

INDIAN SCHOOL MUSCAT
SECOND PRE-BOARD EXAMINATION

SET A

FEBRUARY 2020

CLASS X

Marking Scheme – SCIENCE [THEORY]/ CHEMISTRY

SECTION - A

Q.NO.	ANSWER	MARKS
1	In dry state, HCl gas does not give any H^+ ions. It does not behave as an acid.	1
4	CHE	
4(a)	(c)Basic copper carbonate	1
4(b)	(b)gold	1
4(c)	(a)silver.	1
4(d)	(d)Potassium	1
12	(a) Carbon compounds are good conductor of heat and electricity OR (d) It is used for making insulated plates	1
	<p>For question numbers 13 and 14, two statements are given- one labeled <i>Assertion</i> (A) and the other labeled <i>Reason</i> (R). Select the correct answer to these questions from the codes (i), (ii).(iii) and (iv) as given below</p> <p style="padding-left: 40px;">i) Both A and R are true and R is correct explanation of the assertion.</p> <p style="padding-left: 40px;">ii) Both A and R are true but R is not the correct explanation of the assertion.</p> <p style="padding-left: 40px;">iii) A is true but R is false.</p> <p style="padding-left: 40px;">iv) A is false but R is true</p>	
13	Ans : (iv) Assertion is false but reason is true.	1
SECTION - B		
15	<div style="display: flex; justify-content: space-between;"> Silver :colour-black Copper: green iron :reddish brown </div> <div style="display: flex; justify-content: space-between;"> Chemical name-silver sulphide basic copper carbonate Ferric oxide </div>	3
16	POP is calcium sulphate hemihydrate($CaSO_4 \cdot 1/2H_2O$) Gypsum is calcium sulphate dihydrate($CaSO_4 \cdot 2H_2O$) (1/2+1/2)	3

	<p>Gypsum is heated at temp. 380K, changes to POP POP when mixed with water changes into hard solid mass, gypsum (1/2+1/2) POP is used in hospitals for setting fractured bones. (1) OR NaOH (1) Neutralisation Reaction (Nonmetal oxides are acidic in nature, react with NaOH gives Na₂CO₃ (salt) & water (1) 2NaOH + CO₂ → Na₂CO₃ + H₂O (1)</p>	
17	<p>1. Electronic configuration of A (13) = 2, 8, 3` Group number = 13 Period number = 3 (1) 2. Electronic configuration of B = 2, 8, 7 Valency of B = 8 – 7 = 1, Valency of A is 3 and valency of B is 1. (1)` Formula of the compound formed by the reaction of A and B is AB₃. (1)</p>	3
SECTION- C		
25	<p>Hydrogenation reaction: Reactions in which unsaturated hydrocarbons add hydrogen in the presence of nickel as a catalyst to give saturated hydrocarbons, (1) Ni catalyst e.g., CH₂=CH₂ → CH₃-CH₃ (b) Oxidation reaction: Reactions in which alcohols are oxidised to carboxylic acids in the presence of oxidising agent (alkaline KMnO₄) on heating, (1) Heat / Alkaline KMnO₄ e.g., CH₃ CH₂ OH → CH₃ COOH (c) Substitution reaction: Reactions in which hydrogen of alkanes is substituted by halogens in the presence of sunlight, Sunlight e.g., CH₄ + Cl₂ → CH₃ Cl + HCl (1) (d) Saponification reaction: Reactions in which esters react with sodium hydroxide to form sodium salt of acid and alcohol; CH₃ COOC₂ H₅ + NaOH → CH₃ COONa + C₂ H₅ OH (1) (e) Combustion reaction : Reactions in which compounds burn with oxygen, liberating a large amount of heat and light, e.g., CH₄ + 2O₂ → CO₂ + 2H₂ O + Heat + Light (1) OR (a) (i) Hydrocarbons: The compounds made of only carbon and hydrogen. (1) (ii) Two categories: Saturated and unsaturated (1) (b) Alkanes: The hydrocarbons in which all the bonds are single covalent bonds. Example: Methane (CH₄) (1) Alkenes: The hydrocarbons in which there is a double covalent bond between any two carbon atoms. Example: Ethene (C₂ H₄) (1) Alkynes: The hydrocarbons in which there is a triple covalent bond between any two carbon atoms. Example: Ethyne (C₂ H₂) (1)</p>	5
26	<p>(a) When aluminium is dipped in HNO₃; a layer of Al₂O₃ is formed on its surface which is passive and makes it less reactive. (1) (b) Since sodium and magnesium are more stronger reducing agent than carbon, the oxides of sodium and magnesium cannot be reduced by carbon. (1) (c) In solid sodium chloride (NaCl) movement of ions is not possible due to the rigid structure but in aqueous solution (molten state) the ions can move freely and thus conduct electricity. (1) (d) As iron articles get rusted when kept in open, these articles are galvanised in which a thin coating of zinc is applied on these articles to prevent rusting. (1) (e) <u>Being highly reactive</u>, these metals react with air/moisture/other substances present in the atmosphere, hence not found in nature in their free state. (1)</p>	5

SET – B

SECTION - A

Q.NO.	ANSWER	MARKS
1	Plaster of Paris; chemical formula: $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$	1
4	CHE	
4(a)	(a) silver.	1
4(b)	(d) Potassium	1
4(c)	(b) Gold	1
4(d)	(c) Basic copper carbonate	1
12	(a) Atomic size of $\text{B} > \text{Be}$ OR (d) Both (b) and (c)	1
	<p>For question numbers 13 and 14, two statements are given- one labeled <i>Assertion</i> (A) and the other labeled <i>Reason</i> (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below</p> <p>i) Both A and R are true and R is correct explanation of the assertion.</p> <p>ii) Both A and R are true but R is not the correct explanation of the assertion.</p> <p>iii) A is true but R is false.</p> <p>iv) A is false but R is true</p>	
13	(iv) A is false but R is true.	1

SECTION - B

15	<p>The reaction in which oxidation and reduction takes place simultaneously is called redox reaction. (1)</p> <p>(a) C is oxidised and PbO is reduced. (1)</p> <p>(b) HCl is oxidised and MnO_2 is reduced. (1)</p>	3
16	<p>The ore, on treatment with dilute hydrochloric acid, gives the smell of a rotten egg, so the gas evolved is hydrogen sulphide (H_2S). Hence it is a sulphide ore. (1)</p> <p>2. The metal is obtained from its concentrated ore by the following metallurgical operations:</p>	3

	<p>(a) Roasting: (1) The process of heating of an ore in the presence of air. The metal sulphide is converted to metal oxide along with the evolution of sulphur dioxide gas.</p> <p>(b) Reduction with carbon (1) On heating the metal oxide with carbon, it reduces to free metal with the evolution of carbon monoxide.</p> <p>OR</p> <p>(a) It did not extend beyond calcium and could not include all the known elements. (1+1+1) (b) It assumed that only 56 elements existed in nature and no more elements would be discovered in the future. Later, several elements were discovered with properties that could not fit into the Law of Octaves. (c) Unlike elements were adjusted under the same slot. For example, the adjustment of cobalt & nickel along with fluorine and chlorine on the basis of their chemical properties was not justified.</p>	
17	<p>(a) 'X' is a metal (1/2) (b) Basic oxides (1/2) (c) $X(NO_3)_2$ XSO_4 (1/2+1/2) (d) Ionic/electrovalent (1)</p>	3
SECTION- C		
25	<p>Soaps are sodium or potassium salts of long chain carboxylic acids, while detergents are ammonium or sulphonate salts of long chain carboxylic acids. (1/2+1/2)</p> <p>2. Cleansing action of soap: One part of soap molecule is ionic/hydrophilic and dissolves in water. The other part is non-ionic/carbon chain/hydrophobic part which dissolves in oil. Thus the soap molecules arrange themselves in the form of a micelle. On rinsing with water, soap is washed off, lifting the oily dirt particles with it. (2)</p> <p>3. Soaps do not form lather in hard water because of their reaction with Ca and Mg ions present in hardwater, which form insoluble precipitate called scum. (1)</p> <p>4. Problems due to the use of detergents:</p> <p>(a) Detergents are non-biodegradable (do not easily decompose). (b) Use of detergents leads to water and soil pollution. (c) Detergents can also cause skin problems. (any two) (1/2+1/2)</p> <p>OR</p> <p>(c) (i) Hydrocarbons: The compounds made of only carbon and hydrogen. (1) (ii) Two categories: Saturated and unsaturated (1) (d) Alkanes: The hydrocarbons in which all the bonds are single covalent bonds. Example: Methane (CH_4) (1) Alkenes: The hydrocarbons in which there is a double covalent bond between any two carbon atoms. Example: Ethene (C_2H_4) (1) Alkynes: The hydrocarbons in which there is a triple covalent bond between any two carbon atoms. Example: Ethyne (C_2H_2) (1)</p>	5
26	<p>(a) (i) Hydrogen gas is liberated when an acid reacts with a metal. (1/2) (ii) The presence of hydrogen could be detected by holding a lit matchstick just above the test tube when the gas bubbles are rising and coming out of the solution. The hydrogen gas burns with a pop sound. (1/2)</p> <p>(b) (i) $Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$ (1) (ii) $Zn(s) + 2NaOH(aq) \rightarrow Na_2ZnO_2 + H_2(g)$ (1) (c) The chemical names of salts obtained are (a) zinc chloride ($ZnCl_2$) and (b) sodium zincate (Na_2ZnO_2). (1/2+1/2)</p> <p>(d) Ammonium chloride salt is made from ammonium hydroxide (NH_4OH), a weak base and hydrochloric acid (HCl) a strong acid. The nature of this salt is acidic. (1)</p>	5

SET – C

SECTION - A

Q.NO.	ANSWER	MARKS
1	Acidic Oxides:SO ₂ ,CO ₂ Basic Oxides:MgO,Na ₂ O	1
4	CHE	
4(a)	(a)silver.	1
4(b)	(d)Potassium	1
4(c)	(b)Gold	1
4(d)	(c)Basic copper carbonate	1
12	(b)HCl OR (d) C ₄ H ₈	1
	<p>For question numbers 13 and 14, two statements are given- one labeled <i>Assertion</i> (A) and the other labeled <i>Reason</i> (R). Select the correct answer to these questions from the codes (i), (ii).(iii) and (iv) as given below</p> <p>i) Both A and R are true and R is correct explanation of the assertion.</p> <p>ii) Both A and R are true but R is not the correct explanation of the assertion.</p> <p>iii) A is true but R is false.</p> <p>iv) A is false but R is true</p>	
13	(iv) A is false but R is true.	1

SECTION - B

15	During decomposition reaction a single chemical compound breaks down into two or more different elements or compounds, whereas during chemical combination reaction two or more elements or compounds react to form a single chemical compound. Thus, we can say that chemical decomposition reaction is opposite of chemical combination reaction. (1) Any two chemical equation (1+1)	3
16	i. Roasting is the heating of a metallic ore (generally sulphides) in the presence of air. Calcination is the heating of a metallic ore (generally carbonates or oxides) in the absence of air. (1)	3

	<p>ii. $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$ (Thermite reaction) (1)</p> <p>iii. Anode : Impure copper Cathode : Thin rod or sheet of pure copper Electrolyte : Copper sulphate solution acidified with sulphuric acid. (1)</p> <p>OR</p> <p>The chemical formula of bleaching powder is CaOCl_2 (1/2)</p> <p>Chemical equation for the preparation of bleaching powder: $\text{Ca(OH)}_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$ (1)</p> <p>3. Bleaching powder is used</p> <p>(a) for bleaching cotton and linen in the textile industry/for bleaching wood pulp in paper factories/for bleaching washed clothes in laundry. (any one)</p> <p>(b) as an oxidising agent in many chemical industries.</p> <p>(c) for disinfecting drinking water to make it free from germs. (1/2+1/2+1/2)</p>	
17	<p>i. A, B and C occupy 2nd period of periodic table and 15, 16 and 17 groups respectively.</p> <p>ii. $A > B > C$ because atomic size decreases as we move from left to right across a period.</p> <p>iii. C has electronic configuration 2, 7. It needs only one electron to complete its outermost shell. So it is more reactive.</p>	3
SECTION- C		
25	<p>i. Hydrogen (1/2)</p> <p>ii. Elements A to G belong to the same group of the periodic table since they contain the same number of electrons in their outermost shells.</p> <p>iii. H_2O (Since A is hydrogen)/A_2O (1)</p> <p>iv. Electron dot structure (1)</p> <p>v. Ratio = 4 : 1 (1/2)</p> <p>vi. . Hydrogen (represented by A) is likely to have the smallest atomic radius amongst all the elements in a group. This is because the atomic radius increases while moving down the group. (1/2)</p> <p>OR</p> <p>a)*Increasing order of atomic mass *similarity in chemical properties (1/2+1/2)</p> <p>b)for undiscovered elements (1)</p> <p>c)It resembles both with alkali metals as well as halogens (1)</p> <p>d)(i)atomic size decreases from left to right due to increase in effective nuclear charge.(1) (ii)atomic size increases from top to bottom due to decrease in effective nuclear charge.(1)</p>	5
26	<p>a)Homologous series : A series of carbon compounds in which the successive members differ by $-\text{CH}_2$ group. (1)</p> <p>b)Alkenes:C_nH_{2n} (1) Alkynes:$\text{C}_n\text{H}_{2n-2}$ (1)</p> <p>c)C_2H_2 and C_3H_4 belong to the same homologous series because both are alkynes having same general formula $\text{C}_n\text{H}_{2n-2}$. (1)</p> <p>d)$\text{CH}_2=\text{CH}_2$ (1)</p>	5