CHEMICAL REACTIONS AND EQUATIONS **TOPIC-1 Chemical Reactions and Equations** SUMMATIVE ASSESSMENT WORKSHEET-1 Ans. 1: Rusting of Iron. (1) Ans. 2: Balanced Equation $2\text{FeSO}_4(s) \xrightarrow{\text{Heat}} \text{Fe}_2O_3(s) + SO_2(g) + SO_3(g)$ (1) Ans. 3: When zinc glanules as heated with NaOH solution the product sodium zincate is formed : $2NaOH(aq) + Zn(s) \xrightarrow{Heat} Na_2ZnO_2(aq) + H_2(g)$ (2) Ans. 4: Blue colour changes to light green. Reddish brown deposit on the iron nail is formed. $Fe(s) + CuSO_4(aq) \longrightarrow FeSO_4(aq) + Cu(s)$ 1 + 1 = 2Ans. 5: Baking powder (NaHCO₃), salt X is commonly used in bakery products. On heating, it forms sodium carbonate (Na₂CO₃), y and CO₂ gas; Z is evolved. When CO₂ gas is passed through lime water it forms calcium carbonate (CaCO₃), which is slightly soluble in water making it milky. 11/2 $X - NaHCO_3$; $Y - Na_2CO_3$; $Z - CO_2$ gas $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + H_2O + CO_2$ $Na_2CO_3.10H_2O \xrightarrow{Heat} Na_2CO_3 + 10H_2O$ $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ Ans. 6: (a) Substance X is lime water. $Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$ (lime water) (carbon (calcium (water) dioxide) carbonate) (b) Calcium oxide reacts vigorously with water to produced slaked lime (calcium hydroxide) releasing a large amount of heat. $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2 (aq)$ (quick lime) (3) (slaked lime) Ans. 7: (a) With dil H_2SO_4 : H_2 gas is evolved. $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2^{\uparrow}$ (b) With dil HCl : H_2 gas is evolved. $Zn + HCl \longrightarrow ZnCl_2 + H_2 \uparrow$ (c) With dil HNO_3 : N₂O gas is evolved. $4Zn + 10HNO_3 \longrightarrow 4Zn(NO_3)_2 + 5H_2O + N_2O$ (d) With dil NaCl : No chemical reaction takes place. (e) With dil NaOH : Salt is formed and H_2 gas is evolved. $Zn + 2NaOH \longrightarrow Na2ZnO2 + H2\uparrow$ [CBSE Marking Scheme, 2013] $1 \times 5 = 5$ SUMMATIVE ASSESSMENT WORKSHEET-2 **Ans. 1**: ZnO(s) and $CO_2(g)$ are formed. Chemical Equation : $ZnCO_3 \xrightarrow{Heat} ZnO + CO_2$ $\frac{1}{2} + \frac{1}{2}$ **Ans. 2**: $Pb(NO_3)_2 + 2KI$ \longrightarrow 2KNO₃ + PbI₂ (Lead (Potassium (Potassium (Lead nitrate) iodide) nitrate) iodide) (1)

SOLUTIONS

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Ans. 3: Balanced Chemical Equations : (i) $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$ (ii) $BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + 2NaCl$ 1 + 1Ans. 4: Ca + 2HNO₃ \longrightarrow Ca(NO₃)₂ + H₂ $Mg + 2HNO_3 \longrightarrow Mg(NO_3)_2 + H_2$ [CBSE Marking Scheme, 2013] 1+1 Ans. 5: (a) Exothermic Reaction $CaO + H_2O \longrightarrow Ca(OH)_2$ (b) Double displacement reaction. $BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + NaCl$ [CBSE Marking Scheme, 2015] 1¹/₂ + 1¹/₂ **Ans. 6**: $N_2 + H_2 \longrightarrow NH_3$ (Unbalanced equation). Examine the number of atoms of different elements present in the unbalanced equation. (ii) In the above reaction both the sides N_2 and H_2 both are unbalanced. (iii) To balance hydrogen, H₂ is multiplied by 3 on both the sides. It makes 6H-atoms on the left hand side. (iv) Now to balance hydrogen atoms on the right hand side NH₃ should be multiplied by 2. It make 6H-atoms on this side. (v) Now to balance nitrogen atoms, they are counted separately for both the sides and we will find that, nitrogen atoms are 2 on both left hand side and right hand side. (vi) Balanced chemical equation will be : $N_2 + 3H_2 \longrightarrow 2NH_3$ $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ **Ans. 7** : (i) Shivam had spicy food, so he was suffering from acidity. 1 (ii) Antacids are alkaline in nature, so when Shivam took a spoon of antacid it neutralized the acid. The type of reaction is Neutralisation reaction. 2 (iii) Friendship, concern for each other, value and balanced diet. 2 SUMMATIVE ASSESSMENT WORKSHEET-3 Ans. 1: Quick lime reacts with water vigorously to produce slaked lime and a large amount of heat. + $H_2O \longrightarrow Ca(OH)_2$ + Heat CaO(s)(Quick lime) (Slaked lime) 1 Ans. 2: Law of conservation of mass. Mass can neither be created nor be destroyed during a chemical reaction. $\frac{1}{2} + \frac{1}{2}$ Ans. 3: (i) $2AgBr(s) \xrightarrow{Sunlight} 2Ag(s) + Br_2(g)$ 1 (ii) $2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$ [CBSE Marking Scheme, 2012] 1 Ans. 4: Magnesium combines with atmospheric oxygen to form magnesium oxide $2Mg + O_2 \longrightarrow 2MgO$ [CBSE Marking Scheme, 2012] 2 Ans. 5: (i) Na₂CO₃(s) + 2HCl(aq) \longrightarrow 2NaCl(aq) + H₂O(l) + CO₂(g) (ii) $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq) + Heat$ (iii) $Pb(NO_3)_2(aq) + NaCl(aq) \longrightarrow PbCl_2(s) + 2NaNO_3(aq)$ [CBSE Marking Scheme, 2014] 1+1+1 Ans. 6: (i) Change in colour : Reaction between lead nitrate solution and potassium iodide solution. $Pb(NO_3)_2(aq) + 2KI \longrightarrow PbI_2(s) + 2KNO_3(aq)$ In this reaction, colour changes from colourless to yellow.

(ii) Change in temperature : Action of dil. sulphuric acid on zinc. $Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2$ (iii) Formation of precipitate : Action of barium chloride on sodium sulphate.

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BaCl_2(aq) + Na_2SO_4(aq) \longrightarrow BaSO_4(s) + 2NaCl(aq) [CBSE Marking Scheme, 2014] 1+1+1
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- Ans. 7: (i) $2NaOH(aq) + Zn(s) \longrightarrow Na_2ZnO_2(aq) + H_2(g)$
 - (ii) $Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O$
 - (iii) $Na_2CO_3 + H_2SO_4(dil) \longrightarrow Na_2SO_4(aq) + H_2O(l) + CO_2(g)$
 - (iv) $CaCO_3 + 2HCI \longrightarrow CaCl_2 + H_2O + CO_2$
 - (v) $CuO + 2HCl (dil) \longrightarrow CuCl_2 + H_2O$

1+1+1+1+1



TOPIC-2 Types of Chemical Reactions–Corrosion and Rancidity

SUMM	ATIVE ASSESSMENT WO	ORKSHEET-4
Ans. 1: The	ey get tarnished by reacting with atmospheric air to form silver sulphide.	1
Ans. 2 : To	prevent the oil and fats of the chips from being oxidized or becoming ranc	id. 1
Ans. 3 : Co	pper sulphate — Green	
Fer	rous sulphate — Pale green	
Soc	lium sulphate — Milky white	
Bai	ium chloride — White	$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$
Ans. 4 : Iro	n is more reactive than copper. Iron displaces copper from copper sulphate s phate, hence the colour of solution changes.	solution and forms fron
	Equation : Fe + CuSO ₄ (aq) \longrightarrow FeSO ₄ (aq) + Cu	1+1
Ans. 5 : (a)	$2Mg + O_2 \longrightarrow 2MgO$	
	$MgO + H_2O \longrightarrow Mg(OH)_2$	
	Oxidation reaction	
(b)	$CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$	
	(Lime stone) (quick lime)	
	Reduction reaction.	1½+1½
Ans. 6: Iros sul	n is more reactive than copper. Iron displaces copper from copper sulphate s phate, hence the colour of solution changes.	solution and forms iron
	Equation : Fe (s) + CuSO ₄ (aq) \longrightarrow FeSO ₄ (aq) + Cu (s)	1+1
Ans. 7 : (a)	Corrosion : The process in which metals breakdown gradually by the air, on their surface.	moisture or a chemical
(b)	Rusting of Iron	
(c)	By the development of a black coating on silver.	
(d)	Every year enormous/large amount of money is spent to replace damage	ed iron.
(e)	Paint, galvanization, electroplating (any one) [CBSE Marking Schem	ne, 2015] 1+1+1+1+1

SOLUTIONS

SUM	MATIVE ASSESSN	AENT	WORKSHEET-5
Ans. 1 :	2CO(g) + O ₂ (g) (Carbon (Oxygen) monoxide)	$ \rightarrow 2CO_2(g) (Carbon dioxide) $	1
Ans. 2 :	NaCl + AgNO ₃ (Sodium (Silver chloride) nitrate)	→ AgCl + NaNO ₃ (Silver (Sodium chloride) nitrate)	1
Ans. 3 :	(i) To prevent rancidity.(ii) Rusting and corrosion.		[CBSE Marking Scheme, 2014] 1+1
Ans. 4 :	$Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2$ Displacement reaction is the r	Fe eaction in which one eleme	1 ent displaces another element. [CBSE Marking Scheme, 2012] ½+½
Ans. 5 :	 (i) Silver : Colour — Black Chemical name — Silver sulpl (ii) Copper : Colour — Green Chemical name — Copper oxi (iii) Iron : Colour — Reddish I Chemical name — Ferric oxide 	nide de Brown 2.	1+1+1
Ans. 6 :	(i) $CaCO_3(s) \xrightarrow{Heat} CaO($ (Calcium (Calciu carbonate) oxid (ii) $2AgCl(s) \xrightarrow{Sunlight} 2Ag$ (Silver chloride) (Silver	s) + $CO_2(g)$ im (Carbon e) dioxide) g(s) + $Cl(g)ver) (Chloride)$	
Ans. 7 :	 (III) 2H₂O(1) <u>Excert carrent</u> (Water) (F (a) When fats and oils are oxis The type of chemical reaction is Definition: Rancidity is the particular resulting in the production of f (b) Methods to Prevent Rance (i) Refrigeration of cook (ii) Packing of food mate (iii) By adding antioxidation 	2H ₂ (g) + O ₂ (g) Hydrogen) (Oxygen) dised, the food becomes ra s oxidation. foul odour and taste in the idity : ted food at low temperature erials in air tight containers ints e.g., BHA (Butylated hy	1+1+1 ancid <i>i.e.</i> , their smell and taste changes. oil and fat present in the food materials m. res. s. vdroxyanisole) 1+1+3
SUM	MATIVE ASSESS	MENT	WORKSHEET-6
Ans. 1 : Ans. 2 :	In combination reactions, two s tions, a compound breaks dow Electrolytic reduction.	substances combine to form n into two or more substa	n one compound and in decomposition reac- nces, so they are opposite to each other. 1 1
Ans. 3 :	Light green is the colour of cry upon heating. (a) $FeSO_4.7H_2O \xrightarrow{\Lambda} FeSO_4$	rstalline FeSO ₄ .7H ₂ O. Ligh $D_4 + 7H_2O$	t green changes to reddish brown or brown 1
	(b) $2\text{FeSO}_4 \xrightarrow{\text{rear}} \text{Fe}_2\text{O}_3 +$	$SO_2 + SO_3$	[CBSE Marking Scheme, 2012]1
Ans. 4 :	A reaction in which two or mo Example : $C + O_2 \xrightarrow{Burn} O_2$ $2H_2 + O_2 O_2$	ore simpler substances com CO ₂ • 2H ₂ O	bine to form a single product. 1 ½ [CBSE Marking Scheme. 2012] ½
	<u>2</u>	4	

SCIENCE-X TERM-1

Ans. 5	The oxidation of oils or fats in a food resulting into bad su It can be prevented by— (i) adding of anti-oxidants (ii) flushing with nitrogen gas.	mell and bad taste is called rancidity. 1 [CBSE Marking Scheme, 2012] 1
Ans. 6	On mixing the clear solution of two ionic compounds, a sub This insoluble substance is known as a precipitate and the called as precipitation reaction. Example : When sodium sulphate solution is mixed with be of a substance (BaSO ₄) is formed Na ₂ SO ₄ (<i>aq</i>) + BaCl ₂ (<i>aq</i>) \longrightarrow BaSO ₄ (\downarrow) + 2NaCl(<i>aq</i>)	ostance which is insoluble in water is formed. The reaction in which precipitate is formed is parium chloride solution, a white precipitate [CBSE Marking Scheme, 2013] 1+1+1
Ans. 7 :	 (a) Corrosion. (b) Conditions are – air and moisture. Activity: Take three test-tubes. Place clean iron nails in each test-tue Pour some water in test-tube-1, cork it. Pour water (boiled/distilled) in test-tube-2, add some Put some anhydrous calcium chloride in test-tube-3 After 2-3 days, we observe that the nails in test-tube 2 and 3 do not place in the presence of air and moisture both. Methods to prevent rusting : Alloying, galvanization, pair 	$\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$ bbe. e oil and cork it. and cork it. 1 get rusted because they are exposed to air get rusted. This shows rusting of iron takes $\frac{21}{2}$ nting, lubrication (any 2). $\frac{1}{2}+\frac{1}{2}$
PRA	CTICAL BASED QUESTIONS	WORKSHEET-7
Ans. 1 Ans. 2 Ans. 3 Ans. 4 Ans. 5 Ans. 6	 (B) Solution becomes pale green to colourless. (B) Zinc is less reactive than Iron. (B) Because Iron is more reactive than zinc and replaces (B) Reddish brown residue is due to formation of Fe₂O₃. (B) Solid product formed on heating FeSO₄ is brown and s is left. When a solution of sodium sulphate is mixed with a soluti displacement reaction takes place . 	(1) (1) zinc in ZnSO ₄ . (1) smell of sulphur dioxide and sulphur trioxide (1) on of barium chloride, the following double
Ans. 7 :	Na ₂ SO ₄ (<i>aq</i>) + BaCl ₂ (<i>aq</i>) \longrightarrow BaSO ₄ (<i>s</i>) + 2NaCl(<i>aq</i>) In this reaction, sulphate ions from sodium sulphate are d ions in barium chloride are displaced by sulphate ions. A phate is formed and sodium chloride remains in the solur The aqueous solutions of barium chloride and sodium 6.1 g BaCl ₂ .2H ₂ O and 3.2 g of Na ₂ SO ₄ .10H ₂ O in water an	lisplaced by chloride ions (Cl ⁻) and chloride s a result, a white precipitate of barium sul- tion. 1+1 n sulphate can be prepared by dissolving d then diluting them to 100 ml separately.
Ans. 8 : Ans. 9 :	 1+1 The iron nails must be cleaned properly by using sand pay solution. Iron displaces copper ions from an aqueous solution of or reaction of one metal by another metal. Iron is placed at placed above in this series are more reactive than those plathan copper. In this reaction, metallic iron is converted in is converted into metallic copper. 	per before dipping them in copper sulphate $1+1$ copper sulphate. It is a single displacement bove copper in the activity series. Elements aced below them. Thus iron is more reactive nto ferrous ion (Fe ²⁺) and cupric ion (Cu ²⁺)
Ans. 10	$Fe(s) + Cu_{2+}(aq) \longrightarrow Fe_{2+}(aq) + Cu(s)$: It is a combination reaction as a new product calcium hy both the reactants.	1+1 droxide will be produced while combining 1+1
FOR	MATIVE ASSESSMENT	WORKSHEET-8
Note : .	Students should do this activity themselves.	
SOLU	ΓΙΟΝΙ	P-5