EDUCATIONAL ASSESSMENT AND EXAMINATIONS SERVICE (EAES)

ETHIOPIAN SECONDARY SCHOOL LEAVING CERTIFICATE EXAMINATION (ESSLCE)

Hamlie, 2016 E.C / July, 2024 G.C

Subject Code: 05 **Booklet Code: 197**

Item Number: 80 **Time Allowed: 2:$\frac{1}{2}$ Hours**

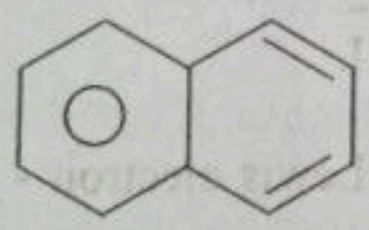
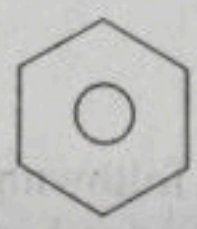
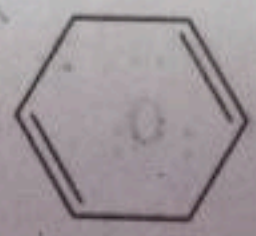
1. What are the molecular formulae of an alkene and alkyne containing seven carbon atoms, respectively?

A. C_7H_{14} and C_7H_{12}
B. C_7H_{16} and C_7H_{14}
C. C_7H_{14} and C_7H_{16}
D. C_7H_{12} and C_7H_{14}

2. Which of the following is the **CORRECT** method of preparation of alkenes in the laboratory?

A. Alkylation of sodium acetylide with a primary alkyl halide.
B. Heating of sodium salt of an organic acid with soda lime.
C. Reaction of halogenated alkane with sodium.
D. Dehydration of alcohols with concentrated sulfuric acid.

3. Which of the following is the **CORRECT** structure of benzene?

A. 
C. 
B. 
D. 

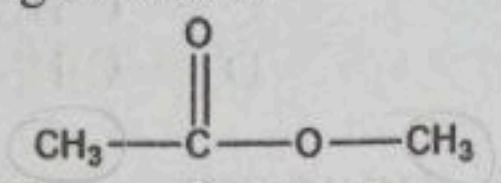
4. Which of the following is the product of fractional distillation of crude oil?

A. Producer gas
B. Naphthalene
C. Water gas
D. Kerosene

5. What is the molecular formula and IUPAC name of a saturated monocarboxylic acid having six carbon atoms?

A. $C_5H_{11}COOH$, heptanoic acid
B. $C_6H_{13}COOH$, heptanoic acid
C. $C_5H_{11}COOH$, hexanoic acid
D. $C_6H_{13}COOH$, hexanoic acid

6. Given the following structure:



What is the IUPAC name for the above structure?

A. Methyl ethanoate
B. Ethyl ethanoate
C. Propyl formate
D. Ethyl acetate

7. During summer, the average value for the temperature measured in a certain chemistry laboratory is 298.15 K. How many decimal places are there in the measured value?

A. 5
B. 3
C. 2
D. 1

8. Which of the following is the **CORRECT** Lewis electron - dot symbol of MgO? (Atomic number: Mg = 12 and O = 8)

A. Mg^{+} $:\ddot{O}:^{2-}$

B. Mg^{+2} $:\ddot{O}:^{-}$

C. Mg^{+} $:\ddot{O}:^{-}$

D. Mg^{+2} $:\ddot{O}:^{2-}$

9. A student collected four beakers in his/her laboratory and added some small amounts of the following: naphthalene to the first, graphite to the second, iodine to the third and alcohol to the fourth. If they added equal volume of water to each of the above beakers and shake each beaker, which of the following will be their observation?

A. There will be dissolution in the first three breakers.
B. Water will dissolve iodine rather than graphite.
C. Water will dissolve the whole given chemicals in the four beakers.
D. There will be dissolution of alcohol in the fourth beaker.

10. Which of the following explanations about reversible and irreversible reactions is **CORRECT**?

A. A reaction that has only a forward reaction or a reverse reaction is known as a reversible chemical reaction.
B. A reaction that proceeds from reactant to product and from product to reactant is known as an irreversible reaction.
C. Chemical reactions that proceed only towards the formation of a product are known as irreversible reactions.
D. Chemical reactions that proceed only towards the formation of a product are known as reversible reactions.

11. Consider the following three steps:

Step: 1 Electrolysis of water and fractional distillation of air
Step: 2 Passing hot mixture of gases through a condenser
Step: 3 Introducing hydrogen and nitrogen gases in a chamber containing iron particles at a temperature of 300 - 500 °C and a pressure of 15 - 25 MPa

Which of the following is the **CORRECT** sequence involved during the industrial production of ammonia using the Haber process?

A. Step 1 → Step 3 → Step 2
B. Step 2 → Step 3 → Step 1
C. Step 2 → Step 1 → Step 3
D. Step 1 → Step 2 → Step 3

12. Which of the following is a physical property of nitric acid, HNO_3?

A. On exposure to light, it turns brown.
B. Nitric acid is a corrosive chemical.
C. Nitric acid has a pungent smell.
D. It forms large number of salts.

13. Which of the following is the **CORRECT** explanation about herbicides?

A. Selective herbicides control specific weed species, leaving the desired crop unharmed.
B. Organochlorine compounds are the most common herbicide substances.
C. Herbicides are substances that are used to control unwanted insects.
D. Herbicides are substances that are used to enhance the growth of important plants.

14. A student collected the following information from the community on the preparation of the local alcoholic drink "ARAKI":

Step: 1	Distillation of the liquid mixture in traditional ways
Step: 2	Adding a proportional amount of water to liquidity the tick dough - like mixture and leaving for 1-2 days for further fermentation
Step: 3	"Bikel" preparation from barely, the starter ("Tinses") preparation by mixing the Bikel with Gesho (Rhamnuspronoides) powder and fermentation of the starter for few days
Step: 4	Baking of bread from different ingredients and breaking down the bread and mixing with the fermented starter and leaving for fermentation for couple of days

Which of the following is the correct procedure for the preparation of Araki?

A. Step - 2 → Step - 4 → Step - 3 → Step – 1
B. Step - 2 → Step - 3 → Step - 4 → Step – 1
C. Step -3 → Step - 4 → Step - 2 → Step – 1
D. Step - 4 → Step - 3 → Step - 2 → Step - 1

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15. Which one of the following synthetic polymers is used to make squeeze bottles, plastic wrapping and electrical insulation?

A. Polypropylene
B. Polymethyl methacrylate
C. Polyvinylchloride
D. Polyethylene

16. Which of the following descriptions of the property of a covalent compound is **CORRECT**?

A. Covalent compounds have low melting and boiling points.
B. Most covalent compounds are solids at room temperature.
C. Most covalent compounds are soluble in water.
D. Covalent compounds are non-volatile.

17. The attractive force between molecules is known as _____.

A. nuclear force
B. intermolecular force
C. lattice force
D. intramolecular forces

18. The hybridization of the central atom xenon (Xe) in xenon tetraflouride, XeF_4, is sp^3d^2. Which of the following is the shape of XeF_4?

A. Octahedral
B. Square planar
C. Tetrahedral
D. Seesaw shape

19. Which of the following is the **CORRECT** electron configuration of a peroxide ion, O_2^{2-}?

A. $(\sigma_{1s})^2(\sigma^*_{1s})^2(\sigma_{2s})^2(\sigma^*_{2s})^2(\sigma_{2px})^2(\pi_{2py}{}^2 = \pi_{2pz}{}^2)(\pi^*_{2py})^2(\sigma^*_{2z})^2$
B. $(\sigma_{1s})^2(\sigma^*_{1s})^2(\sigma_{2s})^2(\sigma^*_{2s})^2(\sigma_{2px})^2(\pi_{2py}{}^2 = \pi_{2pz}{}^2)(\pi^*_{2py}{}^2 = \pi^*_{2pz}{}^2)$
C. $(\sigma_{1s})^2(\sigma^*_{1s})^2(\sigma_{2s})^2(\sigma^*_{2s})^2(\sigma_{2px})^2(\pi_{2py}{}^2 = \pi_{2pz}{}^2)(\pi^*_{2x})^2$
D. $(\sigma_{1s})^2(\sigma^*_{1s})^2(\sigma_{2s})^2(\sigma^*_{2s})^2(\sigma_{2px})^2(\pi_{2py}{}^2 = \pi_{2pz}{}^2)$

20. Consider the following reaction between nitrogen (N_2) and oxygen (O_2):

$$N_2(g) + O_2(g) \rightarrow 2NO(g)$$

If the rate of disappearance of N_2 is 2.5×10^{-6} M/s, what is the rate of reaction for the formation of NO?

A. 5.0×10^{-6} M/s
B. 1.25×10^{-3} M/s
C. 2.50×10^{-3} M/s
D. 2.50×10^{-6} M/s

21. Which of the following is a Lewis acid?

A. SO_4^{2-}
B. SO_3^{2-}
C. BF_3
D. NH_3

22. The pH of a 0.10 M solution of an aqueous solution of a certain acid is 3. What is the value of acid ionization constant (K_a) of this acid?

A. 1.0×10^{-7}
B. 1.0×10^{-5}
C. 1.0×10^{-3}
D. 1.0×10^{-1}

23. The shift in the position of equilibrium caused by the addition of an ion already involved in the reaction is known as _____.

A. common - ion effect
B. buffer - ion effect
C. hydrolysis - effect
D. titration -effect

24. Which of the following is **CORRECT** about equivalents of acids and bases?

A. The volume of an acid or base required to reach equivalence point during acid - base titration reaction.
B. The number of moles of an acid or base required to form a one molar aqueous acidic or basic solution.
C. It is the amount of a substance that is required to react with one mole of hydroxide ions in redox reactions.
D. It is the amount of a substance that is required to react with one mole of hydrogen ions in acid - base reactions.

25. A 250 mL solution is formed from 24.5 g of sulfuric acid (H_2SO_4). What is the normality of this solution? (Mt. wt. $H_2SO_4 = 98$ g/mol)

A. 4.00 N
B. 2.00 N
C. 0.250 N
D. 0.125 N

26. Which of the following reaction is used for the preparation of bases?

A. Reaction of metal hydroxides with dilute acids.
B. Reaction of active metal oxides with water.
C. Heating of a salt with a non - volatile acid.
D. Heating of carbonates with dilute acids.

27. Which of the following salts is used in the treatment of waste water?

A. $CaCO_3$
B. $BaSO_4$
C. $FeCl_3$
D. KNO_3

28. A student prepared two beakers, each containing 100 mL of water. The student dissolved 10 mL of concentrated HCl in the first beaker and 10 mL of concentrated CH_3COOH in the second beaker, which of the following would occur in the solution?

A. In the first beaker, a large fraction of HCl dissociates into ions and in the second beaker, a small fraction of CH_3COOH dissociates into ions.
B. In the first beaker, a small fraction of HCl dissociates into ions and in the second beaker, a large fraction of CH_3COOH dissociates into ions.
C. There is no dissociation or ionization of the HCl and CH_3COOH in both the first and second beakers.
D. The amount of HCl dissociated in the first beaker and the amount of CH_3COOH dissociated in the second beaker are identical.

29. Consider the following five - steps during the extraction of aluminum from its bauxite ore by the Hall process:

I. Treating the mixture of an aqueous solution of sodium silicate and aluminate with an acid
II. Heating aluminum oxide strongly in a furnace
III. Heating the ore with sodium hydroxide solution
IV. Conversion of aluminum oxide to soluble sodium aluminate
V. Electrolysis of molten mixture of cryolite and aluminum oxide

Which of the following is the **CORRECT** sequence of production?

A. III, IV, I, II and V
B. IV, II, I, III and V
C. V, I, II, IV and III
D. II, I, III, IV and V

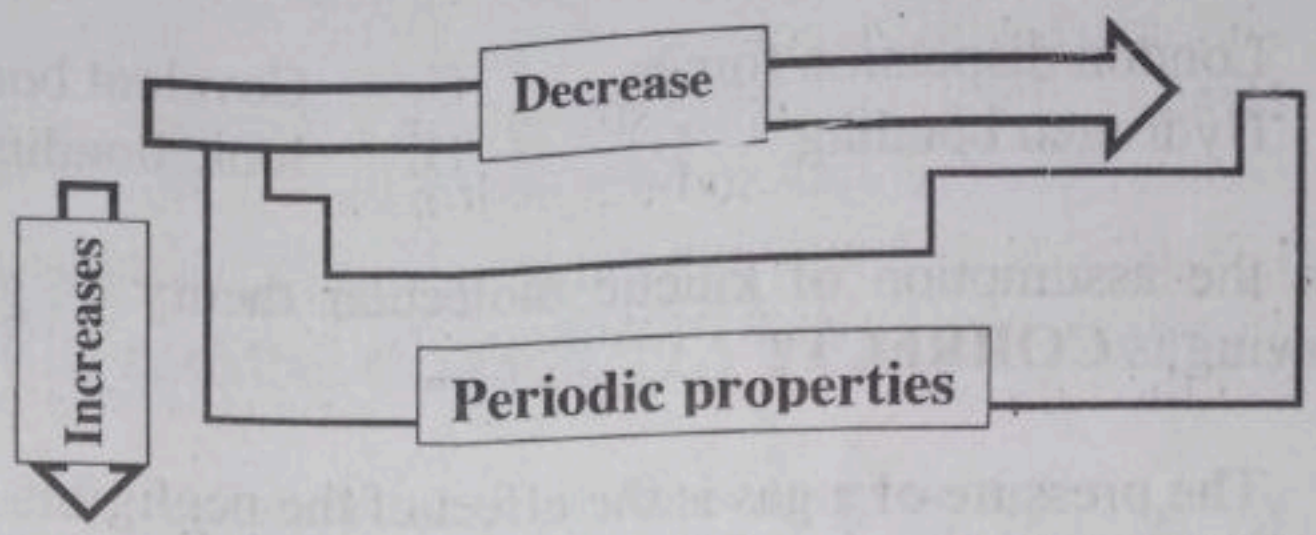
30. Which of the following food preservation methods leaves a product without loss of aroma or flavor?

A. Vacuum - packing
B. Freeze - drying
C. Freezing
D. Melting

31. The electronic configuration of an element in the periodic table is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$. In which block does this element belong?

A. f - block
B. d - block
C. p - block
D. s - block

32. Consider the following chart of general periodic properties in the periodic table:



From the given periodic properties, which one **CORRECTLY** agrees with the periodic trend in the chart?

A. Electronegativity
B. Electron affinity
C. Ionization energy
D. Atomic radius

33. Which of the following is **CORRECT** about the formation of a covalent bond? A covalent bond is formed

A. between positively and negatively charged ions.
B. between mobile and stationary electrons.
C. by the sharing of valence electrons.
D. by the transfer of valence electrons.

34. The molecule of carbon tetrachloride (CCl_4) has four polar (C – Cl) bonds. However, CCl_4 is a non-polar molecule. Which of the following explains the reason for the observed property of CCl_4?

A. The molecule is non-polar because of the presence of four polar C- Cl bonds in the molecule.
B. The molecule is non-polar because of the difference in electronegativity between carbon and chlorine.
C. Even though the bond in CCl_4 is polar, the net dipole moment of the molecule is different from zero.
D. Even though the bond in CCl_4 is polar, the net dipole moment of the molecule is zero.

35. Which of the following is responsible for the unusual high boiling points of HF, H_2O and NH_3?

A. London dispersion forces
B. Hydrogen bonding
C. Covalent bonding
D. Ionic bonding

36. From the assumption of kinetic molecular theory of gases, which of the following is **CORRECT**?

A. The pressure of a gas is the effect of the negligible volume of the gas compared to the total volume of the gas.
B. The average kinetic energy of gas particles is inversely proportional to the absolute temperature of the gas.
C. There are some forces of attraction or repulsion between gas particles.
D. Under ordinary conditions, the total volume of gas molecules is much smaller than the total volume of gas.

37. Which of the following is **CORRECT** about the phase change observed in water?

A. Water starts to evaporate at the boiling point and condenses at the melting point.
B. When a solid ice is heated, it is changed to liquid water without melting.
C. At the boiling point temperature, water exists in three different physical states.
D. At the melting point of ice, the temperature remains constant.

38. Given the symbols of the three subatomic particles; electrons (e^-), protons (p^+) and neutrons (n^o), which of the following is the **CORRECT** comparison of the absolute masses of protons, electrons and neutrons?

A. Mass of e^- > mass of p^+ = mass of n^o
B. Mass of e^- = mass of p^+ > mass of n^o
C. Mass of e^- < mass of p^+ < mass of n^o
D. Mass of e^- > mass of p^+ > mass of n^o

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39. In the modern periodic table, what is the name of the group that contains the most electronegative elements?

A. Alkali
B. Halogens
C. Chalcogens
D. Noble gases

40. A given element has atomic number of 55 and mass number of 133. Which of the following describes **CORRECTLY** the property of this element?

A. The non-metallic character of the element is high.
B. The metallic character of the element is high.
C. The element has high electron affinity.
D. The element has high electronegativity.

41. Consider the mechanism for the decomposition of N_2O_5 to NO_2:

First step: $2N_2O_5\,(g) \rightleftharpoons N_4O_{10}\,(g)$ fast

Second step: $N_4O_{10}\,(g) \rightarrow N_2O_3\,(g) + 2\,NO_2\,(g) + O_3\,(g)$ slow

Third step: $N_2O_3\,(g) + O_3\,(g) \rightarrow 2\,NO_2\,(g) + O_2\,(g)$ fast

Overall: $2N_2O_5\,(g) \rightarrow 4\,NO_2\,(g) + O_2\,(g)$

Which step is the rate - determining step?

A. Third step
B. First step
C. The overall step
D. Second step

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42. Consider the following reaction:

$$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$$

The equilibrium concentrations of gaseous nitrogen, oxygen and nitrogen monoxide in a sealed container are as follows: $[N_2] = 1 \times 10^{-5}$ M, $[O_2] = 2 \times 10^{-5}$ M and $[NO] = 4 \times 10^{-5}$ M. What is the value of the equilibrium constant for the reaction?

A. 8
B. 2
C. 16
D. 4

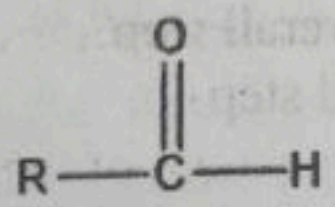
43. At a certain temperature the following reaction has an equilibrium constant Kc = 12.4.

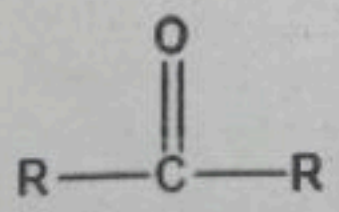
$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

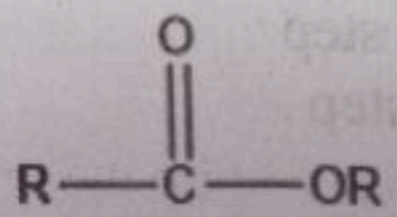
If $[N_2] = 2.0$ M, $[H_2] = 2.0$ M and $[NH_3] = 10.0$ M, to which direction will the reaction proceed to reach equilibrium?

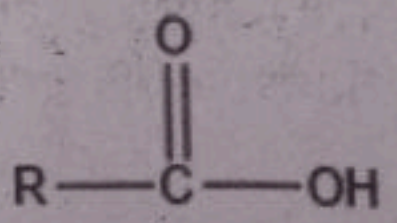
A. The reaction will proceed to the reverse direction.
B. The reaction is at a chemical equilibrium.
C. The equilibrium is independent of the concentration.
D. The reaction will proceed to the forward direction.

44. Which of the following is the general formula for saturated monocarboxylic acids? (R is an alkyl group)

A. 

B. 

C. 

D. 

45. Upon standing long, "Tella" or "Tej" turns sour. Which of the following is the **CORRECT** explanation for the observed effect?

A. The reduction of alcohol to an acid.
B. The oxidation of alcohol to an acid.
C. Addition reaction of alcohol with an acid.
D. Decomposition reaction of alcohol.

46. A student is interested in determining the content of a leaf from his/her environment and performed the following.

Step: 1 He/she dried the leaves up in sun light
Step: 2 Evaluated the work and draw conclusions
Step: 3 Collected leaves from the tree around his village
Step: 4 He/she boiled the leaves and collected the leaves extracted
Step: 5 Analyze the content of the leaves extracted using an instrument

Which of the following is the **CORRECT** procedure if a student developed an experimental skill?

A. Steps: $3 \rightarrow 5 \rightarrow 4 \rightarrow 1 \rightarrow 2$
B. Steps: $3 \rightarrow 4 \rightarrow 1 \rightarrow 5 \rightarrow 2$
C. Steps: $3 \rightarrow 1 \rightarrow 4 \rightarrow 5 \rightarrow 2$
D. Steps: $3 \rightarrow 1 \rightarrow 5 \rightarrow 4 \rightarrow 2$

47. Which of the following characteristics of an electromagnetic radiation is **CORRECT**?

A. The speed of an electromagnetic radiation decreases with increase in its wavelength.
B. The speed of an electromagnetic radiation increases with increase in its frequency.
C. The speed of an electromagnetic wave is independent of the nature of the medium it travels through.
D. The wave length of an electromagnetic radiation is directly proportional to its frequency.

48. "The hydrogen atom moves in a fixed circular orbit associated with allowable energy states". This is called _____.

A. Planck's theory
B. Bohr's theory
C. Pauli's principle
D. Aufbau's principle

49. Which of the following is the core electron configuration of the metal ion in ferric sulfate, $Fe_2(SO_4)_3$? (Atomic Number of Fe = 26)

A. $[Ar]\ 4s^2 3d^3$
B. $[Ar]\ 4s^2 3d^6$
C. $[Ar]\ 3d^5$
D. $[Ar]\ 3d^6$

50. A chemical bond that results from the attractive force between shared electrons and nonmetal nucleus is called _____.

A. covalent bond
B. ionic bond
C. hydrogen bond
D. metallic bond

51. Which of the following is peroxide?

A. ZnO
B. FeO
C. K_2O
D. CaO_2

52. Among the following which one is a ternary acid?

A. HBr
B. HCl
C. H_2SO_4
D. H_2S

53. A student collected few lemons from his/her backyard, brought it to their class and prepared a lemon juice in a beaker. They got blue and red litmus papers from his/her teacher and placed few drops of the lemon juice both on the red and blue litmus papers. What will be their observation on the litmus papers?

A. The blue litmus paper as well as the red litmus paper will maintain their color.
B. The blue litmus paper and the red litmus paper will turn colorless.
C. The red litmus paper will turn to blue and the blue litmus paper will maintain its color.
D. The blue litmus paper will turn red and the red litmus paper will maintain its color.

54. What is the pOH of pure water at 37°C, where K_w equals $2.5.0 \times 10^{-14}$ and its pH is 6.8? ($\log^{2.5} = 0.4$)

A. 8.8
B. 8.2
C. 6.8
D. 7.5

55. The hydrogen ion concentration in a certain solution at 25 °C is 1.0×10^{-8} M. What is the pOH of this solution?

A. 8
B. 10
C. 2
D. 6

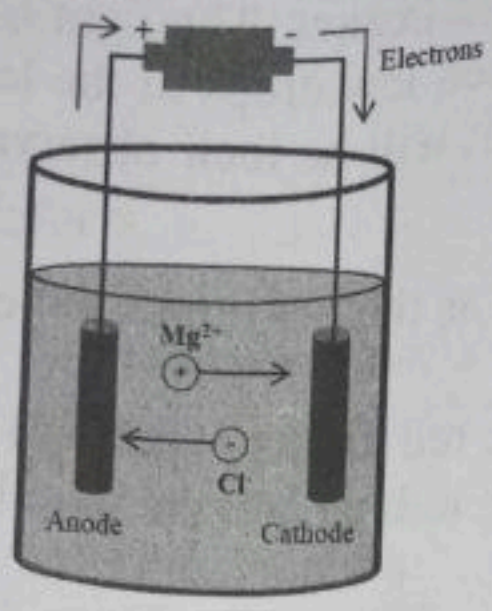
56. Given the following oxidation - reduction reaction:

$$H_2S + HNO_3 \rightarrow S + NO + H_2O$$

Which of the following is **CORRECT** from the given equation?

A. The oxidation number of N is increased.
B. The oxidation number of S is decreased.
C. S is a reducing substance.
D. HNO_3 is an oxidizing agent.

57. Consider the following diagram of an electrolytic cell:



Which of the following is **CORRECT** from the given diagram?

A. Oxidation takes place at the cathode.
B. Reduction takes place at the anode.
C. Magnesium ion is oxidizing agent in the electrode reaction.
D. There is a decrease in oxidation number of chloride ion.

58. Which of the following is **CORRECT** about molten electrolytes and aqueous electrolytes?

A. The possible half reactions in molten electrolytes are more compared to aqueous electrolytes.
B. Both molten and aqueous electrolytes involve preferential discharge of ions at each electrode.
C. An electrolyte that conducts electricity when dissolved in a certain liquid is molten electrolyte.
D. During the electrolysis of a molten electrolyte, the reduction of cations occurs at the cathode.

59. Which of the following is **NOT** the industrial application of electrochemistry?

A. Electrolytic refining
B. Electroplating
C. Electromagnetism
D. Electro synthesis

60. Which of the following chemical industries is **INCORRECTLY** matched with its products?

A. Textile industry- glasses
B. Beverage industry- alcohols
C. Food industry- Biscuits
D. Paper industry- cartons

61. A student added 25 mL of $AgNO_3$ solution to a beaker and weighed the mass of the beaker and its content as m_1. He/she added 50 mL of a saturated solution of NaCl into the second beaker and weighed the mass of the beaker and its content as m_2. Finally, he/she mixed the two solutions and weighed the mass of the resulting solution with the two beakers and recorded as m_3.If he/she found that $m_3 = m_1 + m_2$, which one of the following laws is investigated by this trial?

A. Law of definite composition
B. Law of multiple proportions
C. Law of conservation of energy
D. Law of conservation of mass

62. A chemical reaction that releases heat energy to the surrounding is known as _____.

A. exothermic reaction
B. endothermic reaction
C. decomposition reaction
D. combination reaction

63. A type of reaction in which two compounds react together to form two or more products by exchanging reactants ions is known as _____.

A. Decomposition reaction
B. Combination reaction
C. Double Displacement reaction
D. Single Displacement reaction

64. "At a given temperature and pressure, equal volumes of different gases contain equal number of molecules", this is known as _____

A. Charle's law
B. Boyle's law
C. Gay Lussac's law
D. Avogadro's law

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65. Which of the following includes the preconditions required for a chemical reaction to occur?

A. Temperature, activation energy, proper orientation
B. Temperature, pressure and proper orientation
C. Activation energy, proper orientation and collision between reactants
D. Activation energy, pressure and collision between reactants

66. Consider the following reaction of zinc carbonate, $ZnCO_3$:

$$ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$$

The chemical reaction that takes place during the conversion of $ZnCO_3$ is classified as _____

A. decomposition reaction
B. combination reaction
C. double displacement reaction
D. single displacement reaction

67. Given the following reaction:

$CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$ (unbalanced)

If 40 g of $CaCO_3$ reacts with 50 g of HCl, which substance is the limiting and which is the excess reagent? (Atomic Mass Ca=40 g/mol, C=12 g/mol, O=16 g/mol, H=1 g/mol and Cl=35.5 g/mol)

A. HCl is limiting and $CaCl_2$is excess reagents.
B. HCl is limiting and $CaCO_3$ is excess reactants.
C. $CaCO_3$ is limiting and $CaCl_2$ is excess reagents.
D. $CaCO_3$ is limiting and HCl is excess reactants.

68. A sample of a certain gas has a volume of 100 L at 27 °C and 750 torr. The gas is expanded to a volume of 250 L at 200 torr. What is the final temperature of the gas?

A. -83 °C
B. -73 °C
C. -173 °C
D. -273 °C

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69. Which of the following is a **CORRECT** explanation of the given term?

A. Boiling point is the temperature at which the vapor pressure of the liquid equals the atmospheric pressure.
B. Condensation is the process by which a liquid changes to a gas at the boiling point of the liquid.
C. Normal boiling point is the temperature at which the liquid starts to be converted to the gaseous state.
D. Heat of vaporization is the energy required to convert one gram of a solid to a gas at its boiling point.

70. Which of the following is the general formula of alkenes?

A. C_nH_{2n-2}
B. C_nH_{2n+2}
C. C_nH_n
D. C_nH_{2n}

71. What are the two types of polymerizations?

A. Condensation and substitution polymerizations
B. Addition and decomposition polymerizations
C. Condensation and displacement polymerizations
D. Addition and condensation polymerizations

72. Which of the following is a monomer of natural rubber?

A. Ethylene terephthalate
B. Styrene
C. Hexamethylene diamine
D. Isoprene

73. The component of the environment consisting earth's upper outer most skin, and accessible to human beings is known as _____.

A. biosphere
B. lithosphere
C. hydrosphere
D. atmosphere

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74. Consider the following steps that occur during the nitrogen cycle:

Step: 1 Reduction of nitrate by microbial action
Step: 2 Fixation of nitrogen by bacteria and algae
Step: 3 Nitrification by nitrosomas and nitrobactria
Step: 4 Denitrification of nitrate with acid and formladyde

Which of the following is the **CORRECT** sequence in the nitrogen cycle?

A. Step 2 → Step 3 → Step 4 → Step 1
B. Step 1 → Step 2 → Step 3 → Step 4
C. Step 2 → Step 3 → Step 1 → Step 4
D. Step 1 → Step 3 → Step 4 → Step 2

75. Some hazardous substances damage and create unwanted changes in air, water, soil or any other natural resource. The resulting change created is known as:

A. afforestation
B. pollution
C. greenhouse effect
D. global warming

76. Given the following heterogeneous reaction:

$$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$$

What is the equilibrium constant expression for the above reaction?

A. $K_c = [CaO][CO_2]$
B. $K_c = \frac{[CaO][CO_2]}{[CaCO_3]}$
C. $K_c = [CO_2]$
D. $K_c = \frac{[CaO]}{[CaCO_3]}$

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77. Which of the following statements is **CORRECT** regarding the properties of monocarboxylic acids?

A. Carboxylic acids react with active metals to form salt and hydrogen gas.
B. The hydrolysis of carboxylic acids in water produces an ester and water.
C. Carboxylic acids react with strong bases to form esters and water.
D. Heating of carboxylic acid with alcohol produces salt and water.

78. What is the scientific notation for 0.0000055?

A. 55×10^{-7}
B. 5.5×10^{-6}
C. 55×10^{-5}
D. 5.5×10^{-4}

79. A water molecule has two bond pairs and two lone pairs of electrons. Which of the following is **CORRECT** about these pairs of electrons?

A. The repulsion between the two bonding pairs is greater than the repulsion between the two lone pairs.
B. The repulsion between the two lone pairs is greater than the repulsion between the two bonding pairs.
C. Bonding pair - lone pair repulsion is greater than lone pair - lone pair repulsion.
D. Lone pair - lone pair repulsion is exactly identical with bonding pair - bonding pair repulsion.

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80. Which of the following **CORRECTLY** describes conjugate acids and conjugate bases?

A. Conjugate acid is a species formed after a removal of a proton from a base whereas conjugate base is formed after addition of proton to an acid.

B. Conjugate base is a species formed after removal of a proton from an acid whereas conjugate acid is formed after addition of a proton to a base.

C. Conjugate acid has one fewer hydrogen and one more minus charge than the corresponding acid.

D. Conjugate base has one more hydrogen and one fewer minus charge than the corresponding base.

THE END