Instructions: Read carefully all answers before selecting the best one for each question!

1) In a solution of 20mg of sugar in 100 mL of water, sugar is the
a) solution  b) solute  c) solvent  d) suspension

2) The molar mass of 2-methylpropane is:
a) 30g/mol  b) 44g/mol  c) 58 g/mol  d) None of the above

3) The molar volume of any gas (in L) under Standard Temperature and Pressure is:
a) 6.02 x 10^23  b) 44.8  c) 22.4  d) 273.15

4) Which of the following has the same number of atoms as 32g of Methane?
a) 115g of Sodium  b) 391g of Potassium  c) 32 g of Ethane  d) 48g of Magnesium

5) At Standard Temperature and Pressure 22.4 L of Chlorine gas Cl₂ will have a mass of:
a) 35.45g  b) 22.4g  c) 28.0g  d) 70.9g

6) What is the intermolecular force that makes the molecules of iodine interact and is responsible for the fact that iodine is solid at room temperature?
a) Covalent Bond  b) Ionic Bond  c) Hydrogen Bond  d) London Induced Dipole-Induced Dipole Forces
7) 25 g of methanol are dissolved in 100.0 mL of water. What is the w/v % concentration of the solution?  
   a) 20%  b) 25%  c) 75%  d) 80% 

8) The molecular shape of the methane molecule (CH₄) is best described as:  
   a) linear  b) trigonal planar  c) trigonal pyramidal  d) tetrahedral 

9) How many grams of AgNO₃ are required to make 1.00 L of a 0.100 M solution?  
   a) 0.100 g  b) 85.0 g  c) 8.50 g  d) 17.0 g 

10) Which substance has non-polar covalent bonds, and is overall non-polar?  
    a) O₂  b) CCl₄  c) NaCl  d) CO 

11) When red blood cells are placed into deionized water they will undergo ____ since deionized water is ____  
    a) hemolysis/hypertonic  b) hemolysis/hypotonic  c) crenation/hypertonic  d) crenation/hypotonic 

12) Unsaturated hydrocarbons have:  
    a) only C-C bonds  b) one or more C=C bonds or C≡C bonds  
    c) no C=C bonds  d) an odd number of carbon atoms 

13) The formula CₙH₂ₙ corresponds to:  
    a) Alkanes  b) Alkenes  c) Alkynes  d) Alcohols 

14) Alcohol vaporization is a(n)___________process  
    a) Exothermic  b) Endothermic  c) Chemical  d) all of the above 

15) When a given quantity of gas is kept at stable temperature and the pressure is increased  
    a) Volume will increase  b) Volume will decrease  c) Volume will be always 22.4L  d) number of moles changes 

16) Which one of the following compounds is an isomer of heptane  
    a) cyclohexane  b) 2,2-dimethylbutane  c) 2,2-dimethylpentane  d) methylcyclopentane 

17) The following structures could be described as:  
   a) isomers  b) different conformations of the same compound  c) alkynes  d) None of the above 

18) What is the correct name for the following structure:  
    a) 2-ethyl butane  b) 2-methyl pentane  c) 3-methyl pentane  d) 3-methyl hexane 

19) Which of the following substances is an electrolyte?  
    a) HCl  b) NaCl  c) NH₄NO₃  d) All are electrolytes 

20) A general statement concerning the solubility of organic compounds is ____  
    a) the larger molecules dissolve best in a solvent with a low molecular weight.  
    b) those compounds that have only covalent bonds dissolve well in water.  
    c) the polar organic compounds dissolve best in non-polar solvents.  
    d) the nonpolar compounds can dissolve well in non-polar polar solvents. 

21) What is the approximate F-B-F angle observed in the BF₃ molecule?  
    a) 90°  b) 105°  c) 120°  d) 180° 

22) The least electronegative element of the following is  
    a) Sodium  b) Hydrogen  c) Carbon  d) Chlorine 

23) The electronic structure of SO₃ is ______ and the molecular structure is ________  
    a) tetrahedral, bent  b) tetrahedral, pyramidal  
    c) trigonal planar, bent  d) trigonal planar, trigonal planar 

24) Two identical gas containers containing N₂ and O₂ have the exact same number of moles, but the O₂ is stored at 20°C while the N₂ container is stored at 40°C. Which of the following statements is true?  
    a) The molecules of the two gases have the same kinetic energy  
    b) P(for N₂) = 2 x P(for O₂)  
    c) The two gases are different so we cannot apply gas laws to compare their pressures  
    d) The oxygen container is heavier
25) How much sodium chloride do you need to prepare 740 mL of a 0.9% saline (m/v) NaCl solution for IV therapy?
   a) 3g  b) 7g  c) 20g  d) 40g

26) Which of the following statements is NOT true concerning organic chemistry?
   a) Some organic compounds can be made from inorganic compounds.
   b) **Organic chemistry is the chemistry of chemicals originating from living organisms.**
   c) Organic chemistry is the chemistry of carbon-containing compounds.
   d) Of the more that 20 million known chemical compounds, the vast majority are organic compounds.

27) Hydrocarbons with only single bonds are called _____. Those with a triple bond are called _____, and those with a double bond are called _____.
   a) alkanes, alkenes, alkynes
   b) alkenes, alkynes, alkanes
   c) **alkanes, alkynes, alkenes**
   d) alkenes, alkanes, alkynes

28) Name the compound, CH₃CH=CHCH₃.
   a) Butane
   b) 1-Butene
   c) **2-Butene**
   d) 2-Butyne

29) Hydrogen in hydrocarbons:
   a) forms ionic compounds
   b) **forms 1 covalent bond to a C atom**
   c) bonds to carbon and forms chains
   d) bonds to hydrogen by covalent bonds

30) Propene, benzene, acetylene, and 2-butene are all examples of
   a) alkenes
   b) alkanes
   c) **unsaturated hydrocarbons**
   d) aromatic compounds

31) A molecular formula of an alkene is
   a) C₆H₁₄
   b) C₈H₁₈
   c) C₅H₈
   d) C₆H₆

32) Calculate the Pressure of 15L of gas, at the temperature of 20°C, if its pressure at 50°C is 2.00 Atm.
   a) 2.20 Atm
   b) **1.81 Atm**
   c) 5.00 Atm
   d) 0.80 Atm

33) 2-methylbutane and 2,2′-dimethyl-propane are:
   a) Conformations
   b) Isotopes
   c) **Isomers**
   d) None of the above

34) Which of the following is the formula for 1-butyne?
   a) CH₃CH₂CH₂CH₃
   b) CH₂=CHCH₂CH₃
   c) CH₂=CHCH₃
   d) **None of the above**

35) What would be the proper name for the following compound? Identify and number the longest chain correctly!
   ![Compound Image]
   a) 2,4,6-trimethyl-undecane
   b) 3,5,7-trimethyl-decane
   c) **2,4,6-trimethyl-octane**
   d) 2-ethyl,4,6-dimethyl-heptane

36) What would the following equation can be described as: PV = nRT
   a) the law of conservation of matter
   b) **The ideal gas law**
   c) the periodic law of the elements
   d) Boyle’s law

37) The main component(s) of gasoline is (are):
   a) **hydrocarbons**
   b) carbohydrates
   c) elemental carbon
   d) ionic compounds

38) Standard Temperature and Pressure is
   a) 37°C and 1.01 Atm
   b) 25°C and 1 Atm
   c) 100°C and 1 Atm
   d) **0°C and 1 Atm**

39) To prepare 5.00 mL of a 0.200 M solution of Potassium Chloride in water you will need to dissolve
   a) 7.46 mg
   b) **74.6 mg**
   c) 746 mg
   d) None of the above

40) Dienes have to contain
   a) Triple bonds
   b) **At least two double bonds**
   c) Single bonds only
   d) The benzene ring

*This is an EASY EXAM! GOOD LUCK! :)*