

Chemistry, 2017 EC, entrance exam, version 1

Grade 12 · Chemistry · 2017 E.C.

Time allowed: 120 minutes

Questions: 76

Total marks: 76

Name _____ Grade _____ ID No. _____ Date _____

1. Which of the following atomic models is NOT expressed correctly? (1)
- A. Dalton's atomic model. billiard ball model
 - B. Thomson's model of atom .Plum pudding model
 - C. Thomson's model of atom .Planetary model
 - D. Rutherford atomic model .Nuclear model
2. Suppose an unknown element does NOT deflect cathode rays in an electric field but has significant mass. Based on atomic models, which subatomic particle could it be composed of, and how would this impact the element's atomic structure? (1)
- A. Protons; making the nucleus positively charged
 - B. Neutrons; contributing to atomic mass without charge
 - C. Electrons; moving freely in orbitals
 - D. Positrons; leading to an unstable atom
3. A student is studying an atom with a mass number of 23 and an atomic number of 11. Based on nuclear composition, which of the following statements is correct? (1)
- A. The nucleus contains 11 protons and 12 neutrons
 - B. The nucleus contains 11 neutrons and 12 protons
 - C. The nucleus contains only 11 protons
 - D. The nucleus contains 23 neutrons and 11 protons
4. A scientist shines red and blue light on a metal surface. The red light does not eject electrons, but the blue light does. What conclusion can be drawn? (1)
- A. The red light has higher intensity than the red light
 - B. The blue light has a higher frequency and sufficient energy
 - C. The red light has more energy than the blue light
 - D. The photoelectric effect depends only on intensity, not frequency
5. The maximum kinetic energy of photoelectrons ejected from a metal when it is subjected to a radiation of frequency 3.0×10^{15} Hz is 6.63×10^{-19} J. The threshold frequency, ν_0 of the photoelectron of the metal is (1)
- A. 1.0×10^{15} Hz
 - B. 2.0×10^{-15} Hz
 - C. 3.0×10^{15} Hz
 - D. 2.0×10^{15} Hz
6. Which of the following correctly explains Heisenberg's Uncertainty Principle? (1)
- A. The exact position and momentum of a particle can be simultaneously determined.
 - B. The more precisely the position of an electron is known, the less precisely its momentum is known.
 - C. It suggests that electrons move in fixed circular orbits around the nucleus.
 - D. It only applies to macroscopic objects and not quantum particles.

7. Why do ionic compounds typically have higher melting points than covalent compounds? (1)
- A. Due to ionic bonds involve electron sharing.
B. Due to ionic lattices have strong electrostatic forces.
C. Due to covalent bonds are weaker than van der Waals forces.
D. Due to ionic compounds have lower polarity?
-
8. Using Born-Haber cycle, what is the lattice energy of NaCl, given the following data? Sublimation energy of Na = +108 kJ/mol; Ionization energy of Na = +496 kJ/mol; Bond dissociation of Cl₂ = +240 kJ/mol; Electron affinity of Cl = -349 kJ/mol; Enthalpy formation of NaCl = -411 kJ/mol. (1)
- A. -750 kJ/mol
B. -880 kJ/mol
C. -786 kJ/mol
D. -920 kJ/mol
-
9. Which of the following molecules is an exception to the octet rule due to having an incomplete octet? (1)
- A. CO₂
B. BeCl₂
C. NH₃
D. CH₄
-
10. Which molecular shape is expected when a central atom has three bonding pairs and one lone pair? (1)
- A. Trigonal planar
B. Tetrahedral
C. Trigonal pyramidal
D. Trigonal bipyramidal
-
11. According to valence shell electron pair repulsion (VSEPR) theory, what is the molecular shape of PF₅? (1)
- A. Trigonal planar
B. Tetrahedral
C. Trigonal bipyramidal
D. Octahedral
-
12. Which of the following sample routine correctly indicate the extraction of copper from its principal ore? (1)
- A. Concentration of ores → Reduction → Roasting → Purification
B. Concentration of ores → Roasting → Reduction → Purification
C. Concentration of ores → Purification → Roasting → Reduction
D. Purification → Concentration of ores → Reduction → Roasting
-
13. Though Graphite is a non-metal, it conducts electricity. Which of the following is correctly explaining this property? (1)
- A. Due to the presence of delocalized electrons within its structure that allow charge movement.
B. Because it is made of ionic bonds, allowing ions to move freely.
C. Because it contains metallic bonds similar to those in metals.
D. Due to Graphite atoms are arranged randomly, which increases conductivity.
-
14. Which type of intermolecular force is primarily responsible for the high boiling point of water? (1)
- A. Ion-dipole interactions
B. London dispersion forces
C. Hydrogen bonding
D. Covalent bonding
-
15. Which of the following represents the correct molecular orbital electron configuration of O₂? (1)
- A. $\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_x^2 (\pi 2p_y^2 = \pi 2p_z^2) (\pi^* 2p_y^1 = \pi^* 2p_z^1)$
B. $\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_x^2 \pi 2p_y^2 = \pi 2p_z^2 \pi^* 2p_y^2$
C. $\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \pi 2p_y^2 = \pi 2p_z^2 \sigma 2p_x^2 \pi^* 2p_y^2 = \pi^* 2p_z^1$
D. $\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_x^2 \pi 2p_y^2 = \pi 2p_z^2 \pi^* 2p_z^2$

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16. Why does the molecular geometry of ammonia (NH_3) have a trigonal pyramidal shape rather than being a tetrahedral shape? (1)
- A. Due to the presence of lone pair-bonding pair repulsion on nitrogen
 - B. Due to the presence of hydrogen bonding in ammonia molecule.
 - C. Because nitrogen exhibits sp-hybridization
 - D. Because the hydrogen atoms are different in size
-
17. If a molecule has sp hybridization, what will its molecular geometry be? (1)
- A. Tetrahedral
 - B. Trigonal planar
 - C. Linear
 - D. Bent
-
18. If the temperature of a gas decreases while the volume remains constant, what happens to the pressure? (1)
- A. Increases
 - B. Decreases
 - C. Stays the same
 - D. Doubles
-
19. A gas occupies 2 L at 300 K. If the temperature increases to 600 K at constant pressure, what will be its new volume? (1)
- A. 1 L
 - B. 2 L
 - C. 4 L
 - D. 6 L
-
20. Why do solids have a fixed shape? (1)
- A. Their particles are far apart and move freely
 - B. Their particles are tightly packed
 - C. Their particles slide past each other
 - D. Their particles have the highest kinetic energy
-
21. What type of bond you observe in phenol? (Image placeholder) (1)
- A. 5 C-H, 3 C=C, 5 C-C and 1 O-H
 - B. 5 C-H, 3 C=C, 3 C-C, 1 C-O and 1 O-H
 - C. 5 C-H, 6 C-C, 2 C-O and 1 O-H
 - D. 5 C-H, 4 C=C, 2 C-C, 2 C-O and 1 O-H
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22. Which of the following statements about the three states of matter is FALSE? (1)
- A. Solids have definite shape and volume
 - B. Liquid attain the shape of container
 - C. Gases have definite shape and volume
 - D. Gases can be compressed easily
-
23. Which of the following is NOT a factor affecting rate of reaction? (1)
- A. Pressure of gaseous substance
 - B. Concentration of product
 - C. Surface area of solid substance
 - D. Temperature of solid
-
24. In the reaction $\text{X} + 3\text{Y} \rightarrow 2\text{Z}$, how does disappearance rate of Y compare with the rate of appearance of Z? (1)
- A. The rate of disappearance of Y is 1/2 the rate of appearance of Z
 - B. The rate of disappearance of Y is 3/2 the rate of appearance of Z
 - C. The rate of disappearance of Y is 2/3 the rate of appearance of Z
 - D. The rate of disappearance of Y is 1/3 the rate of appearance of Z

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- 25.** How does catalyst generally affect the rate of a chemical reaction? (1)
- A. Positive catalyst promote the rate of reaction by increasing activation energy
 - B. Positive catalyst promote the rate of reaction by decreasing activation energy
 - C. Inhibitor facilitate the rate of reaction with constant activation energy
 - D. Catalyst doesn't affect rate of reaction
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- 26.** If you need to design an experiment to increase the rate of reaction between magnesium and hydrochloric acid, which combination of factors would work best? (1)
- A. Use large pieces of magnesium and decrease temperature
 - B. Crush magnesium block into powder and use a catalyst
 - C. Reduce hydrochloric acid concentration and add a catalyst
 - D. Increase pressure and decrease reactant concentration
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- 27.** What does Le Chatelier's Principle predict when the concentration of reactants in a system at equilibrium is increased? (1)
- A. The equilibrium will shift to favor the reactants.
 - B. The equilibrium will shift to favor the products.
 - C. The equilibrium will not shift
 - D. The reaction will stop.
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- 28.** The value of the equilibrium constant, K_c for the reaction given: $A + 2B \rightleftharpoons 2C$ is 10. What is the value of the equilibrium constant for the reaction: $6C \rightleftharpoons 3A + 6B$? (1)
- | | |
|----------|---------|
| A. 0.010 | B. 1000 |
| C. 0.001 | D. 10 |
-
- 29.** Which elements are commonly found in the alloy of bronze? (1)
- | | |
|----------------------|------------------------|
| A. Copper and tin | B. Iron and carbon |
| C. Aluminum and zinc | D. Nickel and chromium |
-
- 30.** In general, melting point of fat is _____ and melting point of oil is _____ (1)
- | | |
|-------------------|------------------|
| A. Higher, higher | B. Lower, lower |
| C. Higher, lower | D. Lower, higher |
-
- 31.** Given the general structure of organic compounds: $R-CH_2-CH_2CH_2OH$... monohydric alcohol; $R-CH_2-CH_2COOH$... Carboxylic acid; $R-CH_2CH_2CHO$... Aldehyde. Then which general formula derived for monohydric alcohol, carboxylic acid and aldehyde respectively? (1)
- | | |
|--|--|
| A. $C_nH_{2n+1}(OH)$, $C_nH_{2n}(O)_2$, $C_nH_{2n-2}(O)$ | B. $C_nH_{2n}(OH)$, $C_nH_{2n}(O)$, $C_nH_{2n}(O)$ |
| C. $C_nH_{2n}(OH)$, $C_nH_{2n+1}(O)$, $C_nH_{2n}(O)$ | D. $C_nH_{2n}(OH)$, $C_nH_{2n}(O)$, $C_nH_{2n}(O)_2$ |
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- 32.** Why carboxylic acids are more acidic than alcohols both of them have a hydrogen atom attached to an oxygen atom ($-O-H$)? Because: (1)
- A. Carboxylic acids can release proton easier than alcohols.
 - B. The intermolecular force of carboxylic acid is stronger than that of alcohol
 - C. The boiling point of carboxylic acid is higher than that of alcohol
 - D. The surface area of carboxylic acid is greater than that of alcohol

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- 33.** In which of the following compounds, IUPAC name, common name and its structure is NOT correctly matched? (1)
- A. Ethanedioic acid - Oxalic acid - $\text{HO}_2\text{C}-\text{CO}_2\text{H}$
 - B. Propanedioic acid - Malonic acid - $\text{HO}_2\text{CCH}_2\text{CO}_2\text{H}$
 - C. Butanedioic acid - Succinic acid - $\text{HO}_2\text{C}(\text{CH}_2)_2\text{CO}_2\text{H}$
 - D. Pentanedioic acid - Glutaric acid - $\text{HO}_2\text{CCH}_2\text{CO}_2\text{H}$
-
- 34.** Esters are reduced to primary alcohols by special reducing agents. What is the most appropriate reagent used to do this reduction? (1)
- A. $\text{LiAlH}_4/\text{H}^+$
 - B. V_2O_5
 - C. KMnO_4
 - D. Pt/Pd
-
- 35.** Which of the following are the correct postulates of Dalton atomic theory that are inconsistent with modern atomic theory? (1)
- A. All elements are made up of small particles called atoms
 - B. Compounds are formed when atoms of more than one element combine
 - C. Any matter is composed from indivisible atoms
 - D. Atoms of the same elements have identical chemical properties.
-
- 36.** What is the main product when benzene is treated with a mixture of concentrated nitric acid and sulfuric acid? (1)
- A. Nitrobenzene
 - B. Benzaldehyde
 - C. Phenol
 - D. Toluene
-
- 37.** What is the period and group of the element with atomic number 13? (1)
- A. Period 2, Group IIA
 - B. Period 3, Group IIA
 - C. Period 3, Group IIIA
 - D. Period 4, Group IIA
-
- 38.** Which of the following is TRUE about the periodic properties of elements? (1)
- A. Alkali metals lose electrons more easily due to lower ionization energy
 - B. Halogens gain electrons less readily due to higher electron affinity
 - C. Both alkali metals and halogens are more readily to lose electron at arbitrary condition
 - D. Alkali metals gain electrons more readily than halogens.
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- 39.** Which of the following statements is TRUE about polar covalent molecules? (1)
- A. They have equal sharing of electrons
 - B. They always involve symmetrical geometry
 - C. They dissolve easily in benzene.
 - D. They have unequal sharing of electrons.
-
- 40.** A Grade 12 student claims that hydrogen bonding and dipole-dipole forces are equally strong. How would you assess this statement? (1)
- A. The student is correct because both forces occur between polar molecules.
 - B. The student is incorrect because dipole-dipole forces are weaker than hydrogen bonding.
 - C. The student is incorrect because dipole-dipole interactions only exist in ionic compounds.
 - D. The student is correct because both forces require permanent dipoles.
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- 41.** Which of the following is the best example of the Law of Conservation of Mass? (1)
- A. 10 g of hydrogen reacts with 80 g of oxygen to form 90 g of water.
 - B. 10 g of hydrogen reacts with 40 g of oxygen to form 30 g of water.
 - C. 10 g of hydrogen reacts with 10 g of oxygen to form 5 g of water.
 - D. 10 g of hydrogen reacts with 5 g of oxygen to form 20 g of water.

42. Which of the following is TRUE about conjugated acid-base pair? (1)
- A. The stronger the acid, the weaker its conjugate acid.
 - B. The stronger the acid, the stronger its conjugate base.
 - C. Conjugated acid has one more hydrogen than its base.
 - D. Conjugated base has one fewer negative charge than its acid.
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43. For the reaction given: $\text{HOBr} + \text{OH}^- \rightleftharpoons \text{H}_2\text{O} + \text{OBr}^-$, which of the following is the correct conjugated acid-base pair? (1)
- A. $\text{HOBr} / \text{OBr}^-$
 - B. $\text{OBr}^- / \text{OH}^-$
 - C. $\text{OH}^- / \text{H}_3\text{O}^+$
 - D. $\text{OBr}^- / \text{H}_2\text{O}$
-
44. Given the reaction: $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$. How can H_2O act as both an acid and a base? (1)
- A. By donating a proton and accepting a proton.
 - B. By donate a proton only
 - C. By accepting a proton only
 - D. By remains neutral
-
45. A 0.20 M solution of HF has a K_a of 6.6×10^{-4} . How would you determine the pH of this solution? (1)
- A. Solve $[\text{H}_3\text{O}^+]$ then use $\text{pH} = -\log[\text{H}_3\text{O}^+]$
 - B. Assume $[\text{H}_3\text{O}^+] = [\text{OH}^-]$ and solve pH
 - C. Use $K_a = [\text{HA}]/[\text{H}_3\text{O}^+]$ to find pH
 - D. Assume $\text{pH} = 7$ because HF is a weak acid
-
46. A solution of NaOH has initial concentration of 0.01 M. Calculate the $[\text{OH}^-]$ and determines the pOH. (1)
- A. $[\text{OH}^-] = 0.01 \text{ M}$, $\text{pOH} = 2$
 - B. $[\text{OH}^-] = 0.01 \text{ M}$, $\text{pOH} = 3$
 - C. $[\text{OH}^-] = 0.001 \text{ M}$, $\text{pOH} = 2$
 - D. $[\text{OH}^-] = 0.1 \text{ M}$, $\text{pOH} = 1$
-
47. Two solutions A and B have pH values of 2 and 4 respectively. Which of the following is correctly described? (1)
- A. Solution A is more basic than solution B.
 - B. The concentration of H^+ in solution B is 100 times greater than that of solution A.
 - C. The concentration of H^+ in solution A is 1000 times greater than that of solution B.
 - D. The concentration of H^+ in solution A is 100 times greater than that of solution B.
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48. Which of the following statements best evaluates the impact of increasing temperature on the ionization constant of water? (1)
- A. The value of K_w remains unchanged, and the pH of pure water stays constant.
 - B. The value of K_w increases, leading to an increase in both $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$.
 - C. The value of K_w decreases, reducing the ionization of water and increasing the pH.
 - D. The value of K_w is unaffected by temperature, but $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$ change independently.
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49. If the pH of a buffer solution is lower than the $\text{p}K_a$ of its component, which of the following is TRUE? (1)
- A. The concentration of acid is greater than the conjugate base.
 - B. The concentration of acid is less than the conjugate base.
 - C. The buffer has lost its buffering capacity
 - D. The solution is neutral
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50. Which of the following is NOT a component of a buffer system? (1)
- A. A weak acid/strong conjugate base
 - B. A weak base/strong conjugated acid
 - C. A strong acid/weak conjugated base
 - D. A weak base/its salt

51. A buffer solution is prepared by mixing an acid (HA) and its salt (NaA). If the concentration of A^- increases relative to HA, which of the following expressions should be used to determine the resulting pH? (1)

A. $pH = \log[H^+]$ B. $pH = pK_a + \log([A^-]/[HA])$
C. $pOH = pK_a + \log([HA]/[A^-])$ D. $pH = [H^+] \times [OH^-]$

52. A buffer solution is made by mixing NH_4Cl and NH_3 . Which species will react with added H^+ ions? (1)

A. NH_4^+ B. NH_3
C. Cl^- D. H_2O

53. What is the pH of a buffer solution containing equimolar of acetic acid and sodium acetate having $pK_a = 4.76$? (1)

A. 4.46 B. 4.76
C. 5.06 D. 7.00

54. A compound having molecular formula C_7H_8 that does not decolorize in Br_2 in CCl_4 or $KMnO_4$ solution most likely belongs to which class of hydrocarbons? (1)

A. Alkynes B. Aromatic hydrocarbons
C. Alkanes D. Alkenes

55. Which of the following salts undergoes anionic hydrolysis, resulting in a basic solution? (1)

A. Sodium formate ($HCOONa$) B. Potassium chloride (KCl)
C. Sodium sulfate (Na_2SO_4) D. Ammonium nitrate (NH_4NO_3)

56. A student prepares a 2.0 M HCl solution by dissolving hydrochloric acid in water. If they were to prepare the same molarity solution using sulfuric acid (H_2SO_4), what would be its normality? (1)

A. 1.0 N B. 2.0 N
C. 4.0 N D. 3.0 N

57. What is the sum of coefficients of reactants and products after the following ionic equation gets balanced in acidic media? $MnO_4^- + Fe^{2+} \rightarrow Mn^{2+} + Fe^{3+}$ (1)

A. 19 B. 23
C. 24 D. 10

58. What is the difference between electrolytic cell and galvanic cell? (1)

A. In a galvanic cell, non-spontaneous chemical reactions take place.
B. In an electrolytic cell, non-spontaneous chemical reactions take place.
C. In a galvanic cell, the anode is positive and the cathode is negative.
D. Galvanic cells convert electrical energy into chemical energy.

59. What is the half-reaction at the anode during the electrolysis of copper sulfate ($CuSO_4$) solution using copper electrode? (1)

A. $Cu^{2+} + 2e^- \rightarrow Cu$ B. $Cu \rightarrow Cu^{2+} + 2e^-$
C. $4OH^- \rightarrow O_2 + 2H_2O + 4e^-$ D. $2Cl^- \rightarrow Cl_2 + 2e^-$

60. Which of the following is the correct increasing order of the atomic size of: Mg^+ , Na , Si^{3+} , and Al^{2+} ? (1)

A. $Na < Mg^+ < Al^{2+} < Si^{3+}$ B. $Al^{2+} < Mg^+ < Na < Si^{3+}$
C. $Si^{3+} < Al^{2+} < Mg^+ < Na$ D. $Si^{3+} > Al^{2+} > Na > Mg^+$

61. What gases are produced at the cathode and anode respectively if concentrated hydrochloric acid is electrolyzed? (1)
- A. Hydrogen gas and Oxygen gas
B. Chlorine gas and oxygen gas
C. Hydrogen and chlorine
D. Hydrogen and water
62. Which of the following best describes a line spectrum? (1)
- A. Continuous range of colors without any gap.
B. A spectrum that shows only specific wavelengths of light.
C. A spectrum emitted only by solids at high temperature.
D. A black and white representation of visible light.
63. What are the volume of H_2 and O_2 gases at 25°C and 1.00 atm that will be collected at the cathode and anode, respectively if $\text{Na}_2\text{SO}_4(\text{aq})$ solution is electrolyzed for 2 hours with 10 amperes current? (1)
- A. 9 L of oxygen and 4.5 L of hydrogen
B. 6 L of oxygen and 12 L of hydrogen
C. 9 L of hydrogen and 4.5 L of oxygen
D. Equal volume of oxygen and hydrogen gases are produced
64. A student is tasked with calculating the mass of copper deposited when a current is passed through a copper(II) sulfate solution for 3 hours using 5 amperes of current. Using Faraday's second law of electrolysis, how would they derive the formula for mass of copper deposited in terms of current, time, and the equivalent mass of copper? (1)
- A. $m = V i t$
B. $m = M I t / n F$
C. $m = z Q$
D. $m = n F$
65. What is the primary function of a sacrificial anode in corrosion protection? (1)
- A. To increase the rate of corrosion in metal structures.
B. To facilitate the oxidation reaction of other metal keeping itself at cathode.
C. To sacrifice itself to protect another metal from corrosion.
D. To enhance the electrical conductivity of the protected metal
66. When a piece of metal A is placed in a solution containing ions of B, metal B plates out on the piece of A. Which metal is being oxidized and reduced respectively? (1)
- A. Metal A and metal B
B. Metal B and metal A
C. Both metal A and metal B are equally reduced
D. Both metal A and metal B are equally oxidized
67. Given the reaction: $\text{Mg}(\text{s}) + \text{Zn}^{2+}(\text{aq}) \rightarrow \text{Mg}^{2+}(\text{aq}) + \text{Zn}(\text{s})$. Which of the following is the correct cell notation? (1)
- A. $\text{Zn}^{2+}(\text{aq})/\text{Zn}(\text{s}) // \text{Mg}(\text{s})/\text{Mg}^{2+}(\text{aq})$
B. $\text{Zn}^{2+}(\text{aq})/\text{Zn}(\text{s}) // \text{Mg}^{2+}(\text{aq})/\text{Mg}(\text{s})$
C. $\text{Mg}(\text{s})/\text{Mg}^{2+}(\text{aq}) // \text{Zn}(\text{s})/\text{Zn}^{2+}(\text{aq})$
D. $\text{Mg}(\text{s})/\text{Mg}^{2+}(\text{aq}) // \text{Zn}^{2+}(\text{aq})/\text{Zn}(\text{s})$
68. Which of the following is TRUE about the reaction given below? $2\text{Au}(\text{s}) + 3\text{Ca}^{2+}(0.1\text{M}) \rightarrow 2\text{Au}^{3+}(0.1\text{M}) + 3\text{Ca}(\text{s})$ (1)
- A. There are a total of 2 electron transfer in overall reaction
B. The value of ΔG° is large positive value making the reaction spontaneous
C. The forward reaction is non-spontaneous
D. Gold can reduce calcium spontaneously

69. How does industrial chemistry contribute to environmental sustainability? (1)
- A. By promoting the excessive use of fossil fuel.
 - B. By developing eco-friendly materials and sustainable production processes.
 - C. By increasing chemical waste production.
 - D. By reducing the use of recycling methods in manufacturing.
-
70. Which one of the following best describes the formation of pi (π) bond? (1)
- A. They are formed by sideways overlap of p orbitals.
 - B. They are formed by the axial overlaps of s or d orbitals.
 - C. They are formed by the sideways overlaps of an s and p orbitals.
 - D. They are formed by the parallel overlaps of either s or p orbitals.
-
71. Which of the following are the correct steps in sulfuric acid (98%) manufacturing process? (1)
- A. $S \rightarrow SO_2 \rightarrow H_2S_2O_2 \rightarrow H_2SO_4$
 - B. $S \rightarrow SO_2 \rightarrow SO_3 \rightarrow H_2S_2O_2 \rightarrow H_2SO_4$
 - C. $S \rightarrow SO_2 \rightarrow SO_3 \rightarrow H_2S_2O_7 \rightarrow H_2SO_4$
 - D. $S \rightarrow SO_2 \rightarrow SO_3 \rightarrow H_2S_2O_7 \rightarrow H_2SO_3$
-
72. In which of the following aqueous solution provides the same electrolysis with water, when O_2 and H_2 are formed at anode and cathode respectively? (1)
- A. Concentrated HCl solution
 - B. $AgNO_3$ solution
 - C. $CuSO_4$ solution
 - D. Diluted H_2SO_4 solution
-
73. Thermoplastic polymers are those which melt when heated and re-solidify when cooled. Which of the following polymers is NOT a thermoplastic polymer? (1)
- A. Dacron
 - B. Bakelite
 - C. Polyethylene
 - D. Teflon
-
74. What is the molar mass of a polyethylene sample, $[-CH_2-CH_2-]_n$, when $n = 4600$? (Atomic mass $H=1$, $C=12$). (1)
- A. 1.288×10^3 g/mol
 - B. 1.288×10^5 g/mol
 - C. 1.196×10^3 g/mol
 - D. 1.196×10^4 g/mol
-
75. Given the monomers: i. $HO-CH_2CH_2-OH$; ii. $HOOC-CH_2CH_2-COOH$. Which of the following polymer can be synthesized from these monomers? (1)
- A. $[-O-CH_2CH_2-OOC-CH_2-CH_2-CO-]_n$
 - B. $[-OC-C_6H_4-COO-(CH_2)_2O-]$
 - C. $[-NH_2CH(R)(COOH)-]$
 - D. $[-NH-CH_2-CO-NH-CH_2CO-]$
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76. An unknown salt when heated with a Bunsen flame produced a bright-yellow flame. An aqueous solution of this salt when reacted with dilute HCl released a gas that turns limewater milky. Upon addition of calcium chloride solution to an aqueous solution of this salt, a white precipitate is formed. What is the unknown salt? (1)
- A. Na_2CO_3
 - B. NH_4NO_3
 - C. $Al_2(SO_4)_3$
 - D. CH_3COOH

— END OF EXAMINATION —