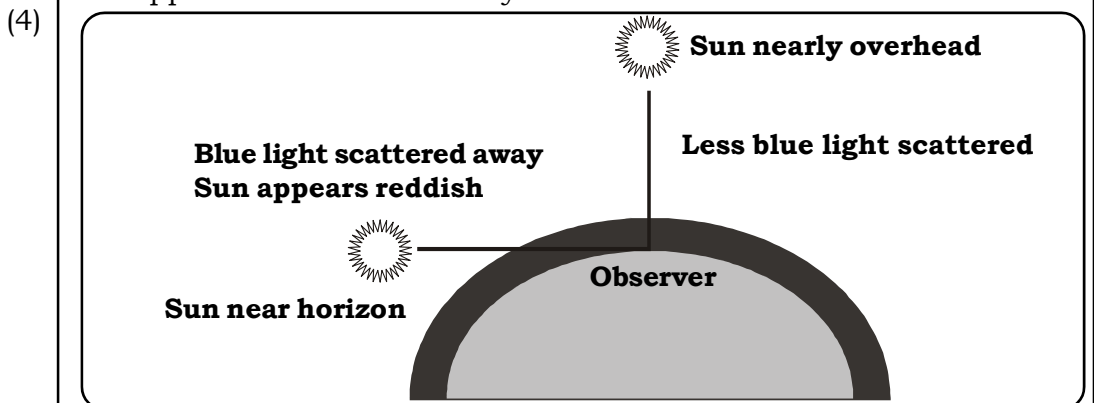
(2)	<p style="text-align: center;">Convex mirror</p>	<p style="text-align: center;">Concave mirror</p>	2
	<ol style="list-style-type: none"> 1. In a convex mirror, the reflecting surface is on the outer side. 2. It is called as diverging mirror. 3. The focus of a convex mirror is virtual. 4. It can form only a virtual image 5. It can form only a diminished image. 	<ol style="list-style-type: none"> 1. In a concave mirror, the reflecting surface is on the inner side. 2. It is called as converging mirror. 3. The focus of a concave mirror is real. 4. It can form a real as well as a virtual image. 5. It can form an enlarged, diminished as well as the same size image. 	
(3)	 <p style="text-align: center;"> $R_1 = 10\Omega$ $R_2 = 2.5\Omega$ $R_3 = 3\Omega$ </p>		2
	<p>To find : Equivalent Resistance (R) = ?</p>		
	<p>Solution :</p>		
	<p>1. Resistance R_1 and R_2 are in parallel combination.</p>		
	$\therefore \frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$		
	$\therefore \frac{1}{R_p} = \frac{1}{10} + \frac{1}{2.5}$		
	$\therefore \frac{1}{R_p} = \frac{1+4}{10}$		
	$\therefore \frac{1}{R_p} = \frac{5}{10}$		
	$\therefore R_p = \frac{10}{5}$		
	$\therefore R_p = 2\Omega$		
	<p>2. Resistance R_p and R_3 are in series combination.</p>		
	$\therefore R = R_p + R_3$		
	$\therefore R = 2 + 3$		
	$\therefore R = 5\Omega$		
	<p style="text-align: center;">The effective resistance of the arrangement is 5Ω.</p>		

(4)	<ol style="list-style-type: none"> At the time of sunrise or sunset, the sun is very close to horizon. Sunlight has to travel a longer path through the atmosphere to reach the observer. The blue and violet colours are scattered in a greater amount than red colour. The light that reaches to the observer is mostly red and yellow. Hence the sun appears reddish early in the morning. 	2				
(5)	<table border="1"> <thead> <tr> <th data-bbox="279 656 805 701">Alkali metals</th> <th data-bbox="805 656 1321 701">Alkaline earth metals</th> </tr> </thead> <tbody> <tr> <td data-bbox="279 701 805 1137"> <ol style="list-style-type: none"> In the modern periodic table, IA group elements including lithium, sodium, potassium, rubidium, cesium and radioactive francium are alkali metals. Atoms of these elements have one electron in the valence shell. They are monovalent. Their oxides and hydroxides dissolve readily in water. </td> <td data-bbox="805 701 1321 1137"> <ol style="list-style-type: none"> In the modern periodic table, IIA group elements including beryllium, magnesium, calcium, strontium, barium, radioactive radium are alkaline earth metals. Atoms of these elements have two electrons in their valence shell. They are divalent. Their oxides and hydroxides dissolve slightly in water. </td> </tr> </tbody> </table>	Alkali metals	Alkaline earth metals	<ol style="list-style-type: none"> In the modern periodic table, IA group elements including lithium, sodium, potassium, rubidium, cesium and radioactive francium are alkali metals. Atoms of these elements have one electron in the valence shell. They are monovalent. Their oxides and hydroxides dissolve readily in water. 	<ol style="list-style-type: none"> In the modern periodic table, IIA group elements including beryllium, magnesium, calcium, strontium, barium, radioactive radium are alkaline earth metals. Atoms of these elements have two electrons in their valence shell. They are divalent. Their oxides and hydroxides dissolve slightly in water. 	2
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(6)	<p>When silver nitrate solution reacts with sodium chloride solution it gives a white precipitate of silver chloride and sodium nitrate. This reaction is a double displacement reaction.</p> $\text{AgNO}_{3(aq)} + \text{NaCl}_{(aq)} \rightarrow \text{AgCl} \downarrow + \text{NaNO}_{3(aq)}$ <p>Silver nitrate Sodium chloride Silver chloride Sodium nitrate</p>	2				
Q.3. (1)	<p>Attempt any FIVE of the subquestions :</p> <table border="1"> <thead> <tr> <th data-bbox="279 1473 805 1523">Primary pollutants</th> <th data-bbox="805 1473 1321 1523">Secondary pollutants</th> </tr> </thead> <tbody> <tr> <td data-bbox="279 1523 805 1926"> <ol style="list-style-type: none"> The pollutants that are emitted directly from the sources and are found in the atmosphere in the form in which they were emitted are known as primary pollutants. Examples- ash, smoke, dust, radioactive compounds, oxides of sulphur, carbon and nitrogen. </td> <td data-bbox="805 1523 1321 1926"> <ol style="list-style-type: none"> The pollutants that are formed in the atmosphere by chemical reactions between primary pollutants and atmospheric constituents are known as secondary pollutants. Examples - SO₃, O₃, hydrogen cyanide, peroxyacetyl nitrate, ketones, etc. </td> </tr> </tbody> </table>	Primary pollutants	Secondary pollutants	<ol style="list-style-type: none"> The pollutants that are emitted directly from the sources and are found in the atmosphere in the form in which they were emitted are known as primary pollutants. Examples- ash, smoke, dust, radioactive compounds, oxides of sulphur, carbon and nitrogen. 	<ol style="list-style-type: none"> The pollutants that are formed in the atmosphere by chemical reactions between primary pollutants and atmospheric constituents are known as secondary pollutants. Examples - SO₃, O₃, hydrogen cyanide, peroxyacetyl nitrate, ketones, etc. 	3
Primary pollutants	Secondary pollutants					
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- (2) According to the new cartesian sign convention, the pole (P) of the mirror is taken as origin. The principal axis is taken as X-axis of the co-ordinate system. The sign conventions are as follows :
1. The object is always placed on the left of the mirror.
 2. All distances parallel to principal axis are measured from the pole of the mirror.
 3. All the distances measured to the right of the origin are taken as positive, while distances measured to the left of the origin are taken as negative.
 4. Distances measured perpendicular to and above the principal axis are taken as positive.
 5. Distances measured perpendicular to and below the principal axis are taken as negative.
 6. Focal length of convex mirror is positive while that of concave mirror is negative.



- (3)
- (a)
1. Electric bell
 2. Telephone earpiece
 3. Galvanometer
 4. Ammeter.
- (b)
1. If many electrical appliances of high power rating such as geyser, heater, motor, oven are switched on simultaneously, overloading occurs.
 2. This may result in switching off of the fuse resulting in lose of power supply.
 3. It may also cause fire. Hence we should not use many electrical appliances simultaneously.



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	<ol style="list-style-type: none"> In the atmosphere, there are different layers of air with different refractive indices which keep on changing as the physical conditions of air are not stationary. When we observe any object through this air, the light coming from them refract randomly due to which the apparent position of the object fluctuates. The large scale effect of this phenomenon is the twinkling of stars, advanced sunrise and delayed sunset. Due to change in the refractive index of atmosphere, the intensity of light that reaches our eyes from the stars varies and hence the stars appear twinkling at night. Advanced sunrise occurs as a ray of light from the sun enters the earth's atmosphere, it follows a curved path due to refraction before reaching to the observer. It appears to the observer as if the rays are coming from the position where the sun is seen by the observer, hence the sun is seen earlier before it reaches the horizon. 																																											
(5)	<ol style="list-style-type: none"> On the basis of electronic configuration of elements, the periodic table is divided into four blocks namely, s-block, p-block, d-block and f-block. The elements of s-block (except hydrogen), d-block and f-block are all metals. In the p-block, all the three types of elements, i.e. metals, non-metals and metalloids are present. A zig-zag line separates the metals on the left side from the non-metals on the right side of the periodic table. The bordering elements along the zig-zag line are the metalloids. These are Antimony (Sb), Germanium (Ge), Boron (B), Silicon (Si), Arsenic (As), Tellurium (Te), Polonium (Po), Astatine (At). They show intermediate properties and are called as metalloids or semi-metals. 	3																																										
(6)	<ol style="list-style-type: none"> When a base reacts with acid, then a salt and water is formed. This is called as neutralization reaction. Eg. : <ol style="list-style-type: none"> When hydrochloric acid reacts with sodium hydroxide, sodium chloride and water are formed. <table style="margin-left: 40px;"> <tbody> <tr> <td>HCl</td> <td>+</td> <td>NaOH</td> <td>→</td> <td>NaCl</td> <td>+</td> <td>H₂O</td> </tr> <tr> <td>Acid</td> <td></td> <td>Base</td> <td></td> <td>Salt</td> <td></td> <td>Water</td> </tr> <tr> <td>Hydrochloric acid</td> <td></td> <td>Sodium hydroxide</td> <td></td> <td>Sodium chloride</td> <td></td> <td>Water</td> </tr> </tbody> </table> When carbon dioxide is passed through lime water, it turns milky due to the formation of white precipitate of calcium carbonate. <table style="margin-left: 40px;"> <tbody> <tr> <td>Ca(OH)_{2(aq)}</td> <td>+</td> <td>CO_{2(g)}</td> <td>→</td> <td>CaCO_{3↓(s)}</td> <td>+</td> <td>H₂O_l</td> </tr> <tr> <td>Base</td> <td></td> <td>Acidic</td> <td></td> <td>Salt</td> <td></td> <td>Water</td> </tr> <tr> <td>Calcium hydroxide</td> <td></td> <td>Carbon dioxide</td> <td></td> <td>Calcium carbonate</td> <td></td> <td>Water</td> </tr> </tbody> </table> 	HCl	+	NaOH	→	NaCl	+	H ₂ O	Acid		Base		Salt		Water	Hydrochloric acid		Sodium hydroxide		Sodium chloride		Water	Ca(OH) _{2(aq)}	+	CO _{2(g)}	→	CaCO _{3↓(s)}	+	H ₂ O _l	Base		Acidic		Salt		Water	Calcium hydroxide		Carbon dioxide		Calcium carbonate		Water	3
HCl	+	NaOH	→	NaCl	+	H ₂ O																																						
Acid		Base		Salt		Water																																						
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Base		Acidic		Salt		Water																																						
Calcium hydroxide		Carbon dioxide		Calcium carbonate		Water																																						

	<p>3. Thus this is a neutralization reaction where base reacts with acidic non-metallic oxide (CO_2) to form salt and water.</p> <p>Q.4. Attempt any ONE of the following :</p> <p>(1) Magnetic field : The area adjoining the magnet comprising of magnetic lines of force is called magnetic field. Characteristics of magnetic lines of force :</p> <ol style="list-style-type: none"> 1. Magnetic lines of force are closed continuous curves. They start from north pole and ends on south pole. 2. The tangent at any point on the magnetic lines of force gives the direction of the magnetic field at that point. 3. No two magnetic lines of force can intersect each other. 4. Magnetic lines of force are crowded where the magnetic field is strong and far from each other where the field is weak. <p>(2) Steps of writing a chemical equation :</p> <ol style="list-style-type: none"> 1. The symbols or molecular formulae of the reactants are written on the left hand side and products are on the right hand side. 2. Reactants and products are connected with an arrow (\rightarrow) pointing towards product side. 3. Whenever there are two or more reactants, a plus (+) sign is written between each of them. Similarly, if there are two or more products, a plus sign is written between them. 4. Certain reactions have to be carried out under specific condition such as temperature, pressure, catalyst. These condition are mentioned on the arrow pointing from reactants to product. 5. The physical states of reactants and products are also mentioned in a chemical equation to make it more informative. 6. The notations like g,l,s,aq are written in brackets as subscripts along with symbols/formulae of reactants and products. \uparrow or (g) - Gas (l) - Liquid (s) - Solid (aq) - Aqueous solution \downarrow - Precipitate. <p>Importance of a chemical equation :</p> <ol style="list-style-type: none"> 1. Reactants are converted into products. 2. Mass is conserved. 3. Atoms are conserved. 4. The properties and compositions of the products of a chemical reaction are different from those of its reactants. 5. Generally, energy is either absorbed or evolved. 	<p>5</p> <p>5</p>
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SECTION - B		
Q.5. (A) Answer the following sub-questions :		
(1) True.		1
(2) (i) Pulmonary artery takes the blood to the lungs for oxygenation.		1
(2) (ii) The nerves are composed of neurons and neuroglia .		1
(3) (i) Transverse binary fission.		1
(3) (ii) Sharing of electrons.		1
Q.5. (B) Rewrite the following statements by selecting the correct options :		
(1) The kidney shaped cells which regulate the closing and opening of stomata are called guard cells .		1
(2) Excess of carbohydrates stored in the plant body is in the form of starch .		1
(3) Light energy splits the water molecule into hydrogen and oxygen, releasing energy in the form of ATP .		1
(4) Ankita wanted to test glucose bought by her to see whether it was adulterated with starch or not. She tested it by iodine .		1
(5) A solution of FeSO₄ in water is green in colour.		1
Q.6. Attempt any FIVE of the following :		
(1) When magnesium reacts with dilute sulphuric acid to give magnesium sulphate and hydrogen gas.		2
$\text{Mg}_{(s)} + \text{H}_2\text{SO}_{4(aq)} \rightarrow \text{MgSO}_{4(aq)} + \text{H}_{2(g)}$ <p style="margin-left: 40px;">Magnesium Sulphuric acid Magnesium sulphate Hydrogen</p>		
(2) 1. On reaching puberty, a woman's ovaries usually release one egg each month. 2. When the egg is not fertilized, this unfertilized egg along with blood and mucous form a flow which leaves the uterus. This is called menstruation which lasts for three to five days.		2
(3) Organs which are fundamentally the same in structure, but perhaps modified for widely different functions are termed as homologous organs. Eg. : 1. The forelimbs of man (adapted for handling), bat and bird (adapted for flying), whale and seal (adapted for swimming) have the same principal skeletal composition. 2. The scales of an ovulate pine cone correspond with the carpels of a flower and the scales of the staminate cone correspond with the stamens of a flower.		2

(4)	<p>Salient features of The Biomedical Waste Rules:</p> <p>(i) These rules deal with the generation, handling, treatment and disposal of biomedical waste.</p> <p>(ii) These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle biomedical waste in any form.</p> <p>(iii) It is the duty of the occupant to take all steps to ensure that such waste is handled without any adverse effect to human health and environment.</p>	2				
(5)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Calcination</th> <th style="width: 50%; text-align: center;">Roasting</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <p>1. In calcination, ore is heated in limited supply of air at high temperature.</p> <p>2. It is generally used for carbonate ores. Eg. :</p> $\text{ZnCO}_3 \xrightarrow{\Delta} \text{ZnO} + \text{CO}_2\uparrow$ </td> <td style="vertical-align: top;"> <p>1. In roasting, the ore is heated in excess supply of air at a high temperature.</p> <p>2. It is generally used for sulphide ores. Eg. :</p> $2\text{ZnS} + 3\text{O}_2 \xrightarrow{\Delta} 2\text{ZnO} + 2\text{SO}_2\uparrow$ </td> </tr> </tbody> </table>	Calcination	Roasting	<p>1. In calcination, ore is heated in limited supply of air at high temperature.</p> <p>2. It is generally used for carbonate ores. Eg. :</p> $\text{ZnCO}_3 \xrightarrow{\Delta} \text{ZnO} + \text{CO}_2\uparrow$	<p>1. In roasting, the ore is heated in excess supply of air at a high temperature.</p> <p>2. It is generally used for sulphide ores. Eg. :</p> $2\text{ZnS} + 3\text{O}_2 \xrightarrow{\Delta} 2\text{ZnO} + 2\text{SO}_2\uparrow$	2
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(6)	<p>1. Gold and silver are noble metals and are malleable, ductile and lustrous in nature.</p> <p>2. They are not affected by air, water and acids under normal conditions. Hence, gold and silver are used to make jewellery.</p>	2				
Q.7.	Attempt any FIVE of the following :					
(1)	<p>Powers of the MPCB:</p> <p>(i) Implementation of environmental laws and pollution control.</p> <p>(ii) Laying down standards and securing their compliance.</p> <p>(iii) Inspection and monitoring of all sources of pollution.</p> <p>(iv) Issuance of notices with time limit to comply with the legal requirements.'</p> <p>(v) Closure of the defaulter unit in grave cases.</p> <p>(vi) Prosecution in cases of serious violation.</p>	3				
(2)	<p>The human nervous system can be divided into :</p> <p>1. The Central Nervous System (CNS) : It comprises of the brain and spinal cord and regulates all activities of the body.</p> <p>2. The Peripheral Nervous System (PNS) : It includes all the nerves. The nerves form a network and spread throughout the body. They are instrumental in connecting all parts of the body to the central nervous system.</p> <p>3. The Autonomic Nervous Sytem (ANS) : If comprises of all the nerves present in the involuntary organs like heart, stomach, lungs etc.</p> <p>4. On the basis of their function, the nerves are categorized as afferent and efferent nerves.</p>	3				

	<p>5. The nerves are composed of neurons and neuroglia. The neurons are specialized cells capable of creating and transmitting electrochemical impulses. The neuroglia are supportive cells which assist the neurons in their function.</p> <p>(3) 1. Corrosion of metals can be prevented if the contact between metal and air is cut off. This is done in a number of ways. Some of the methods are given below :</p> <p>(a) Corrosion can be prevented if the metal is coated with something which does not allow moisture and oxygen to react with it.</p> <p>(b) Coating of metals with paint, oil, grease or varnish prevents the corrosion of metals e.g rusting of iron can be prevented by this method.</p> <p>(c) Coating of corrosive metals with non corrosive metals also prevents corrosion. Some of the methods by which metals can be coated with non-corrosive metals are:</p> <p>2. Galvanizing : It is process of giving a thin coating of zinc on iron or steel to protect them from corrosion. E.g shiny iron nails, pins extra.</p> <p>3. Tinning : It is the process of giving a coating of tin, i.e., molten tin over other metal. Eg. : Cooking vessels, made of copper and brass get a greenish coating due to corrosion. This greenish coating is poisonous. Therefore they are given a coating of tin to prevent corrosion. (Kalhai)</p> <p>4. Electroplating : In this method a metal is covered with another metal using electrolysis. Silver-plated spoons, gold-plated jewellery, etc, are electroplated.</p> <p>5. Anodizing : In this method metals like copper and aluminum are electrically coated with a thin strong film of their oxides. This film protects the metals from corrosion.</p> <p>6. Alloying : An alloy is an homogenous mixture of two or more metals or a metal and a non-metal in definite proportion. The resultant metals called alloys do not corrode easily, e.g. stainless steel. Name of Alloy , constituent elements.</p> <p>(a) Brass (copper and zinc)</p> <p>(b) Bronze (copper and tin)</p> <p>(c) Stainless steel (iron, nickel and chromium)</p> <p>If one of the metal is mercury, then the alloy is known as an amalgam.</p>	3
(4)	<p>1. The movement or growth of any part of a plant in response to an external stimulus is called tropism or tropic movements.</p> <p>2. The shoot system of any plant responds towards the stimulus of light i.e., it grows in the direction of source of light. When a potted plant is kept near the window in a room, the stem bends slightly towards the window. This movement exhibited by the plant is called phototropic movement.</p>	3

3. When light falls on a part of growing plant, a hormone called auxin which is synthesized at the tip of the shoot helps the cells to grow longer. As the light is falling on one side of the plant, this hormone auxin diffuses towards the shady side of the shoot and stimulates the cells to grow longer.
4. On the other hand, the root system of the plants responds to the stimulus of gravity and water. These responses are called gravitropic and hydrotropic movements respectively.
5. The movement of plant part in response to certain chemicals.
Eg. The growth of pollen tubes towards the ovules.

- (5) (a) propan-1-ol.
(b) but-2-ene.
(c) First member of alkyne is named as ethyne or acetylene.

3

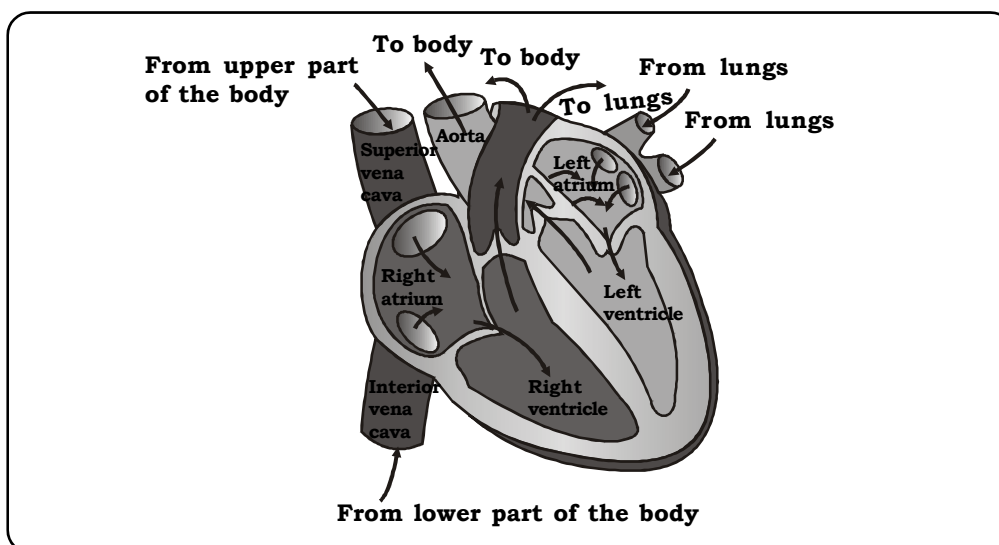
- (6) 1. The alimentary canal begins with the mouth.
2. A variety of food items have to pass through the digestive tract. So, the food is processed in the mouth to generate particles with small size.
3. Such crushed food is wetted with saliva secreted by the salivary glands so the food can smoothly pass through the soft lining of the alimentary canal.
4. The food that we take is of complex nature. It is converted into simpler molecules with the help of biological catalysts called as enzymes. Enzyme salivary amylase breaks down starch into a simple sugar maltose. Thus digestion starts in the mouth itself.

3

Q.8. Attempt any ONE of the following :

- (1) **Structure of human heart :**

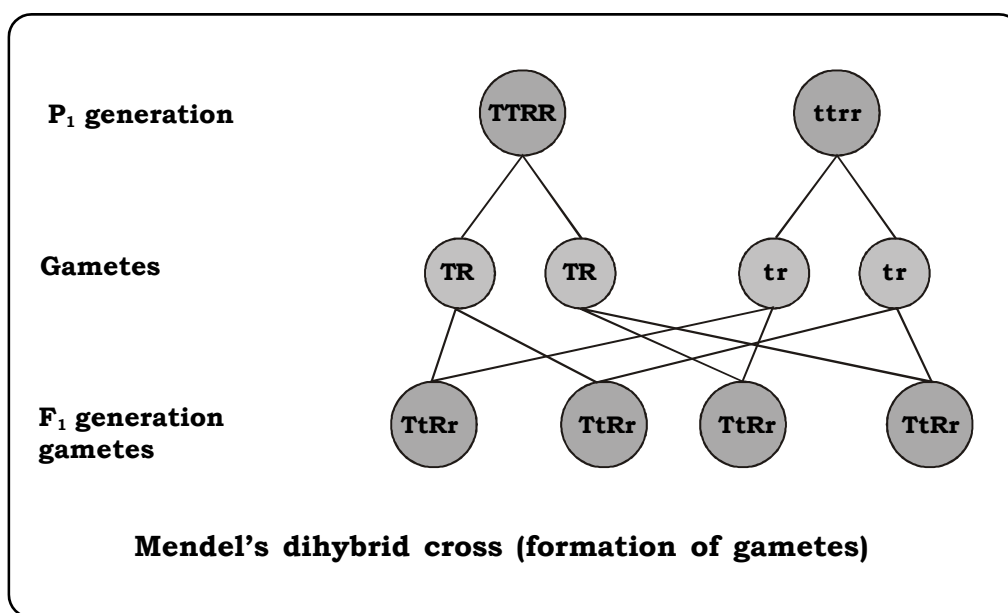
5



1. The human heart is a muscular organ which pumps blood.
2. The heart is covered by the pericardial membrane.
3. It is of the size of a human fist and weighs about 360 gm.
4. As oxygen and carbon dioxide both have to be transported by the blood, the heart has different chambers, the left and the right, to prevent oxygen rich blood from mixing with the blood containing carbon dioxide.
5. The left half carries oxygenated blood whereas the right half carries deoxygenated blood. Such separation allows a highly efficient supply of oxygen to the body.
6. This is very essential in animals that have high energy needs, such as birds and mammals, which constantly use energy to maintain their body temperature.
7. Each half is further divided into two chambers. The upper one is called atrium and the lower one is termed as the ventricle. Therefore the human heart has four chambers.
8. There are valves between the atria and ventricles which ensure that the blood does not flow backwards.

- (2)
1. Tallness is the dominant character and shortness is a recessive character of pea plant.
 2. Similarly red colour of the flower is the dominant character and the white colour of the flower is the recessive character.
 3. Therefore, the gene combinations for the characters will be TT (tallness), tt (shortness), RR (red flowers), rr (white flowers).

5



Cross between TtRr and TtRr :

♀ +	♂ →	TR	Tr	tR	tr
TR		TTRR	TTRr	TtRR	TtRr
Tr		TTRr	TTrr	TtRr	Ttrr
tR		TtRR	TtRr	ttRR	ttRr
tr		TtRr	Ttrr	ttRr	ttrr

The phenotype and genotype is shown in the table below :

Phenotype	No. of squares in chequer board	Genotype	No. of squares in chequer board
Tall with red flowers	9	TTRR	1
Short with red flowers	3	TTRr	2
Tall with white flowers	3	TtRR	2
Short with white flowers	1	TtRr	4
		TTrr	1
		ttRR	1
		ttRr	2
		Ttrr	2
		ttrr	1

The phenotypic ratio of F₂ generation is 9 : 3 : 3 : 1 and the genotypic ratio is 1 : 2 : 2 : 4 : 1 : 1 : 2 : 2 : 1.

