

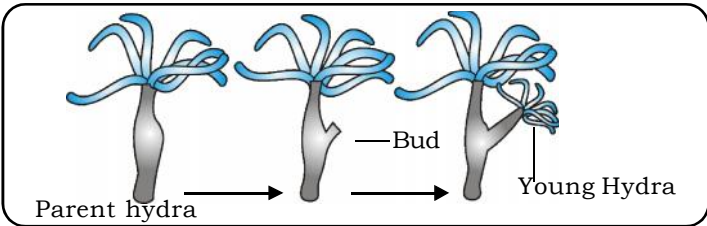
# MT

2017 \_\_\_\_ 1100

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

Time : 2 Hours      Semi Prelim - I : Model Answer Paper      Max. Marks : 40

<b>A.1. (A) Fill in the blanks :</b>	
(1) A basic process in reproduction is the creation of a <b>DNA</b> copy.	1
(2) Dominant character masks the <b>recessive</b> character.	1
(3) Anodizing is a process of forming a thick oxide layer of <b>aluminium oxide</b> .	1
<b>A.1. (B) State whether the following statements are true or false and if false, write the correct statement:</b>	
(1) False - All children inherit 'X' chromosome from their mother.	1
(2) False - Copper does not react with dilute HCl.	1
<b>A.2. Rewrite the following statements by selecting the correct alternative:</b>	
(1) For binary fission, amoeba requires <b>One</b> parent cells.	1
(2) Mammals have evolved from <b>Reptiles</b> .	1
(3) To show that zinc is more reactive than copper, the correct procedure is to <b>prepare copper sulphate solution and dip zinc strip in it</b> .	1
(4) <b>CH<sub>3</sub>COOH</b> is the formula of ethanoic acid.	1
(5) Reaction in which oxidation and reduction takes place simultaneously.	1
<b>A.3. Answer the following in short : (Any 5)</b>	
(1) (i) Flowers are the functional unit concerned with sexual reproduction. (ii) Fertilization takes place in flowers only after pollination takes place. (iii) Insects are the agents of pollination. (iv) Insects are attracted to bright colours and sweet fragrance.	2

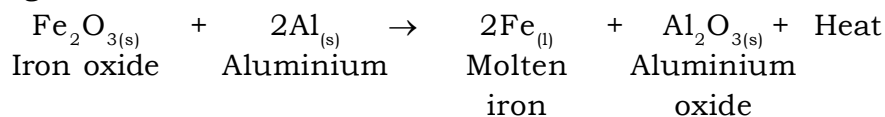
	<p>(v) Hence to attract the insects towards the flower and to enhance the chances of pollination some flowers have attractive colours while some have fragrance.</p>					
<p>(2)</p>	<p>(i) Copper reacts with moist carbon dioxide in air to form copper carbonate. As a result, copper vessel loses its shiny brown surface forming a green layer of copper carbonate.</p> <p>(ii) The copper carbonate is a mixture of copper carbonate and copper hydroxide, <math>\text{CuCO}_3</math> &amp; <math>\text{Cu(OH)}_2</math>.</p> <p>(iii) The tartaric acid present in the tamarind neutralises the basic copper carbonate and dissolves the layer.</p> <p>(iv) So, tarnished copper vessels are cleaned with lemon or tamarind juice to give the surface of the copper vessel its characteristic lustre.</p>	<p>2</p>				
<p>(3)</p>	<p><b>Budding in Hydra :</b></p> 	<p>2</p>				
<p>(4)</p>	<table border="1"> <thead> <tr> <th data-bbox="287 1198 766 1232"><b>Toilet soap</b></th> <th data-bbox="766 1198 1300 1232"><b>Laundry soap</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="287 1232 766 1478"> <p>(i) High quality of fats and oils used as raw material.</p> <p>(ii) Expensive perfumes added.</p> <p>(iii) No free alkali content present to prevent injuries to skin.</p> </td> <td data-bbox="766 1232 1300 1478"> <p>(i) Cheaper quality of fats and oils are used as raw material.</p> <p>(ii) Cheaper perfumes added.</p> <p>(iii) Free alkali present for cleaning action.</p> </td> </tr> </tbody> </table>	<b>Toilet soap</b>	<b>Laundry soap</b>	<p>(i) High quality of fats and oils used as raw material.</p> <p>(ii) Expensive perfumes added.</p> <p>(iii) No free alkali content present to prevent injuries to skin.</p>	<p>(i) Cheaper quality of fats and oils are used as raw material.</p> <p>(ii) Cheaper perfumes added.</p> <p>(iii) Free alkali present for cleaning action.</p>	<p>2</p>
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(6)	<p>When magnesium reacts with hot water, it forms magnesium oxide and hydrogen gas is liberated.</p> $\text{Mg}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow \text{Mg}(\text{OH})_{2(aq)} + \text{H}_{2(g)}$ <p>Magnesium                  Water                  Magnesium hydroxide                  Hydrogen</p>	2
(7)	<p>(a) <b>Metallurgy</b> : The process used for extraction of metals in their pure form from their ores is called metallurgy.</p> <p>(b) <b>Catenation</b> : The property of direct bonding between atoms of the same element to form chain is called catenation.</p>	1 1
<b>A.4. Answer the following in brief : (Any 5)</b>		
(1)	<p>(a) <b>Fossils</b> : Fossils are the impressions or remains of ancient life found preserved in the sedimentary rocks in deep layers of the soil or sea bed.</p> <p>(b) (i) Palaentology is the study of fossils.  (ii) A systematic study of these fossils and its occurrence revealed that the deepest layers were found to have fossils of invertebrates.  (iii) In layers above them were found prehistoric fish like animals, amphibians, reptiles, birds and mammals respectively in that order.  (iv) Therefore, palaentological evidence suggests that invertebrates came into existence before the vertebrates.</p>	3
(2)	<p>(i) Ethanoic acid is commonly known as acetic acid, reacts with chlorine to form mono- chloro acetic acid.</p> $\text{CH}_3\text{COOH} + \text{Cl}_2 \rightarrow \text{CH}_2\text{ClCOOH} + \text{HCl}$ <p>Monochloro acetic acid</p> <p>Monochloro acetic acid further reacts with chlorine to form dichloro acetic acid.</p> $\text{CH}_2\text{ClCOOH} + \text{Cl}_2 \rightarrow \text{CHCl}_2\text{COOH} + \text{HCl}$ <p>Dichloro acetic acid</p> <p>Dichloro acetic acid further reacts with chlorine to form trichloro acetic acid.</p> $\text{CHCl}_2\text{COOH} + \text{Cl}_2 \rightarrow \text{CCl}_3\text{COOH} + \text{HCl}$ <p>Trichloro acetic acid</p>	3

	<p>(ii) Sodium metal reacts with acetic acid and forms sodium acetate along with that hydrogen gas is liberated.</p> $2\text{CH}_3\text{COOH} + 2\text{Na} \rightarrow 2\text{CH}_3\text{COONa} + \text{H}_2 \uparrow$ <p style="text-align: center;">Sodium acetate</p> <p>(iii) When acetic acid reacts with ethanol in presence of anhydrous <math>\text{ZnCl}_2</math>, ethyl acetate is formed.</p> $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{ZnCl}_2} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$ <p style="text-align: center;">Ethyl acetate (ester)</p>	
(3)	<p>(i) Sexual reproduction promotes diversity of characters in the offsprings.</p> <p>(ii) In sexual reproduction, due to genetic variation there is more opportunity for new combination of characters and therefore, it plays a prominent role in the origin of new species.</p> <p>(iii) It also leads to variation, which is necessary for evolution. Variation enables the organisms to adapt and survive in the changing environment.</p>	<b>3</b>
(4)	<p>(i) The metals high up in the reactivity series are very reactive e.g sodium, potassium, calcium, aluminium etc. These metals are obtained by electrolytic reduction. For example, sodium, magnesium and calcium are obtained by electrolysis of their molten chlorides. The metals are deposited at the cathode (–vely charged electrode), whereas, chlorine is liberated at the anode (+vely charged electrode).</p> <p>The reaction of sodium is as follows :</p> <p>At cathode : <math>\text{Na}^+ + \text{e}^- \rightarrow \text{Na}</math></p> <p>At anode : <math>2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-</math></p> <p>(ii) Similarly, aluminum is obtained by the electrolytic reduction of aluminum oxide.</p> <p>At cathode : <math>\text{Al}^{+3} + 3\text{e}^- \rightarrow \text{Al}</math></p> <p>At anode : <math>2\text{O}^{-2} - 4\text{e}^- \rightarrow \text{O}_2</math></p> <p>(iii) Thus the highly reactive metals are extracted by the electrolytic reduction of their molten chlorides or oxides.</p>	<b>3</b>
(5)	<p>(i) The reduction of a metal oxide to form metal by using aluminium powder as a reducing agent is called as thermit reaction.</p> <p>(ii) The reaction of metal oxide with aluminium powder is highly</p>	<b>3</b>

exothermic in which a large amount of heat is evolved.  
 (iii) The heat liberated is so high that the metals are produced in molten state.

Eg. :

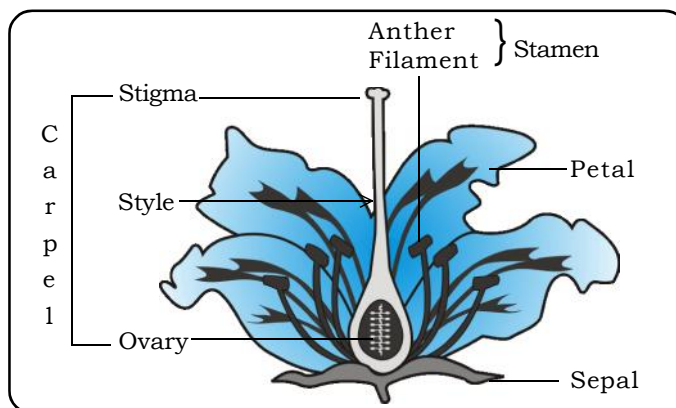


Mitosis	Meiosis
(i) Mitosis is a type of cell division leading to growth and development.	(i) Meiosis is a type of cell division leading to production of gametes.
(ii) It occurs in somatic cells.	(ii) It occurs in reproductive cells.
(iii) Chromosome number is restored.	(iii) Chromosome number is halved.

- (7) (a) prop-1-yne  
 (b) ethanal  
 (c) propan - 2 - ol

**A.5. Answer in detail: (Any 1)**

(1)



In plants, flower is the functional unit concerned with sexual reproduction. The parts of the flower which are involved in reproduction are :

- (i) Carpel : Female reproductive part of a flower present in the centre. It is made up of three parts : stigma, style and ovary.
- (ii) Stigma : It is the sticky terminal part of the style. It is the receptive organ on which pollen germinates.
- (iii) Style : It is the elongated part of carpel bearing stigma at its tip.

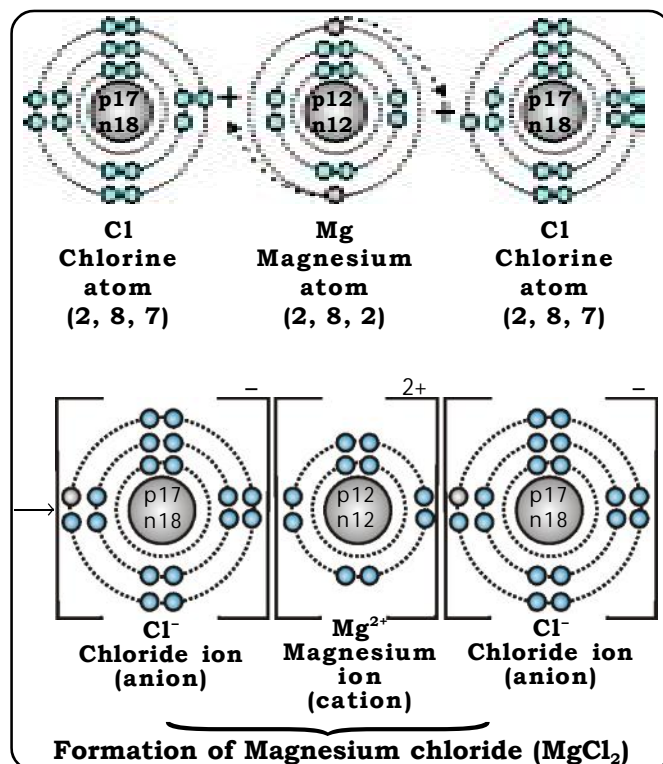
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1  
1  
1

5

- (iv) Ovary : The swollen lower part of carpel containing one or more ovules. Each ovule has an egg cell (female germ cell).  
 (v) Stamen : Male reproductive part of a flower made up of two parts-anther and filament.  
 (vi) Anther : Usually bilobed and produces pollen grains.  
 (vii) Filament : Stalk of anther.

(2)



5

- (i) Magnesium is a metal whereas chlorine is a non-metal.  
 (ii) The atomic number of magnesium is 12, so its electronic configuration is (2, 8, 2). It has 2 valence electrons. A magnesium atom donates its valence electrons (to two chlorine atoms) and forms a stable magnesium ion ( $\text{Mg}^{+2}$ ).  
 (iii) The atomic number of chlorine is 17, so its electronic configuration is (2, 8, 7). Chlorine atom has 7 valence electrons. So, it requires only one electron to complete its octet. Since one magnesium atom donates two electrons, so two chlorine atoms take these two electrons and form two chloride ions ( $2\text{Cl}^-$ ).  
 (iv) The positively charged magnesium ions and negatively charged chloride ions are held together by electrostatic force of attraction to form magnesium chloride which is an ionic compound.

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