

Ans1	Respiration is considered as an exothermic process because heat energy is evolved out during the process of oxidation of food in respiration $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Heat energy}$	1
Ans2	Magnesium ribbon be cleaned before burning because magnesium ribbon is covered with a protective layer of basic magnesium carbonate to remove this protective layer ribbon should be cleaned.	1
Ans3	Balanced equation is a chemical equation in which an equal number of atoms of different elements in the reactants and products are present.	1
Ans4	BHA, BHT and Nitrogen	1
Ans5	Redox reaction is a reaction in which oxidation and reduction takes place simultaneously : Eg : $CuO + H_2 \xrightarrow{\text{heat}} Cu + H_2O$	1
Ans6	$2AgCl \xrightarrow{\text{Sunlight}} 2Ag + Cl_2$ When silver chloride is exposed to sunlight. White colour of AgCl changes to grayish white due to formation of silver metal. This reaction can be used in black and white photography.	2
Ans7	$CuO (s) + H_2(g) \longrightarrow Cu(s) + H_2O (l)$ Reduced \longrightarrow CuO Oxidised \longrightarrow H ₂ Oxidising agent CuO Reducing Agent H ₂ O	2
Ans8	<ul style="list-style-type: none"> Displacement Reaction $CuSO_4 + Zn \longrightarrow Cu + ZnSO_4$ 	2
Ans9	a) Light Green –FeSO ₄ ·7H ₂ O crystals. If FeSO ₄ ·7H ₂ O crystals are heated then it changes to white colour due to evaporation of water of crystallisation. $2FeSO_4(s) \xrightarrow{\text{heat}} Fe_2O_3 (s) + SO_2(g) + SO_3 (g)$	2
Ans10	a) Evolution of gas b) Change in colour <ul style="list-style-type: none"> $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2(g)$ In this equation hydrogen gas is evolved out.	2
Ans11	a) Explain, with example how the physical states of the reactants and products can be shown in a chemical equation. b) Balance the equation and add state symbols : $Zn + HCl \longrightarrow ZnCl_2 + H_2$ c) Write balanced equation for : Sodium hydroxide reacts with sulphuric acid to produce sodium sulphate and water.	3
Ans12	i) $2H_2O_2 \longrightarrow 2H_2O + 2O_2$ Decomposition reaction ii) $4Fe + 3O_2 \longrightarrow 2Fe_2O_3$ Combination reaction iii) $Al_2(SO_4)_3 + 6 NaOH \longrightarrow 2Al(OH)_3 + 3Na_2SO_4$ Double displacement reaction	3
Ans13	i) CO ₂ ii) H ₂ O iii) Sunlight iv) Chlorophyll and Green leaves	3
Ans14	a) Zn and Mg – Two metals like X HCl and H ₂ SO ₄ – Two acids like Y b) Z = CO ₂ $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$	3

Ans15	i) PbSO_4 lead Sulphate ii) PbI_2 lead Iodide iii) Double displacement reaction	3
Ans16	i) Mg- X $\text{MgO} - \text{Y}$ ii) Oxygen iii) $\text{Mg}(\text{OH})_2$ It can be used as an acid iv) $2\text{Mg} + \text{O}_2 \xrightarrow{\text{heat}} 2\text{MgO}$ $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$	5
Ans17	i) A is KClO_3 , potassium Chlorate ii) B is KCl , potassium chloride iii) C is O_2 , oxygen iv) X is MnO_2 act as catalyst to increase the rate of reaction. v) Catalyst	5
Ans18	i) X = CuO ii) $\text{Y}_2 = \text{H}_2$ iii) $\text{XO} = \text{CuO}$ iv) $\text{XO} + \text{Y}_2 \longrightarrow \text{X} + \text{Y}_2\text{O}$ $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$ v) Redox reaction	5
Ans19	i) Combination Reaction ii) Decomposition Reaction iii) Hydrogen gas due to more no of moles of hydrogen iv) Cathode reaction : $2\text{H}^+ + 2\text{e}^- \longrightarrow \text{H}_2$ Anode reaction : $2\text{O}^{2-} \longrightarrow \text{O}_2 + 4\text{e}^-$	5
Ans20	i) CuSO_4 ii) Blue colour iii) Double displacement reaction iv) $\text{CuSO}_4 + \text{H}_2\text{S} \longrightarrow \text{CuS} + \text{H}_2\text{SO}_4$	5

THE ASIAN SCHOOL, DEHRADUN

Test Paper Session 2017-18

CLASS 10

SUBJECT Chemistry

Chapter-2 (Acids Base and Salts)

Ans1	<p>CO₂↑ gas released with effervescences. (½)</p> $\text{CaCO}_3 + \text{HNO}_3 \longrightarrow \text{Ca(NO}_3)_2 + \text{CO}_2\uparrow + \text{H}_2\text{O}$ <p>Calcium Carbonate in egg shell Calcium Nitrate (½)</p> <p>Egg shell slowly dissolve in HNO₃.</p>	1										
Ans2	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">Column A</td> <td style="width: 50%; border: none;">Column B</td> </tr> <tr> <td style="border: none;">a) Lactic Acid</td> <td style="border: none;">Curd</td> </tr> <tr> <td style="border: none;">b) Acetic Acid</td> <td style="border: none;">Vinegar</td> </tr> <tr> <td style="border: none;">c) Citric Acid</td> <td style="border: none;">Lemon</td> </tr> <tr> <td style="border: none;">d) Oxalic Acid</td> <td style="border: none;">Tomato</td> </tr> </table> <p>¼ X 4 = 1</p>	Column A	Column B	a) Lactic Acid	Curd	b) Acetic Acid	Vinegar	c) Citric Acid	Lemon	d) Oxalic Acid	Tomato	1
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a) Lactic Acid	Curd											
b) Acetic Acid	Vinegar											
c) Citric Acid	Lemon											
d) Oxalic Acid	Tomato											
Ans3	<p>Formic acid – HCOOH (½)</p> <p>To use mild Base Like Baking Soda for relief. (½)</p>	1										
Ans4	<p>a) Fresh milk is slightly acedid, it turns sour easily to become more acedid. In presence at baking soda its PH increases and it does not turn into curd easily.</p> <p>b) When the milk set for curd PH decreases i.e., it becomes more acedid. In presence of alkali it does not become more acedid easily.</p>	1										
Ans5	<p>Strong Acids : Those acids are easily release H⁺ in solution. Examples : H₂SO₄ , HCl</p> <p>Strong Base : Those release hydroxide in solution easily. Example : KOH, NaOH</p> <p>Strong Acid : Hydrochloric acid, sulphuric acid Nitric acid</p> <p>Weak acids. Citric acid, Acetic acid,</p>	1										
Ans6	<p>Lime water become milky. When excess of CO₂ is passed clear solution is formed.</p> $\text{Ca(OH)}_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$ <p>Lime Water Calcium Carbonate Milky Suspension.</p> $\text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2 \longrightarrow \text{CaCHCO}_3)_2 (\text{aq})$ <p>Calcium carbonate Calcium bicarbonate (Soluble)</p>	1										
Ans7	<p>a) Neutral</p> <p>b) PH = -log [H⁺] PH = - log [1x 10⁻²] PH = -(2 log 1) PH = 2</p> <p>c) 1 M NaOH has higher PH value.</p>	3										
Ans8	<p>Copper vessel is tarnished due to copper oxide layer farmed on its surface. Copper oxide is basic in nature.</p> $2\text{Cu} (\text{s}) + \text{CO}_2 (\text{g}) + \text{O}_2 (\text{g}) + \text{H}_2\text{O} (\text{l}) \longrightarrow$ <p>From moist air CuCO₃. Cu(OH)₂ Basic copper carbonate (Green)</p> <p>Lemon is acedid due citric acid present its it. The basic copper oxide react with this citic acid and form a salt which washed away with water.</p>	3										
Ans9	<p>a) When metal oxide react. With acid it gives metal salt and H₂O.</p> <p>b) MgO + 2HCl → MgCl₂ + H₂O</p>	3										
Ans10	<p>a) Zn (s) + H₂SO₄(aq) → ZnSO₄ (aq) + H₂↑</p> <p>b) 2Al (s) + 3H₂SO₄(aq) → Al₂(SO₄)₃ + 3H₂↑</p> <p>c) Fe(s) + 2HCl (aq) → FeCl₂ (aq) + H₂ ↑</p>	3										

	not glow. Conclusion : As electric current is curled through the solution by ions, this shows that acids dissociate in solution to produce (H ⁺) ions. But substance like glucose and alcohol do not dissociate to give H ⁺ ions and hence are not acidic. Thus, H ⁺ ions responsible for the acedic nature.	
Ans20	<p>a) A) Factory Indicator: Inform about reaction completion by smell. Eg: Onion, Vanilla essence, Olive Oil.</p> <p>b) Organic Acid: CH₃COOH.</p> <p>c) Blue colour of copper sulphate is due to the presence of hydrated water. CuSO₄ · 5H₂O One heating hydrated water evaporated and copper sulphate become colourless. CuSO₄ + 5H₂O → CuSO₄ + 5H₂O Colourles</p>	5
Ans21	<p>a) Tap water contain minerals that cause of ionic nature, Hence it conducts electricity. However, tap water do not have any mineral.</p> <p>b) Dry HCl gas not release H⁺ ion in the absence of moisture without H⁺ ion litmus not change its colour.</p> <p>c) Ammonia is a Lewis base that have pair of free electron and with water give NH₄OH that change red litmus into blue.</p> <p>d) Baking Soda increases PH of milk and it prevents curd formation.</p> <p>e) Addition of water in H₂SO₄ is cause of Hydrate formation. Which is highly explosive. Hence it is suggested that slowly adds acid (H₂SO₄) in water not water in acid.</p>	5
Ans22	<p>Compound X is any acid such as HCl, H₂SO₄ or HNO₃</p> <p>a) Mg + 2HCl → MgCl₂ + H₂(A)</p> <p>b) HaOH + HCl → NaCl + H₂O (B)</p> <p>c) Al₂O₃ + 6HCl → 2AlCl₃ + 3H₂O (c)</p> <p>Name of A – Magnesium Chloride B – Sodium Chloride C- Aluminium Chloride</p>	5
Ans23	<p>a) When a acid react with a base it give salt and water which has pH – (7). This water which as neutralization. NaOH + HCl → NaCl + H₂O PH = 7</p> <p>b) Acidic Salt : Combination of strong acid and weak buse. HCl NH₄OH NH₄Cl + H₂O Acidic salt</p> <p>c) Basic Salt : Combination of strong base and weak acid. Having PH slightly more than 7. NaOH CH₃COOH CH₃CONa + H₂O Sodium Acetate Basic salt.</p> <p>d) Neutral Salt : Combination of strong acid and strong base having PH 7. NaOH +HCl NaCl + H₂O</p>	5
Ans24	<p>a) Tooth decay : The enamel on our teech is desolve due to low PH of mouth (<5.5). Because enamel formed by calcium phosphate which dissolve by acid produce by bacteria.</p> <p>b) Digestive system : It contain dilute HCl which is not harmful but maintain the PH of stomach 2-3 that helpful in digestion of food.</p> <p>c) Self defense at animal and plant by chemical welfare : Some animal and plant contain some acidic and basic substance in their string which helpful for self defense and cause irritation on human body. Eg: Honey bee or yellow ant for ac id. Netl plant Formic acid.</p> <p>d) Regaining shine at a tarnishing copper vessels : A copper vessel get tarnished due to formation of an oxide layer on its surface. When rub with lemon, the surface inclined due to formation of salt. Because copper oxide layer is basic in nature and lemon contain citric acid.</p>	5
Ans25	<7	1
Ans26	Aqua Regia	1
Ans27	C ₂ H ₅ OH	1

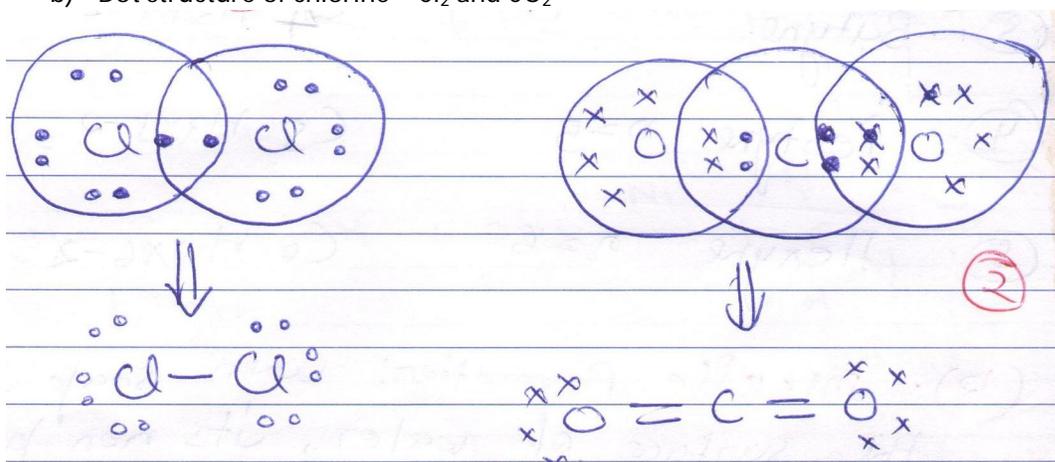
Ans28	Vanilla Essence	1
Ans29	a) Washing Soda b) Bleaching Powder c) Baking soda d) Slaked Lime A) (i) & (ii) B) (i), (ii) & (iii) c) (i) & (iii) d) (i), (iii) & (iv)	1
Ans30	Water < Acetic Acid < Hydrochloric Acid	1
Ans31	Baking Soda	1
Ans32	Lime Juice	1
Ans33	a) $\text{H}_3\text{O}^+ + \text{Cl}^-$	1
Ans34	Corrosive and flammable.	2
Ans35	When marble (calcium carbonate) react with acid it releases CO_2 gas. $\text{CaCO}_3 + 2\text{HCl} \longrightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ When excess of CO_2 is passed through lime water it again become colourless (dissolved) due to formation of calcium hydrogen carbonate. $\text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2 \longrightarrow \text{Ca}(\text{HCO}_3)_2$ Soluble.	2
Ans36	a) acetic acid should not be inhale due to pungent odour. b) It should be prevent from direct touch.	2

<p>Ans15</p> <p>a)</p> <p>b)</p> <p>c)</p>	<p>Handwritten diagrams showing the formation of Na_2O and MgO. Part a) shows the electron configurations: $\text{Na} \rightarrow 2,8,1$, $\text{O} = 2,6$, and $\text{Mg} = 2,8,2$. Part b) shows the formation of Na_2O where two Na atoms lose electrons to form Na^+ ions and one O atom gains two electrons to form O^{2-} ion. Part c) shows the formation of MgO where one Mg atom loses two electrons to form Mg^{2+} ion and one O atom gains two electrons to form O^{2-} ion.</p>	<p>3</p>
<p>Ans16</p>	<p>a) A can be displace Cu, B can be displace Fe, C can displace Ag, As order of reactivity of Cu,Fe and Ag. $\text{Fe} > \text{Cu} > \text{Ag}$ Hence B is most reactive.</p> <p>b) As B is more reactive than copper, it will displace Cu from CuSO_4. Hence blue colour of copper sulphate will fade.</p> <p>c) B can displace Fe, A can displace Cu, C can displace Ag and D ca displace none. Hine order of reactivity will be $\text{B} > \text{A} > \text{C} > \text{D}$</p>	<p>3</p>
<p>Ans17</p>	<p>a) Alloys : Alloys are homogenous mixture of two or more metal for examples : Steel : 0.05 carbon. Stainless steel : Iron 74%, Chromium 18% and Nickel 8%.</p> <p>b) Metal such as Au and Pt which Lie below in the activity series are highly un-reactive. Therefore they are not attracted by atmospheric gases and moisture and not corrode.</p>	<p>3</p>
<p>Ans18</p>	<p>a) Minerals : The naturally occurring chemical substances in form of which the metal occur in the earth along with imparities are called minerals.</p> <p>b) Ore : The minerals from which the metal can be extracted conveniently and economically is called an ore.</p> <p>c) Gangue : The earthy, sandy and rocky imparities associated with the mineral are called gangue or matrix.</p>	<p>3</p>
<p>Ans19</p>	<p>a) When sulphur burnt, it produces sulphur dioxide gas. $\text{S}(\text{s}) + \text{O}_2(\text{g}) \longrightarrow \text{SO}_2(\text{g})$</p> <p>b) There is no action of dry SO_2 on litmus.</p> <p>c) The gas dissolves in water present in moist litmus paper to form sulphurous acid (H_2SO_3) which turns blue litmus red. $\text{SO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{H}_2\text{SO}_3(\text{aq})$</p>	<p>5</p>
<p>Ans20</p>	<p>Amphoteric Oxide : Oxides which react with both acid and bases to form salt and water are called Amphoteric Oxide. Ex : Zinc oxide (ZnO) Aluminium Oxide (Al_2O_3)</p> $\text{ZnO} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2\text{O}$ <p style="text-align: center;">Zinc Chloride</p> $\text{ZnO} + 2\text{NaOH} \longrightarrow \text{Zn}(\text{OH})_2 + \text{H}_2\text{O}$ <p style="text-align: center;">Zinc Hydroxide</p>	<p>5</p>

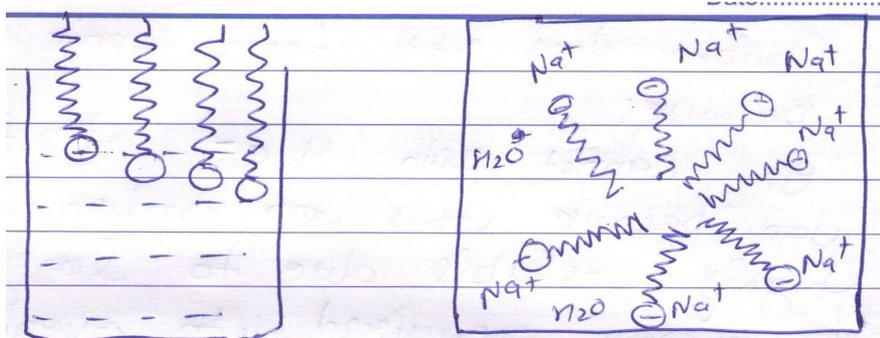
	$\text{Al}_2\text{O}_3(\text{s}) + 6\text{HCl} \longrightarrow 2\text{AlCl}_3 + 3\text{H}_2\text{O}$ <p style="text-align: center;">Aluminium Chloride</p> $\text{Al}_2\text{O}_3(\text{s}) + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2(\text{aq})$ <p style="text-align: center;">Sodium Aluminates</p>																			
Ans21	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 35%;">Metal</th> <th style="width: 35%;">Non Metal</th> </tr> </thead> <tbody> <tr> <td>Nature</td> <td>Electropositive $\text{Na} \longrightarrow \text{Na}^+ \text{e}^-$</td> <td>Electronegative $\text{Cl} + \text{e}^- \longrightarrow \text{Cl}^-$</td> </tr> <tr> <td>Nature of oxide</td> <td>Basic Oxide $4\text{Na} + \text{O}_2 \longrightarrow 2\text{Na}_2\text{O}$ $\text{Na}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{NaOH}$ base</td> <td>Acidic Oxide $4\text{Na}_2\text{O} + \text{O}_2 + 2\text{H}_2\text{O} \longrightarrow 4\text{HNO}_3$ Acid</td> </tr> <tr> <td>Reaction with water</td> <td>Displace H from water Eg : Na, K, Ca</td> <td>Do not react with water except fluorine</td> </tr> <tr> <td>Reaction with dil acid</td> <td>Displace H from acid $\text{Zn} + \text{H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$</td> <td>Do not react with dil acids</td> </tr> <tr> <td>Oxidising and reducing behaviour</td> <td>Reducing agent due to strong tendency to donate electron $2\text{Na} \longrightarrow 2\text{Na}^+ + 2\text{e}^-$</td> <td>Oxidising agent due to strong tendency to accept electron $\text{Cl}_2 + 2\text{e}^- \longrightarrow 2\text{Cl}^-$</td> </tr> </tbody> </table>		Metal	Non Metal	Nature	Electropositive $\text{Na} \longrightarrow \text{Na}^+ \text{e}^-$	Electronegative $\text{Cl} + \text{e}^- \longrightarrow \text{Cl}^-$	Nature of oxide	Basic Oxide $4\text{Na} + \text{O}_2 \longrightarrow 2\text{Na}_2\text{O}$ $\text{Na}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{NaOH}$ base	Acidic Oxide $4\text{Na}_2\text{O} + \text{O}_2 + 2\text{H}_2\text{O} \longrightarrow 4\text{HNO}_3$ Acid	Reaction with water	Displace H from water Eg : Na, K, Ca	Do not react with water except fluorine	Reaction with dil acid	Displace H from acid $\text{Zn} + \text{H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$	Do not react with dil acids	Oxidising and reducing behaviour	Reducing agent due to strong tendency to donate electron $2\text{Na} \longrightarrow 2\text{Na}^+ + 2\text{e}^-$	Oxidising agent due to strong tendency to accept electron $\text{Cl}_2 + 2\text{e}^- \longrightarrow 2\text{Cl}^-$	5
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Ans21	<p>a) On dipping in HNO_3, the surface of Al is oxidizing to form an oxide layer at Al_2O_3, which is hard and impervious. It acts as a protective layer for Al underneath. Hence, reactivity of Al decreases.</p> <p>b) Na or Mg are highly reactive metals. They have greater affinity for oxygen than for carbon. Hence their oxides are stable to reduce them with carbon, very high temperature is required. At this temperature, these metals react with carbon to form corresponding carbides.</p> <p>c) The conduction of electricity is due to movement of ions in the solid state, Na^+ and Cl^-. Hence, it does not conduct electricity. In the aqueous solution or in the molten state. Na^+ and Cl^- ions are free to move about and hence conduct electricity.</p> <p>d) Galvanisation means coating of iron articles with layer of zinc. Zinc is more reactive than iron. Hence, it undergoes oxidation more rapidly than iron. As a result iron articles remain protected.</p> <p>e) These metals are highly reactive and react with gases present in the air. Hence, they are found as compounds in the ores and not in the free state in nature.</p>	5																		
Ans22	<p>a) When copper glance (Cu_2S) an ore of copper, is subjected to roasting, it directly gives copper according to the following reactions :</p> $2\text{Cu}_2\text{S}(\text{s}) + 3\text{O}_2(\text{g}) \xrightarrow{\text{heat}} 2\text{Cu}_2\text{O}(\text{s}) + \text{SO}_2$ <p style="text-align: center;">Copper(I) oxide</p> <p>b) Reduction of copper :</p> $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \xrightarrow{\text{heat}} 6\text{Cu} + 2\text{SO}_2$ <p style="text-align: center;">copper</p> <p>c) Electrolytic Refining : The process of purifying the impure (Crude metal) is called refining of metal.</p> <p>d) Electrolytic Refining of Copper : The block of impure copper is made the anode. A thin plate of pure copper is made the cathode. A solution of copper sulphate acidified with dilute sulphuric acid is taken as the electrolyte in the electrolytic bath. On passing electric current pure copper from the anode passes into the solution as Cu^{2+} ions. An equivalent amount of copper ions from the solution are deposited on the cathode as pure copper.</p> <p>At Anode $\text{Cu}(\text{s}) \longrightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{e}^-$</p> <p>At Cathode $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \longrightarrow \text{Cu}(\text{s})$</p>	5																		

Ans23	<p>A = sodium which burns with golden flame in air. It reacts with chlorine (Z = 17) to form sodium chloride.</p> $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl(s)}$ <p>Hence B = Chlorine C = Sodium Chloride</p> $2\text{NaCl (aq)} + 2\text{H}_2\text{O} \xrightarrow{\text{Electrolysis}} 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$ <p>Hence D = NaOH - Sodium Hydroxide</p>	5
Ans24	a) Soft and Dull	1
Ans25	d) Anywhere on the nail	1
Ans26	a) Zinc is the most active metal followed by iron and copper.	1
Ans27	d) Zinc & aluminium	1
Ans28	d) Iodine	1
Ans29	B) (ii) & (iii)	1
Ans30	a) Ductility	1
Ans31	c) HNO ₃	1
Ans32	c) Conc. HCl : Conc HNO ₃ 3	1
Ans33	<p>a) We observe that on heating the wire near the clamp, after some time the pin falls down. This shows that heat flows through the wire and melts the wax.</p> <p>b) The wire does not melt even after heating for long time, this show that metal have high melting point.</p>	2
Ans34	<p>a) Mg reacts most vigorously followed by Al, Zn and Fe and copper did not react at all.</p> <p>b) The maximum rise in temperature in case of Mg.</p>	2
Ans35	<p>The order of reactivity with dilute HCl is :</p> <p>Mg > Al > Zn > Fe > Cu</p>	2

Ans1		1
Ans2	Detergents are reacts hard as well soft water and form leather however soap not form leather with hard water.	1
Ans3	<p>S16 - 2,8,6</p>	1
Ans4	<p>C_6H_{14} -</p> <p> $\begin{array}{ccccccc} & H & H & H & H & H & H \\ & & & & & & \\ H & - C & - H \\ & & & & & & \\ & H & H & H & H & H & H \end{array}$ $\frac{1}{4} \times 4 = 2$ </p> <p style="text-align: center;">or $\rightarrow n\text{-Hexane}$</p> <p style="text-align: center;">$CH_3CH_2CH_2CH_2CH_2CH_3$</p> <p> $\begin{array}{ccccccc} & H & H & H & H & & \\ & & & & & & \\ H & - C & - C & - C & - C & - H & \text{or } CH_3CH_2CH_2CH(CH_3) \\ & & & & & & \\ & H & H & H & H & & \end{array}$ 2-methyl Pentane </p> <p> $\begin{array}{ccccccc} & H & & H & & H & \\ & & & & & & \\ H & - C & - C & - C & - C & - H & \text{or } CH_3-CH(CH_3)-CH_2-CH_3 \\ & & & & & & \\ & H & H & H & H & & \end{array}$ 2,3dimethyl Signature Butane. </p> <p> $\begin{array}{ccccccc} & H & & CH_3 & & H & & H \\ & & & & & & & \\ H & - C & - C & - C & - C & - H & \text{or } CH_3-C(CH_3)_2-CH_2-CH_3 \\ & & & & & & & \\ & H & & CH_3 & & H & & H \end{array}$ 2,2 dimethyl butane. </p>	2

Ans5	a) Pentanoic acid (1) b) Butyne (1)	2								
Ans6	Saponification : when long chain fatty acids reacts with alkali (like NaOH or KOH) etc, it gives soap and glycerol. Therefore, the process is known as saponification. Eg : $\text{RCH}_2\text{COOH} + \text{NaOH} \longrightarrow \text{RCH}_2\text{COONa} + \text{H}_2\text{O}$ Long chain fatty acids. soap	2								
Ans7	Hydrocarbon : The compounds contain only hydrogen and carbon are known as hydrocarbons. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Saturated</th> <th style="width: 50%;">Unsaturated</th> </tr> </thead> <tbody> <tr> <td>a) They contain only single bonds.</td> <td>a) They formed multiple bonds – Double or Triple</td> </tr> <tr> <td>b) Do not give addition reactions</td> <td>b) Give addition reactions with hydrogen and halogens.</td> </tr> <tr> <td>c) Eg : $\text{CH}_4, \text{C}_2\text{H}_6, \text{C}_4\text{H}_{10}$ etc</td> <td>c) Eg : $\text{C}_2\text{H}_4, \text{C}_3\text{H}_6, \text{CH}_2$ etc</td> </tr> </tbody> </table>	Saturated	Unsaturated	a) They contain only single bonds.	a) They formed multiple bonds – Double or Triple	b) Do not give addition reactions	b) Give addition reactions with hydrogen and halogens.	c) Eg : $\text{CH}_4, \text{C}_2\text{H}_6, \text{C}_4\text{H}_{10}$ etc	c) Eg : $\text{C}_2\text{H}_4, \text{C}_3\text{H}_6, \text{CH}_2$ etc	3
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Ans8	a) Oxidation : Addition of oxygen or removal of hydrogen is known as oxidation. Eg : $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$ b) Combustion Reaction : burning of coal or hydrocarbon in the presence of air oxygen that produce large amount of heat is known as combustion. $\text{CH}_4 + \text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{Heat}$ $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2 + \text{Heat}$	3								
Ans9	a) Cl ₁₇ = 2,8,7 b) Dot structure of chlorine – Cl ₂ and CO ₂ 	3								
Ans10	a) -iv b) -i c) -ii d) -iii	3								
Ans11	Homologous Series : Compounds follow the same general formula but they differ by methylene group (CH ₂) and show similar physical and chemical behaviour are known as homologous. Example : Alkane - $\text{C}_n\text{H}_{2n+2}$ n = 1 CH ₄ n = 2 C ₂ H ₆ etc Five homologous of $\text{C}_n\text{H}_{2n-2}$ a) Ethyne n = 2 C ₂ H ₂ b) Propyne n = 3 C ₃ H ₄ c) Butyne n = 4 C ₄ H ₆ d) Pentyne n = 5 C ₅ H ₈ e) Hexyne n = 6 C ₆ H ₁₀	3								
Ans12	Micelle Formation : When soap is at the surface of water, its non polar hydrophobic hydrocarbon tails will not dissolve in water. Instead the soap molecules will align along the surface of water with	3								

their polar hydrophilic heads in water and the non polar hydrophobic hydrocarbon tails protruding out of water. The process is known as micelle formation.



micelle formed by soap.

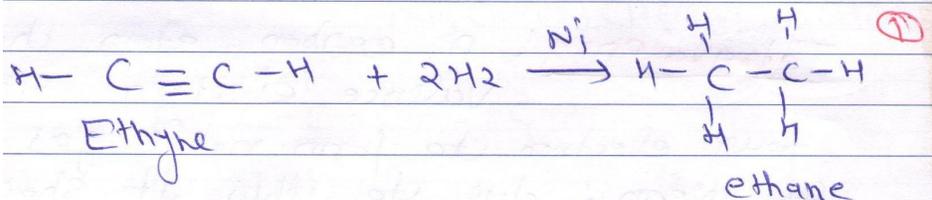
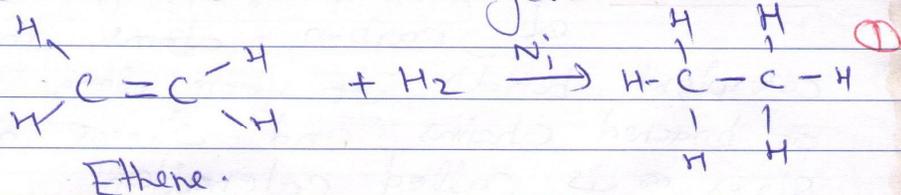
No, micelle formation does not take place in ethanol because the alkyl chain of soap becomes Soluble in alcohol.

Ans13

C_3H_6, C_2H_2 react with Hydrogen because they are unsaturated hydrocarbon.

3

C_3H_6, C_2H_2 react with Hydrogen because they are unsaturated hydrocarbon.



Ans14

Ethanol

Carboxylic Acid

3

a) Ethanol does not give litmus test.

a) Carboxylic acid turns blue litmus into red due to presence of acidic hydrogen.

b) It does not give test with NaHCO_3

b) It gives bubbles of CO_2 with reaction of NaHCO_3 .

Ans15

Carbon does not form ionic compounds because :

3

a) It cannot gain $4e^-$ to form C^{4-} ion because this anion would be highly unstable due to large amount of energy required to overcome the forces of repulsion between the four electrons being added.

b) It cannot lose $4e^-$ to form C^{4+} ion because this would be highly unstable due to the large amount of energy required to remove four electrons from carbon.

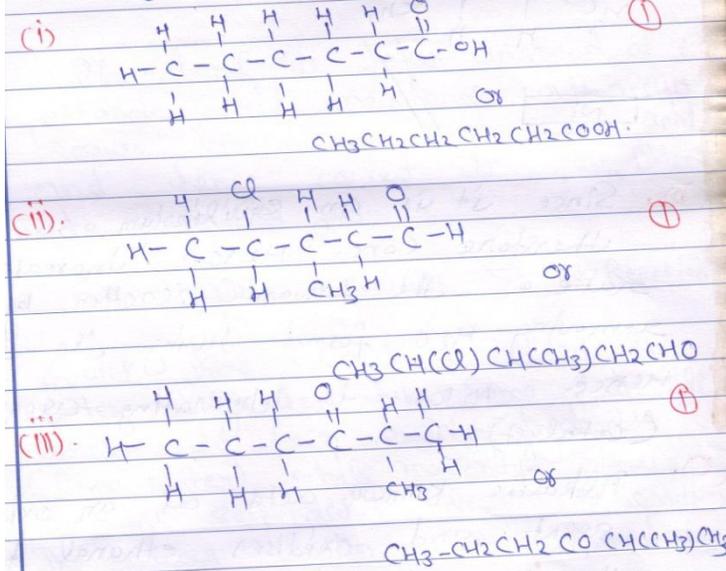
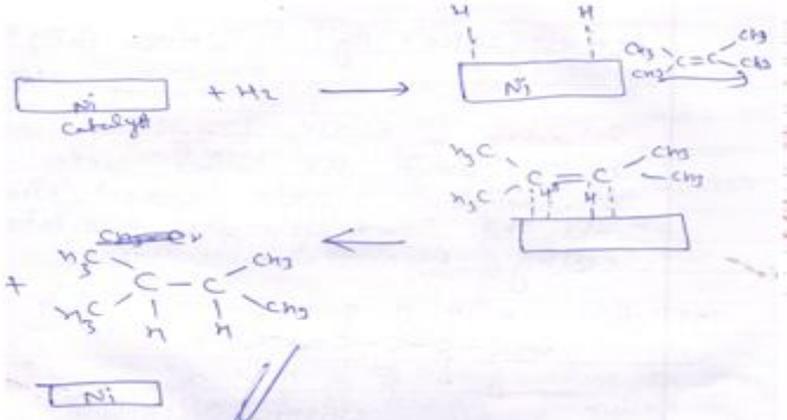
Catenation: The unique property of self linking of carbon atoms through covalent bonds to form long straight or branched chains and rings of different sizes is called catenation.

Tetravalency: A carbon atom has four valence electron and needs four electrons to form noble gas configuration of Neon, due to this it show mutual sharing. Therefore, carbon forms four covalent bonds in other wards carbon show tetravalency.

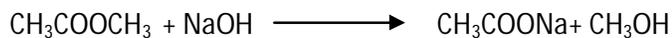
Ans16

Scum : Soap reacts with Ca^{++} and Mg^{++} ions present in hard water and form curdy white precipitates of calcium and magnesium salts of fatty acid called scum.

3

	$2 C_{17}H_{35}COONa + Ca^{++} \longrightarrow (C_{17}H_{35}COO)_2Ca + 2Na^+$ <p style="text-align: center;">Calcium Stearate</p> $2 C_{17}H_{35}COONa + Mg^{++} \longrightarrow (C_{17}H_{35}COO)_2Mg + 2Na^+$ <p style="text-align: center;">Magnesium Stearate</p> <p>Advantage of synthetic detergent over soap. Detergents lower the surface tension of water to a greater extent than soaps and hence detergents are better cleansing agent than water.</p>	
Ans17	 <p>(i) $CH_3CH_2CH_2CH_2CH_2COOH$</p> <p>(ii) $CH_3CH(Cl)CH(CH_3)CHO$</p> <p>(iii) $CH_3CH_2CH_2COCH(CH_3)_2$</p>	3
Ans18	<p>a) Ni is a catalyst. It adsorbs hydrogen molecule on its surface as hydrogen atom then the alkene molecule side by side two hydrogen atoms then adds across the double bond of the alkene to form the addition product i.e. 2,3 dimethyl butane.</p>  <p>b) Since it is an equilibrium reaction, therefore conc. H_2SO_4. Increase the rate of the forward reaction by removing H_2O formed during the reaction. Hence H_2SO_4 is dehydrating agent (catalyst)</p> <p>c) Alkaline $KMnO_4$ acts as an oxidizing agent and oxidizes ethanol to ethanoic acid.</p>	3
Ans19	<p>a) When CO_2 passed through column of calcium hydroxide solution (tests tube B) i.e. lime water, it turns milky due to the formation of insoluble calcium carbonate ($CaCO_3$)</p> <p>b) Tube A: $Na_2CO_3 + CH_3COOH \longrightarrow CH_3COONa + CO_2 + H_2O$ Sodium Carbonate Ethanoic acid Sodium ethanoate</p> <p>Tube B: $Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$ Calcium hydroxide Calcium Carbonate</p> <p>c) If ethanol is taken instead of ethanoic acid, no change will occur because ethanol is a very weak acid and hence cannot decompose Na_2CO_3 to give CO_2 gas.</p> $CH_3CH_2OH + Na_2CO_3 \xrightarrow{x} \text{No Reaction.}$ <p>d) Quick lime (CaO) is added to water in a test tube. Some of it will dissolve to form calcium</p>	3

- e) The Suggestion that the ester (S) is actually methyl ethanoate is supported by the observation that on treatment with NaOH gives the original acid i.e. ethanoic acid (C) and original alcohol, methanol (A)



Ans23

- a) Etherification Reaction: When an acid reacts with an alcohol in the presence of mineral acid, ester and water is formed, this is known as esterification reaction.

$$\text{CH}_3\text{COOH} + \text{CH}_3\text{OH} \longrightarrow \text{CH}_3\text{COOCH}_3 + \text{H}_2\text{O}$$
- b) Cleansing agent : Soaps and detergents are cleansing agents because they contain hydrophobic (water repelling) fat soluble tail and hydrophilic (water loving) water soluble head.
- c) Denatured Alconals : In industries and labs to prevent misuse of alcohols as drinking purpose, some chemicals like methanol, pyridine, copper sulphate etc mixed in it. Due to this alcohol become coloured, pad smelling ad poisonous, it is called denatured alcohol.
- d) Isomerism : If a given molecular formula represents two or more structures having different properties, the phenom on is called isomerism and the different structure are called isomers.
- e) Aromatic Hydrocarbons : The compounds which contain one or more isolated or fused rings are called aromatic compounds.

eg .



Benzene



Naphthalene.

Ans24

Allotropes : The Phenomenon of existence of an element in two or more forms which have different physical properties but identical chemical properties is called allotropy and the different forms are called allotropes.

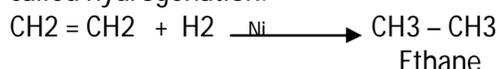
Three allotropes of carbon :

(1)	Diamond	Graphite	Buck minsterfullerence
Structure	Tetrahedral	Planner Hexayonal sheets	Buckyhall or soccer ball like : (C60)
Nature	Extremely hard Insulator, Transparent	Soft Coductor	Dark solid at room temperature
Uses	Jewellery Making Cutting and Drilling tools Eye surgery	As a dry lubricant Making lead pencils Making electrodes of dry cell	Drug delivery system in body In Lubricants As a catalyst.

Structure Refer NCERT page – 61

Ans25

- a) Hydrogenation : Addition of H₂ with unsaturated hydrocarbons in presence of Ni catalyst is called hydrogenation.



Ans26

During hydrogenation two changes will occur.

- a) Some of the esters of fatty acids are converted into ester of corresponding fatty acids.
 b) Some is insaturated fatty acids convert into trans.

Ans27	Health Problems: a) Increase the level of bad cholesterol (LDL) in blood Precautions : a) For cooking purpose olive oil, canola oil should be taken. b) Non vegetarian should eat salmon fish which contain omega – 3 fatty acids.	1
Ans28	Ans : (c) Both Mg^{2+} and Ca^{++}	1
Ans29	Ans : (c) Red colour will change to green	1
Ans30	Ans : (c) C_2H_4OH	1
Ans31	Ans : (b) 50% acetic acid	1
Ans32	Ans c	1
Ans33	Ans c	1
Ans34	Procedure : Take 20ml castor oil in beaker adds 30 ml of 20% NaOH solution, heat and continuous stir till thickness the add 5-10g of common salt and allow to cool. Conclusion : Vegetable oils on alkaline hydrolysis give soaps. Soaps are sodium or potassium salts of higher fatty acids such as palmitic acid, stearic acid while detergents are ammonium or sulphate salts of long chain hydrocarbon containing 12-18 carbon.	
Ans35	Saponification reaction is useful in soap industry because oils and fats are ester of higher fatty acids with glycerol and their saponification produces soap and glycerol. $\text{Veg Oil} + \text{NaOH} \xrightarrow{\text{heat}} \text{C}_{17}\text{H}_{35}\text{COONa} + \begin{matrix} \text{CH}_2\text{OH} \\ \text{CnOH} \\ \text{Cn}_2\text{OH} \\ \text{glycerol} \end{matrix}$	
Ans36	Vinager is 9.5-8% solution of ethanoic acid in H_2O . Functional group present in ethanoic acid, is carboxylic group – C – O – H. When sodium carbonate is added to ethanoic acid CO_2 gas is produced. $2CH_3COOH + Na_2CO_3 \longrightarrow 2CH_3COONa + CO_2 + H_2O$ Ethanoic acid. Sod. Carbonate sod. Ethanoate	2

THE ASIAN SCHOOL, DEHRADUN

Test Paper Session 2017-18

CLASS 10 **SUBJECT Chemistry** **Chapter-5(Periodic Classification of Elements)**

Ans1		1
Ans2	Chloride of Eka – Silicon = Ge Chloride of Eka – Aluminium = Ga	1
Ans3	Cobalt was placed before nickel so, that cobalt could be in the same column as rhodium (Rh) which closely resembles it in properties.	1
Ans4	X – 12 Magnesium 2,8,2 Y – 12 Neon 2,8 X has the largest radii from Y as it contains 3 shells.	1
Ans5	a) Chlorine has the bigger size. b) Potassium has the bigger size	1
Ans6	a) In Period = 3, Group = 1, as it is sodium (Na) b) In Period = 2, Group = 4, as it is Carbon (C) c) In Period = 1, Group = 18, as it is Helium d) In Period = 4, Group = 12, as it is Zinc. e) In Period = 2, Group = 13, as it is Boron	2
Ans7	a) Neon b) Magnesium c) Carbon d) Boron	2
Ans8	a) Average atomic masses = $\frac{7+39}{2}$ $= \frac{46}{2}$ $= 23$ b) Because it is the triad formula that 3 elements in order contain the mass of middle term is equal to arithmetic mean of 2 elements. c) Doberneir Triad d) They are the triads	2
Ans9	A 5 Boron 2,3 B 7 Nitrogen 2,5 C 10 Neon 2,8 i) Neon ii) Nitrogen iii) Boron iv) All belong to 2 nd period	2
Ans10	a) 2 b) 2 c) MgCl ₂	2
Ans11	17 Chlorine 2,8,7 20 Calcium 2,8,8,2 a) X is placed in group = 17, period = 3 Y is placed in group = 2 period = 4 b) X is non-metal and Y is metal c) $2\text{Ca} + \text{O}_2 \longrightarrow 2\text{CaO}$ Nature Basic	3

Ans12	2,8,2 Magnesium a) Magnesium b) 2,8,2 c) $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$ d) $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg(OH)}_2$ e) Mg O	3
Ans13	a) X Nitrogen Y NH_3 Ammonia Z $(\text{NH}_4)_2 \text{SO}_4$ Ammonium Sulphate b) 15 c) 2 nd d) Carbon e) Oxygen	3
Ans14	a) Basic b) Yes c) XY_2 d) +2 e) 2	5
Ans15	Y = 2,6 Oxygen a) Non metal b) 2 c) -2 d) Oxygen e) $4\text{Na} + \text{O}_2 \longrightarrow 2\text{Na}_2\text{O}$	5