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Penciltutor ®

2020 Chemistry 6092/01 Answer Key

Qn	Ans	Explanation
1	D	Styrofoam cup is needed in order to reduce heat loss to the surrounding. Balance is needed to measure the exact amount of carbonate. Stopwatch is not required since the experiment does not require us to monitor rate of change.
2	D	The initial gas collected would be air, which is mainly made of nitrogen.
3	A	The two items required are red litmus paper(for ammonia and chlorine) and wooden splint(for hydrogen and oxygen) Chlorine can be tested with red litmus as the chlorine will bleach the litmus paper.
4	A	Pure substances will have a fixed melting and boiling point. Theya also leave only one deposit on paper chromatography.
5	B	Ar of Argon is 40 while Mr of Carbon dioxide is 44. Thus Argon will diffuse faster. Rate of diffusion also increases when temperature is higher.
6	C	Og has 118 protons and electrons, and 294-118= 176 neutrons. Note that A and D are incorrect as they are referring to nucleons.
7	B	Q has 16 electrons, which gives it an electronic structure of 2,8,6. Thus, it will form a ion with a 2- charge.
8	A	Diamond and Silicon Dioxide both form giant molecular structures in a lattice formation. Graphite's arrangement differs as it forms layers.
9	A	A: Mr = 64, %ofS = 32/64 = 0.5 B: Mr = 98, %ofS = 32/98 = 0.32 C: Mr = 78, %ofS = 32/78 = 0.41 D: Mr = 271, %ofS = 64/271 = 0.23
10	B	Amt of CO2 formed = 1.2/24 = 0.05mol Amt of XCO3 = 0.05mol Mr of XCO3 = 6.25g / 0.05mol = 125g/mol Ar of X = 125 – 12 – 16x3 = 65

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11	A	If 8.0g of Y_2O_3 contains 5.6g of Y, it contains 8.0 – 5.6 = 2.4g of oxygen. Amt of oxygen = 2.4/16 Since Oxygen: Y ratio is 3:2, Amt of Y = 2.4/16 x 2/3
12	A	In exp 1, H_2 gas will be preferentially discharged as it is less reactive than sodium. In exp 2, since Cu is less reactive, it will be preferentially discharged instead of H_2 gas. In exp 3, Ca will be discharged as there are no other cations present.
13	C	Since Magnesium is more reactive than silver, electrons will flow from Mg through the wire to Ag. Thus, Mg loses electrons.
14	D	Reverse reaction would need to overcome both the activation energy and the enthalpy change of the forward reaction. Thus, Activation energy for reverse reaction = 75kJ + 196kJ = 271kJ
15	B	The reaction is combustion, and therefore is exothermic. Thus, enthalpy change is negative. Exothermic reactions release more energy when forming bonds than they absorb when breaking them.
16	C	Catalysts only reduce the activation energy required for the reaction.
17	B	The only factor that changed was the concentration of the acid. Since it is in excess, the yield will not be affected. An increased concentration results in higher no of particles per unit volume and thus a faster reaction.
18	D	A: No change in oxidation state of copper B: I- ion becomes I2 solution. I is oxidized. C: Fe2+ ion becomes Fe3+ ion. Fe is oxidized. D: Manganese is reduced as its oxidation state goes from +7 to +4.

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19	C	Copper does not react with acid. Magnesium will react with acid to form salt and H2 gas. Zinc Oxide will react with acid to form salt and water. Sodium Carbonate will react with acid to give salt, water and carbon dioxide.
20	C	Lead Carbonate can react with nitric acid to give lead nitrate. Copper carbonate can react with nitric acid to give copper nitrate. Nitric acid can react with sodium hydroxide to give sodium nitrate.
21	C	Ammonium chloride cannot be prepared as adding of excess solid means that X has to be a metal/metal oxide/metal carbonate. Barium sulphate cannot be prepared as it is insoluble and will not need to be crystallised. Potassium chloride cannot be formed as Potassium metal, oxide and carbonate are either reactive or soluble in water and thus cannot be added in excess.
22	B	A is incorrect as the formula for calcium chloride is CaCl2 C is incorrect as the equation is not balanced correctly. D is incorrect as the formula for sodium sulphate is Na2SO4
23	B	P belongs in Grp I and has a high tendency to lose electrons. S belongs in Grp 7 and has a high tendency to gain electrons. Hence, both will be highly reactive to one another.
24	A	The equation shown is the displacement equation for halogens. Element X is displacing element Y from its compound and thus element X needs to be more reactive. Thus, the pair of elements would be Chlorine and Iodine, and bromine and iodine.
25	D	A and B are wrong as while transition metals tend to have those traits, not ALL substances with those traits are transition metals. C is wrong as the oxidation state does not affect the ability of a substance to conduct electricity. D is applicable to all transition metals as they have higher melting points.

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26	B	Since it naturally occurs as an element, it belongs below Iron in the reactivity series and will be displaced by Iron, resulting in statement 1 being correct. For the same reason, statement 2 is incorrect and statement 3 is correct. When you see the phrase 'no other chloride of X exists', we understand that X is not a transition metal. Thus, the only charge its ion exists as is X+ and it cannot form the compound X2O3
27	B	Eqn 1, Fe is reduced from Fe3+ to Fe metal, while CO is oxidized to CO2. Eqn 2, C is oxidized as its oxidation state increases from 0 to +4, while O is reduced as its oxidation state decreases from 0 to -2. Only eqn 3 has no change to the oxidation state.
28	D	As surgical instruments need to be rust free, stainless steel is preferred.
29	D	Catalytic convertors oxidise CO to CO2 and reduce NO2 to N2
30	B	Photosynthesis is the only process on this list that uses up carbon dioxide.
31	D	Statement 1 is incorrect as the hydrocarbon is less dense than water and hence will float. Statement 2 is incorrect as Methane is a gas at room temperature. Statement 3 is correct as mixtures can be separated by physical means.

Questions 32 – 40 have been removed from the 2020 syllabus.