



Grade 12 Students

@ETHIO_ENTRANCEG12

EDUCATIONAL ASSESSMENT AND EXAMINATIONS SERVICE (EAES)
ETHIOPIAN SECONDARY SCHOOL PILOT TEST (ESSPT)
GINBOT, 2016 E.C/ MAY, 2024G.C

Subject Code: 05

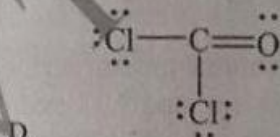
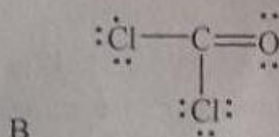
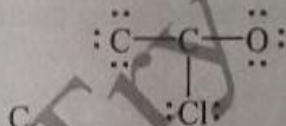
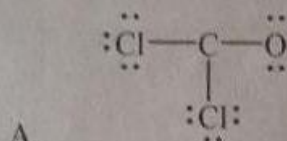
Booklet Code: 016

Number of Item: 80

Time Allowed: $2\frac{1}{2}$ hrs

1. Which of the following statements is **CORRECT** about the discovery of nucleus by Ernest Rutherford's α -particles experiment when a thin gold foil was bombarded by α -particles? It was
 - A. deflected by a very large angle.
 - B. deflected by small angles.
 - C. deflected back to the radiation source.
 - D. passed through the gold foil was undeflected.
2. Which postulate summarizes the Dalton's Atomic Theory?
 - A. Atoms of the same element may not be identical in mass.
 - B. In a compound the number and type of atoms are different.
 - C. Atoms are neither created nor destroyed in chemical reactions.
 - D. Atoms of different elements have identical chemical properties.
3. Which of the following alternatives designates the relative masses of electron, proton, and neutron **CORRECTLY**?
 - A. 0, 1, 1 for electron, proton, and neutron, respectively
 - B. 1, 1, 0 for electron, proton, and neutron, respectively
 - C. 1, 0, 0 for electron, proton, and neutron, respectively
 - D. 1, 1, 1 for electron, proton, and neutron, respectively
4. Among the following which one is the **CORRECT** ground state electron configuration of Copper (${}^{64}_{29}\text{Cu}$)?
 - A. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$
 - B. $1s^2 2s^2 2p^6 3s^1 3p^6 3d^{10} 4s^2$
 - C. $1s^2 2s^2 2p^6 3s^2 3p^5 4s^2 3d^{10}$
 - D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$

5. Consider this electronic configuration for an element $1s^2 2s^2 2p^6 3s^2 3p^4$.
What is the group number of this element?
- A. IIIA
B. VIA
C. VA
D. VII
6. Which of the following is the **CORRECT** Lewis structure of carbonyl chloride having the molecular formula of COCl_2 ?
(At.wt. C = 6, O = 8, Cl = 17)

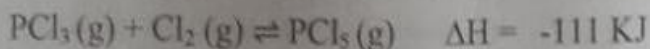


7. Which of the following statements describes chemical bonding **CORRECTLY**? It is the:
- A. amount of energy absorbed or released during a chemical reaction.
B. attractive force that binds atoms together in a molecule, or ions in a crystal lattice.
C. attractive force that keeps an electron to revolve on its own orbit in an atom.
D. energy needed to break a nucleus into its individual protons and neutrons.
8. An element with atomic number 36 belongs to which block in the periodic table?
- A. p
B. s
C. d
D. f

9. A teacher asked two students to bring water sample to the class. The first student brought 2 L of water from lake. The second student brought 5 L of water from river. When the teacher made elemental mass analysis on both water samples, it was found that both samples are composed of 11% of hydrogen and 89% of oxygen.
Which one of the following laws illustrates the teacher's observation?
- A. The law of thermodynamics
 - B. The law of conservation of mass
 - C. The law of multiple proportions
 - D. The law of definite proportions
10. Which one of the following prefixes used in SI unit corresponding with their multiple?
- A. Mega = 10^6
 - B. Tera = 10^3
 - C. Nano = 10^9
 - D. Giga = 10^{12}
11. A triplicate volume measurement using a graduate cylinder gave a volume of 9.12 cm^3 , 9.11 cm^3 and 9.13 cm^3 . The results could be reported as an average value of 9.12 cm^3 . Which one of the following digit is uncertain in the reported average value?
- A. 0.12
 - B. 2
 - C. 9
 - D. 9.1
12. Which one of the following is included in the Modern Atomic Theory?
- A. Atoms are indivisible and indestructible.
 - B. Atoms of the same elements have different chemical properties.
 - C. Atoms of two or more elements combine in simple whole-number ratios to form compounds.
 - D. Atoms of the same element are identical in mass and in other properties.

13. Which one of the following properties describes ionic compounds?
- A. Ionic compounds are found in gaseous state at room temperature.
 - B. Crystalline ionic solids are usually non-conductors of electricity.
 - C. Ionic compounds are usually soluble in organic solvents.
 - D. Generally they have low melting points and boiling points.
14. Which one of the following is TRUE regarding polarity of a covalent molecule?
- A. Polar molecules have zero dipole moment but non-polar molecules have a dipole moment greater than zero.
 - B. Non-polar molecules are created by molecule with a net imbalance of charge but polar molecule is created by a net balance of charge.
 - C. Polar molecules have bonding atoms of equal electronegativity but non-polar molecules have bonding atoms of un-equal electronegativity.
 - D. Molecular shape and bond polarity determines the polarity of molecules with more than two atoms bonded together.
15. Which of the following defines decomposition reaction? It is:
- A. the reaction of metals with non-metals.
 - B. the combination of two or more substances.
 - C. the replacement of one substance by another.
 - D. the breaking down of a compound into two or more entities.
16. Which of the following is TRUE about reaction rate? It is the change
- A. that occurs when the forward reaction rate is equal to the reverse.
 - B. that occurs without sufficient energy during collision between reactants
 - C. changes that are brought by changes in the pressure or temperature of reactants.
 - D. in the concentration of reactant and product that takes place in a period of time.

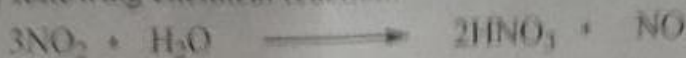
17. Consider the following gaseous reaction at equilibrium:



What is the effect of increasing temperature on this reaction?

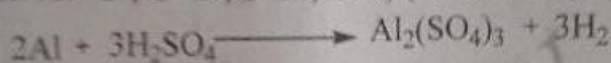
- A. Shifts forward
B. Shifts backward
C. Increases the concentration of PCl_5
D. Decreases the concentration of PCl_3
18. Consider the following reaction:
- $$2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$$
- How many liters of oxygen gas are produced when 20 liters of nitrogen dioxide is produced at STP?
- A. 5
B. 10
C. 20
D. 80
19. What is an exothermic reaction? It is:
- A. a chemical reaction that absorbs heat energy from the surroundings.
B. a process in which heat flows into the system from its surroundings.
C. a chemical reaction which occurs with no release or absorbance of heat energy.
D. a process in which heat is given out from the system to its surroundings.
20. Which of the following reactions represents single displacement reaction?
- A. $2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{H}_2$
B. $\text{CaO} + \text{CO}_2 \longrightarrow \text{CaCO}_3$
C. $2\text{KNO}_3 \longrightarrow 2\text{KNO}_2 + \text{O}_2$
D. $\text{AgNO}_3 + \text{NaCl} \longrightarrow \text{AgCl} + \text{NaNO}_3$

21. Consider the following chemical reaction:



How many moles of HNO_3 are produced from one mole of NO_2 ?

- A. 0.67
B. 1
C. 1.5
D. 2
22. Which of the following is the limiting reactants if 108 g of aluminum reacts with 600 g of sulfuric acid, as described in the following reaction?
(Atomic mass: Al= 27, O=16, S=32, H=1) (G-10 unit 1)



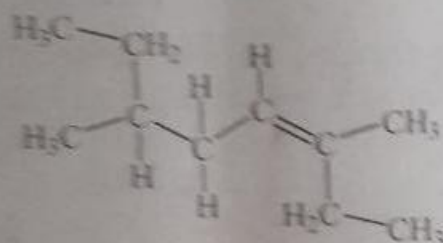
- A. H_2
B. Al
C. H_2SO_4
D. $\text{Al}_2(\text{SO}_4)_3$
23. Which one of the following statements describes homologous series **CORRECTLY**?

- A. It is a group of compounds in which each member of the group differs from the next member by a $-\text{CH}_2$.
- B. It is an increase in reactivity of metals from top to bottom of a column in a periodic table.
- C. It is an arrangement that shows the way electrons are distributed among the atomic orbitals of an atom.
- D. It is a systematic nomenclature of compounds developed by the International Union of Pure and Applied Chemistry (IUPAC) system.
24. Which one of the following chemical properties of alkanes is **CORRECT**?
- A. The reactions of alkanes are mainly addition reaction.
- B. Alkanes undergo elimination reaction to form a saturated compound.
- C. Alkanes burn in excess amount of oxygen to form carbon dioxide, water, and liberate a greater amount of heat.
- D. Alkanes burn in limited supply of oxygen to form carbon, carbon monoxide and liberate a greater amount of heat.

25. Among the following which one is the major use of acetylene?

- A. To prepare acrylonitrile. C. For fire existing usher.
B. For coolant in refrigerators. D. For welding of metals.

26. What is the **CORRECT** IUPAC name of the following alkene?



- A. 2, 5-diethylohex-2-ene C. 2, 5-diethylohex-4-ene
B. 3, 6-dimethyloct-3-ene D. 3, 6-dimethyloct-5-ene
27. Which of the following statements is **CORRECT** about crude oil refining?
- A. Fuel oil also called diesel oil is collected at the top of the fractionating column.
B. Components are separated based on the differences in their molecular weights.
C. The top of the fractionating column is hotter than the bottom section of the fractionating column.
D. High boiling point components such as bitumen (asphalt) are collected at the bottom of the fractionating column.
28. A group of students construct a model to show the cis-trans isomerism of 2-butene using a plastic ball and stick, representing carbon atom and a single bond respectively. Which one of the following **CORRECTLY** describe this model?
- A. The angle around each plastic ball is close to 109.5 degree.
B. The number of sticks between all carbon atoms is the same.
C. The distance between the second and the third plastic ball is the longest.
D. The bond between the second and the third plastic ball should be fixed and restricted for free rotation.

29. Which of the following chemical properties describes *acidic oxides* **CORRECTLY**? Acidic oxides:
- A. react with acid to form salt and water.
 - B. dissolve in water to form neutral solution.
 - C. react with basic or metallic oxides to form salt.
 - D. react with active metals to form salt and hydrogen gas.
30. Which of the following statements **CORRECTLY** describes the conceptual difference between weak acids and dilute acids? Weak acid is a solution which contains large amount of acid and small amount of water, whereas dilute acid is:
- A. a substance that dissociates in water partially.
 - B. a substance that dissociates in water completely.
 - C. a solution which contains large amount of acid and small amount of water.
 - D. a solution which contains small amount of acid and large amount of water.
31. Which of the following statements describes peroxides **CORRECTLY**? Peroxides are compounds:
- A. which exhibits both acidic and basic properties.
 - B. that contains the -O-O- linkage with -1 oxidation number.
 - C. that dissolves and react with water to form basic solutions.
 - D. which reacts neither with acids nor with bases to form salt and water.
32. The compound with the name 3-methyl-3-pentanol is classified as _____.
- | | |
|----------------------|-----------------------|
| A. Primary alcohol | C. Tertiary alcohol |
| B. Secondary alcohol | D. Quaternary alcohol |
33. Which of the following statements describes half-cell reactions?
- A. It is a reaction that takes place at anode or cathode.
 - B. It is a neutralization reaction between an acid and a base.
 - C. It is a reaction whose rate depends on the reactant concentration.
 - D. It is a process where species undergo both oxidation and reduction.

34. Which of the following statements **CORRECTLY** describes metallic conductivity? It is:
- A. the movement of ions (anions and cations) through the electrolyte.
 - B. a process in which electrical energy is used to produce chemical changes.
 - C. the flow of electricity through metals due to the presence of freely moving valence electrons.
 - D. the attraction force between positively charged atomic cores and delocalized electrons of a metal.
35. Which one of the following is considered as a natural resource?
- A. Plastic
 - B. Detergents
 - C. Coal
 - D. Vehicle
36. Which of the following reactions **DOES NOT** describes the main chemical property of nitrogen?
- A. $3\text{Mg(s)} + \text{N}_2\text{(g)} \xrightarrow{\text{heat}} \text{Mg}_3\text{N}_2\text{(g)}$
 - B. $\text{N}_2\text{(s)} + 3\text{H}_2\text{(g)} \xrightarrow[\text{heat}]{\text{Fe}} 2\text{NH}_3\text{(g)}$
 - C. $\text{N}_2\text{(g)} + \text{O}_2\text{(g)} \xrightarrow{\text{heat}} 2\text{NO(g)}$
 - D. $3\text{Cu(s)} + \text{N}_2\text{(g)} \xrightarrow{\text{Pb}} \text{Cu}_3\text{N}_2\text{(s)}$
37. In an experiment to identify the type of oxide, a full spatula of unknown powder is added to a 50 mL KI solution that contains a few drop of H_2SO_4 . A brown color is observed but turned to blue color when 5mL starch solution is further added. What is unknown oxide?
- A. Peroxide
 - B. Basic oxide
 - C. Acidic oxide
 - D. Amphoteric oxide

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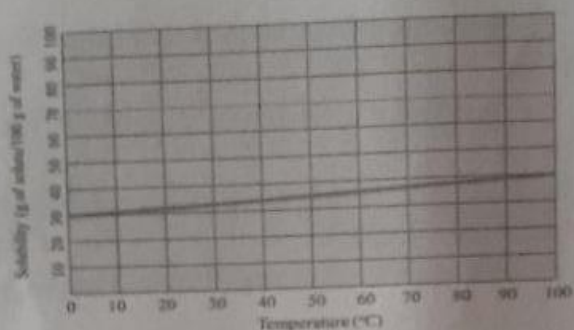
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38. Which of the following statements describes Colligative property **CORRECTLY**. Colligative property is:
- A. a property that depends on the concentration of the solute in the given amount of solvent.
 - B. any property of a substance that cannot be studied without changing its chemical identity.
 - C. a property that depends on the nature or chemical identity of the solute in the given amount of solvent.
 - D. any property of a substance that can be observed without changing the substance into some other substance.
39. Which one of the following represents a basic physical quantity?
- A. Volume
 - B. Density
 - C. Concentration
 - D. Temperature
40. What is the definition of pOH ? It is the negative logarithm of the
- A. hydroxide ion (OH^-) concentration (in mol/L).
 - B. hydrogen ion (H^+) concentration (in mol/L).
 - C. molecular water (H_2O) concentration (in mol/L).
 - D. the molecular hydrogen (H_2) concentration (in mol/L).
41. Which one of the following properties of substances can be affected by hydrogen bonding that exists in the substance?
- A. Extent of solubility
 - B. Combustibility in oxygen
 - C. Boiling point of the substance
 - D. Reactivity with hydrogen
42. On the basis of the electron structure of the central atom, which one the **CORRECT** hybrid orbitals in the compound PCl_5
- A. sp^2
 - B. sp
 - C. sp^3d
 - D. sp^3d^2

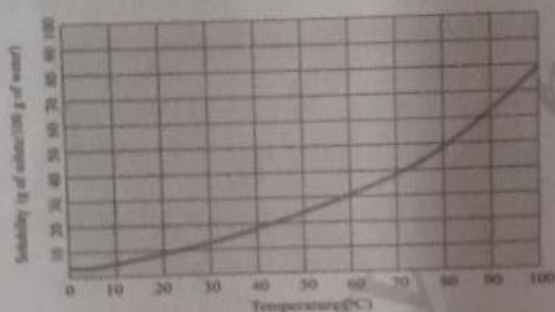
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43. Which of the following illustrations represents the effect of temperature on the solubility of sodium sulphate (Na_2SO_4) salt?

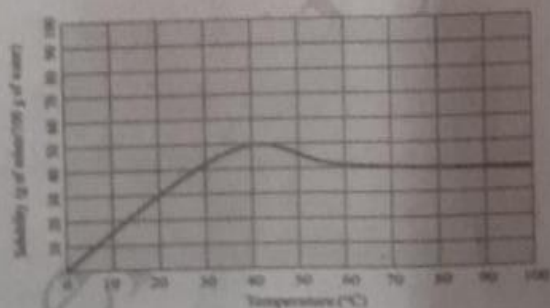
A.



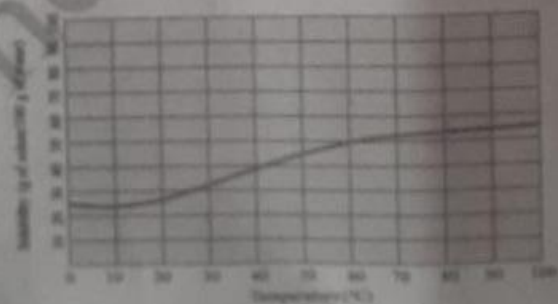
B.



C.

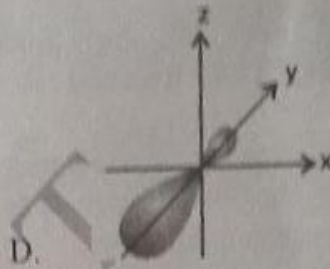
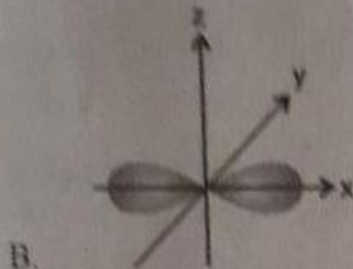
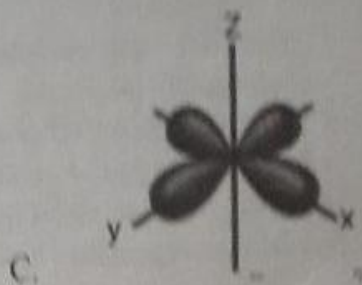
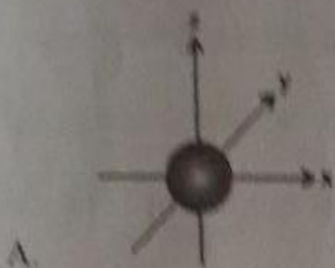


D.



47. Which one of the following statements is **CORRECT** about the phase and energy changes of liquids?
- A. Condensation is process where some of the vapor molecules lose energy and return to the liquid state.
 - B. Boiling is the process by which liquid molecules break freely from the liquid surface and enter the vapor phase.
 - C. Evaporation is the change of a liquid to bubbles of vapor that appear throughout the liquids as well as at its surface.
 - D. Freezing is the process of change of a solid to the liquid state where the intermolecular force of attraction becomes weaker.
48. Suppose you had a 20.0 L of carbon dioxide gas at 23°C and 746 mmHg pressure. What would be the volume of carbon dioxide at 0°C and 760 mmHg?
- A. 10.7 L
 - B. 18.0 L
 - C. 16.5 L
 - D. 37.5 L
49. How much energy is released when an electron makes a transition from the fourth energy level ($n = 4$) to the second energy level ($n = 2$) in a hydrogen atom? ($R_H = 2.18 \times 10^{-18} \text{ J}$)
- A. -5.45×10^{-17}
 - B. -1.09×10^{-18}
 - C. -4.088×10^{-19}
 - D. -2.616×10^{-17}
50. Which of the following chemical bonding is **CORRECTLY** associated with its mechanisms of the bonding process?
- A. Covalent Bonding is formed as a result of electron sharing between two non-metals.
 - B. Ionic bonding is the attraction of ions by water molecules arranged in a specific manner.
 - C. Ionic Bonding refers to the interaction between the delocalized electrons and the metal nuclei.
 - D. Metallic Bonding is formed by electron transfer from a metal to a non-metal with different electronegativity values.

51. Which of the following orbital diagram illustrates sp^3 hybrid orbital of carbon atom in $(H_2C=CH_2)$?



52. What is the basic principle of valence bond theory?
- Electrons in a molecule occupy orbitals that may spread over the entire molecule.
 - Atomic orbitals are capable of combining or overlapping each other to produce new electron distributions.
 - A covalent bond forms when orbitals of two atoms overlap and the overlap region is occupied by a pair of electrons.
 - Bonding in covalent molecules is due to the electrostatic forces between the positive metal ion and the negatively charged ligand.
53. Which one of the following contribution of experiments concerning the atomic structure is **CORRECT**?
- E. Rutherford discovered neutrons using oil drops experiment.
 - J. J. Thomson discovered electron through cathode ray experiment
 - J. Chadwick discovered nucleus by his alpha-particle scattering experiments.
 - R. A. Millikan determined the charge on the electron through thin gold foil experiment.

54. Which of the following statements describes the term crystal?
- A. Crystal is a solid mixture formed from variable composition of different metals.
 - B. Crystal is a rock or mineral from which a metal or nonmetal can be economically produced.
 - C. Crystal is a piece of a solid substance that has plane surface, sharp edges, and a regular geometric shape.
 - D. Crystal is large molecule that is made up of a number of smaller molecules repeatedly linked together.
55. Which one of the following statements defines reaction rate **CORRECTLY**? Reaction rate is:
- A. a sequence of elementary steps that lead to product formation.
 - B. a short-lived, high energy state species formed by the collision of reactant molecules.
 - C. state at which the concentrations of the reactants and products become constant with time.
 - D. the increase in concentration of product per unit time or the decrease in concentration of reactant per unit time.
56. Which of the following statements describes the term lattice energy **CORRECTLY**?
- A. It is the energy associated with the random motion of atoms and molecules.
 - B. It is the energy stored within the structural units of chemical substances such as molecules.
 - C. The enthalpy change that accompanies a solid ionic compound forming separate gaseous ions.
 - D. It is the minimum energy needed to remove the highest-energy electron from the neutral atom in the gaseous state.

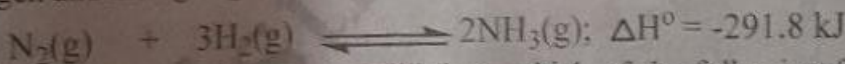
57. What is the definition of rate law of a chemical reaction? It is:
- A. an equation used to relate thermodynamic variables.
 - B. an equation of a reaction in solution in which spectators ions are eliminated.
 - C. an equation that express change in concentration per unit time as a function of reactant concentration.
 - D. an equation that relates the concentrations of reactants and products at equilibrium (equilibrium concentrations).

58. A student performed a combustion reaction using equal masses of magnesium wire, magnesium sheet, magnesium block and magnesium powder in the reaction below?



Which of the following forms of the metal is consumed first in the reaction?

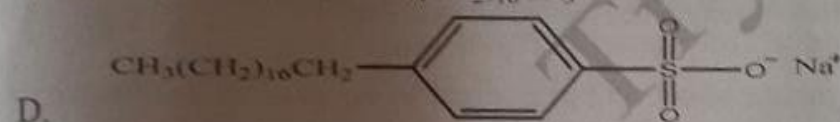
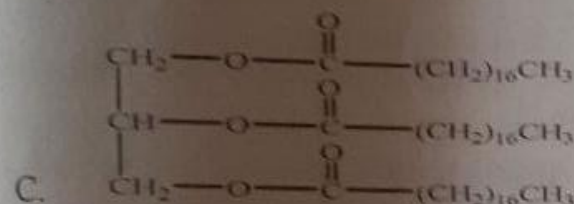
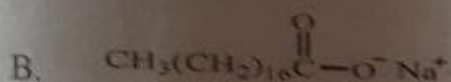
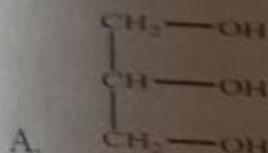
- A. Magnesium wire
 - B. Magnesium sheet
 - C. Magnesium block
 - D. Magnesium powder
59. Ammonia is industrially synthesized by Haber process from atmospheric hydrogen and nitrogen gases, as described in the reaction below



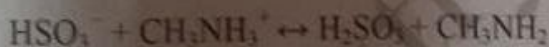
Assume that the reaction is at equilibrium, which of the following factors favor the formation of NH_3 ?

- A. Increasing the concentration of NH_3
 - B. Increasing the pressure of the system
 - C. Increasing the surface area of catalyst
 - D. Increasing the temperature of the system
60. Which one of the following compounds is a Lewis Base?
- A. NH_3
 - B. BF_3
 - C. HCOOH
 - D. H_3O^+

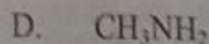
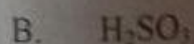
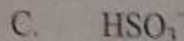
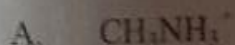
64. Which one of the following structural formulas describes fat?



65. Consider the following reaction:



Which represents the Bronsted-Lowry base?



66. Which one of the following statements defines reduction? It is a process in which substance

- A. loses electrons in a chemical reaction.
B. gains electrons in a chemical reaction.
C. share electrons in a chemical reaction.
D. retains electrons in a chemical reaction.

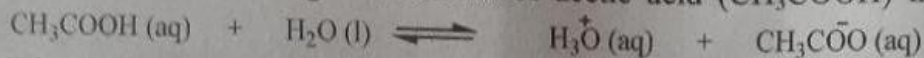
67. Copper is produced by the electrolysis of CuSO_4 solution using inert electrode. How do we explain the production of Cu metal in such electrolysis processes?
- A. At the anode OH^- and at cathode Cu^{2+} are preferentially discharged
 - B. Copper sulfate produces Cu^{2+} which can easily be deposited at the anode.
 - C. At the anode Cu^{2+} and SO_4^{2-} are discharged and copper pure metal preferentially discharged.
 - D. At the anode Cu^{2+} and H^+ are discharged and copper preferentially deposited at this electrode.
68. The most destructive form of corrosion is the rusting of iron. How does such destruction can be explained by a redox reaction?
- A. The surface of iron will be oxidized by oxygen from the atmosphere.
 - B. The electrons lost by iron at the cathode reduce atmospheric oxygen.
 - C. The iron (II) ion formed at the cathode disperses through water and reacts with oxygen.
 - D. The overall reaction of the rusting process is carried out by the cathodic reaction of oxygen.
69. What is the reason that makes the production of sulphuric acid highly important in the development of a nation?
- A. Since the acid produced is toxic and requires more care in production.
 - B. The production of sulphuric acid requires minimum number of raw materials.
 - C. The produced sulphuric acid is applied in different sectors of production.
 - D. The production of the acid in a country requires less sophisticated industry.

70. Which of the following statements is a description of natural polymers?
Natural polymers are:
- A. those made from one type of monomer
 - B. polymers formed by the loses of small molecules
 - C. prepared by polymerizing more than one monomer
 - D. those that can be extracted from naturally occurring substances
71. When are contaminants classified as pollutants?
- A. When the permissible level of toxicity is low
 - B. When its concentration is decreased due to different activity.
 - C. When these substances exert proper change of our environment.
 - D. When it changes the natural resources and impairs the use of resources.
72. Assume that a chemical industry is located nearby to your school. Which of the following **IS NOT** an effect of the industry on the nearby environment?
- A. Decrease air quality by emission of toxic gases.
 - B. Affect the soil by disposing non-biodegradable waste.
 - C. Spillage of some toxic chemicals to the nearby water body.
 - D. Increase soil fertility and organic carbon content of the soil.
73. Which of the following statements describes the term hydrolysis?
Hydrolysis is:
- A. the process of removal of water (H_2O) from a compound.
 - B. the reaction of an anion or a cation of a salt, or both, with water.
 - C. the formation of hydrogen bonding between two water molecules.
 - D. the process of addition of elemental hydrogen (H_2) in to a molecule.

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74. Consider the following dissociation of acetic acid (CH_3COOH) in water:



What is the expression for the acid dissociation constant, K_a ?

A. $K_a = \frac{[\text{CH}_3\text{COOH}][\text{H}_2\text{O}]}{[\text{H}_3\text{O}^+][\text{CH}_3\text{COO}^-]}$

C. $K_a = \frac{[\text{CH}_3\text{COOH}]}{[\text{H}_3\text{O}^+][\text{CH}_3\text{COO}^-]}$

B. $K_a = \frac{[\text{H}_3\text{O}^+][\text{CH}_3\text{COO}^-]}{[\text{CH}_3\text{COOH}][\text{H}_2\text{O}]}$

D. $K_a = \frac{[\text{H}_3\text{O}^+][\text{CH}_3\text{COO}^-]}{[\text{CH}_3\text{COOH}]}$

75. Which of the following is **CORRECT** about electrolysis of concentrated sodium chloride solution (brine solution)?

- A. Na^+ and H^+ ions move towards anode electrode.
 B. Cl^- and OH^- ions move towards cathode electrode.
 C. H^+ ions are discharged in preference to the Na^+ ions.
 D. OH^- ions are discharged in preference to the Cl^- ions.

76. A substance that causes unwanted changes in air, water or other natural resources is known as _____.

- A. Threshold limit
 B. Biological oxygen
 C. Pollutant
 D. Sink

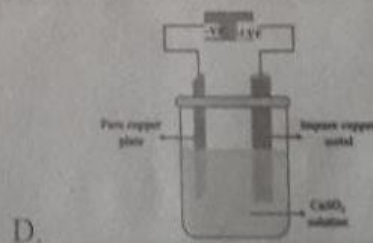
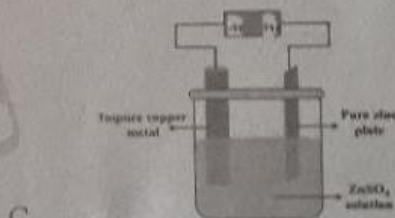
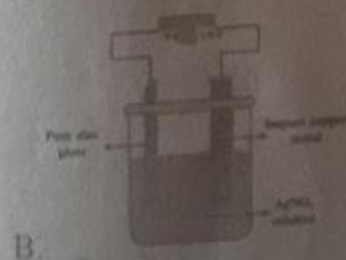
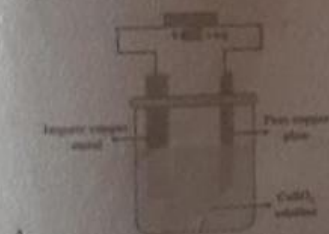
77. Consider the following redox reaction with their reduction potential:

Half reaction	E° (V)
$\text{Cu}^{2+} \text{ (aq)} + 2e^- \longrightarrow \text{Cu (s)}$	+0.34 V
$\text{Sn}^{2+} \text{ (aq)} + 2e^- \longrightarrow \text{Sn (s)}$	-0.14 V
$\text{Zn}^{2+} \text{ (aq)} + 2e^- \longrightarrow \text{Zn (s)}$	-0.76 V
$\text{Mg}^{2+} \text{ (aq)} + 2e^- \longrightarrow \text{Mg (s)}$	-2.37 V
$\text{Cd}^{2+} \text{ (aq)} + 2e^- \longrightarrow \text{Cd (s)}$	-0.41 V
$\text{Fe}^{2+} \text{ (aq)} + 2e^- \longrightarrow \text{Fe (s)}$	-0.44 V

Which of the following is non-spontaneous?

- A. $\text{Cu}^{2+} \text{ (aq)} + \text{Sn (s)} \longrightarrow \text{Cu (s)} + \text{Sn}^{2+} \text{ (aq)}$
 B. $\text{Cu}^{2+} \text{ (aq)} + \text{Zn (s)} \longrightarrow \text{Cu (s)} + \text{Zn}^{2+} \text{ (aq)}$
 C. $\text{Cu}^{2+} \text{ (aq)} + \text{Mg (s)} \longrightarrow \text{Cu (s)} + \text{Mg}^{2+} \text{ (aq)}$
 D. $\text{Fe}^{2+} \text{ (aq)} + \text{Cd (s)} \longrightarrow \text{Fe (s)} + \text{Cd}^{2+} \text{ (aq)}$

78. Which of the following batteries is **NOT** an example of Voltaic (Galvanic) cell?
- A. Alkaline cell
B. Chlor-alkali cell
C. Nickel-Cadmium cell
D. Lead Storage cell
79. Which one of the following statements is **CORRECT** about thermosetting plastics?
- A. Thermosetting plastics can be recycled.
B. They are generally long chain linear polymers.
C. Thermosetting plastics are hard, strong and brittle.
D. On heating, they can be reshaped and remoulded several times.
80. Which one of the following diagram best represents the purification of copper using electrolysis?



THE END

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