1) What are the coefficients for the reactants and the products when the following reaction is balanced:

$FeCl_2(aq) + NaOH(aq) \rightarrow Fe(OH)_3(aq) + NaCl\ (aq)$

a) 1, 1, 1, 1
b) 1, 3, 1, 3
c) 2, 6, 2, 6
d) None of the above

2) In the balanced equation for the reaction between gaseous nitrogen and hydrogen gas forming gaseous ammonia, the coefficients for hydrogen gas is:

a) 4
b) 1
c) 2
d) 3

3) What is the mass of one mole of sulphur atoms?

a) 6.022×10^{23} g
b) 16 g
c) 1.022×10^{23} g
d) None of the above

4) One mole of silver atoms contains

a) 1 atom of silver
b) 6.022×10^{23} atoms of silver
c) 6.022×10^{-23} atoms of silver
d) 1 g of silver

5) The molar mass of hydrogen sulphide is given by

a) 34.08 g/mol
b) 1704 g/mol
c) 68.16 g/mol
d) 66.06 g/mol

6) The formula for the hydrogen sulphate ion is

a) H_2SO_4
b) HSO_4^-
c) HSO_4^{2-}
d) SO_4^{2-}

7) The correct name for SiF_6 is:

a) 0 Fluoride of silicon
b) Monosilicon tetrafluoride
c) Silicon hexafluoride
d) None of the above

8) Calcium phosphate has the formula:

a) $Ca_3(PO_4)_2$
b) $Ca_2(PO_4)_3$
c) $CaPO_4$
d) $Ca_3(PO_4)_3$

9) The correct name for H_2O_2

a) Dihydrogen dioxide
b) Hydrogen peroxide
c) Oxygenated water
d) Dioxygen dihydride

10) How many microliters are there in 282L ?

a) 0.282 µL
b) 28.2 µL
c) $2.82x10^3$ µL
d) $2.82x10^8$ µL

11) A mass of 1.7 ng is also equal to

a) $1.70x10^{-9}$ g
b) $1.7x10^9$ g
c) $1.7x10^{-6}$ mg
d) $1.70x10^{12}$ mg

12) What is the speed (in kilometres per hour) of a car if it takes $9.02x10^{-1}$ minutes to cover a distance of $1.00x10^3$ m?

a) $1.84x10^{-2}$ km/hour
b) 66.5 km/hour
c) 1.11x10 km/hour
d) $1.11x10^{-1}$ km/hour

13) The density of a substance is 1.70 g/ml, what is the mass of $9.20x10^{-3}$ L of this substance?

a) 9.1202 g
b) 5.41 g
c) 1.56x10 g
d) $1.85x10^{-1}$ g

14) If under a set of optimum conditions, calcium carbonate decomposes to produce calcium oxide and carbon dioxide, how many moles of carbon dioxide will be produced (under similar conditions) from 5.00 moles of calcium carbonate?

a) 5.0 moles
b) 5.00 moles
c) 10.00 moles
d) 2.50 moles

15) A cation M^{3+} contains 10 electrons. The number for protons from which the cation is formed is given by?

a) 10
b) 13
c) 16
d) 30

16) The sulphide ion contains:

a) 16 protons and 16 electrons
b) 16 protons and 14 electrons
c) 14 protons and 16 electrons
d) 16 protons and 18 electrons

17) A neutral atom contains 13 protons and has a mass number of 27. The number of electrons in the atom is

a) 40
b) 14
c) 27
d) 13

18) An atom with 11 protons and 12 neutrons represents an atom of

a) Mg
b) H
c) V
d) Na

19) An element containing 33 protons and 33 electrons is a

a) Metal
b) Non-metal
c) Metalloid
d) None of the above

20) The correct answer (expressed in scientific notation) for the calculation 229.55g + 123.345g + 13.2 g is

a) 385.105 g
b) 3.661×10^2 g
c) 366.11 g
d) 3.7×10^2 g

21) The mass of an empty container is 23.0960 g. A solid is then placed in the container. The combined mass of the solid and the container is 23.1190 g. How many significant figures are there in the calculated mass of the solid?

a) 6
b) 4
c) 3
d) 2

4.5

22) The largest volume is represented by:

a) 1.0L
b) 1000 ml
c) $1.0x10^5$ µL
d) $1.0x10^4$ cm^3

23) After performing a calculation, Kelly's calculator displayed the result as 3.45973 if the answer can only have three significant figures and must be expressed in scientific notation, it should be reported as:

a) $3.46x10^0$
b) 0.346x10
c) 3.46
d) 3.46/10

24) In the periodic table, the alkaline earth metals are in the same:

a) Period
b) Group
c) Section
d) Row

25) Workers have a right to

a) Work in a safe and healthy environment
b) Know the processes and substances they are working with
c) Know the potential hazards from the substance and processes
d) All of the above

26) According to WHMIS the cost of effective worker training must be paid by

a) Employee
b) Supplier
c) Regulators
d) None of the above

27) WHMIS was developed through the collective efforts

a) Labor, Industry
b) Federal/Provincial/Territorial Governments
c) Labor, Provincial Government
d) Labor, Industry, Federal/Provincial/Territorial Governments

28) The mere presence of a causative agent constitutes a hazard, it is a hazard in all circumstances

a) True
b) False

29) A mountain climber at an altitude of 5000 meters may be subjected to pressure conditions described as

a) atmospheric
b) hyperbaric
c) hyperatmospheric
d) hypobaric

30) Which of the following statements is false?

a) severe damage to eyes may result from excessive exposure to UV radiation
b) Microwaves do not penetrate appreciably below the skin
c) X-rays are not damaging to body tissue
d) Radiation cannot be detected by human senses

31) Hazard posed by exposure to excessive noise can be classified as

a) Chemical
b) Biological
c) Ergonomic
d) Physical

32) It has been established that ergonomics, properly applied can help increase job efficiency

a) True
b) False

33) Which of the following statements is true for acute toxicity?

a) Results from brief exposure to a high concentration
b) Responses generally have latency periods
c) Responses are difficult to observe and relate
d) Results from low and repeated exposure over a long period of time

34) Chemicals causing malformations in newborns are classified as

a) Asphyxiants
b) Carcinogens
c) Irritants
d) None of the above

35) The formation of nitric acid in the atmosphere is due to the reactions of

a) NO_x
b) SO_x
c) CO
d) SO_4^{2-}

36) Extremely fine particles of zinc oxide formed during welding (a high temperature process) are an example of:

a) vapour
b) fume
c) smoke
d) mist

37) The concentration of air contaminants is determined by

a) Exposing humans to the contaminants
b) Exposing animals to the contaminants
c) Exposing bacteria to the contaminants
d) Sampling and analyzing the contaminants

38) Commonly used units of concentration for gases are

a) ppm
b) ppb
c) %
d) None of the above

39) A concentration of 31.0 ppb for a gas is equal to

a) 3.1×10^{-3} %
b) 3.10×10^{-6} %
c) 3.1×10^{5} %
d) 3.10×10^{-3} %

40) The concentration of SO_2 in air near a pulp and paper mill is 23. ppb, what will it be in ppm

a) 2.30×10^{3} ppm
b) 2.3×10^{-2} ppm
c) 2.3×10^{3} ppm
d) 3×10^{-9} ppm

41) Based upon TLV-TWA values (given in parenthesis) which compound poses the most risk?

a) Compound A (2.0×10^{7} ppb)
b) Compound B (2.0×10^{4} ppm)
c) Compound C (100 ppm)
d) Compound D (3.0 %)

42) A worker is repeatedly exposed to a concentration of 9.5×10^{3} ppb of a substance if the TLV TWA for the substance is 2.5 ppm it is a safe work environment for the worker

a) True
b) False

43) The organization responsible for developing TLVs is

a) AGCIH
b) ACGHI
c) AHGIC
d) None of the above

44) Most common natural routes of entry of chemical agents into the body include

a) respiratory tract
b) digestive tract
c) skin
d) none of the above

45) Methanol (a polar covalent compound) dissolves in water by the formation of

a) Covalent bonds
b) Ionic bonds
c) Hydrogen bonds
d) Oxygen bonds

46) The presence of hydrogen bonding in water accounts for its

a) Taste
b) Purity
c) Odor
d) None of the above

47) Hydrogen bonds in water are:

a) Weaker than covalent bonds
b) Stronger than covalent bonds
c) Of the same bond strength
d) None of the above

48) Surfactants are effective in

a) Increasing the density of water
b) Increasing the surface tension of water
c) Increasing the polarity of water
d) None of the above

49) In the cleaning process the polar end of the surfactant is attracted to water because water is

a) polar
b) dirty
c) non-polar
d) hot

50) An anionic surfactant is

a) negatively charged
b) positively charged
c) without a charge
d) none of the above

51) Detergents almost eliminate the scum formation because they are

a) More expensive than soaps
b) Less affected by ions causing water hardness
c) Naturally occurring materials
d) Used only with water free of Mg^{2+} and Ca^{2+}

52) Hardness of water is due to the presence of certain

a) Alkali metal cations
b) Transition metal cations
c) Halogens
d) None of the above

53) The impact of household cleaner on the environment is minimized because these products are formulated:

a) To work with water and end up in wastewater treatment plants
b) Free of chemicals
c) With natural ingredients only
d) To change into environmentally friendly ingredients

54) In hair coloring the oxidation of natural hair pigments to colorless products is achieved by using a

a) dye
b) reducing agent
c) bleaching agent
d) conditioning agent

55) The oxidizing agent generally used in hair coloring is

a) H_2O
b) H_2O_2
c) O_3
d) H_3O^+

56) Sunscreen creams are formulated with additional ingredients to

a) Charge a higher price
b) Absorb odors
c) Make them look colourful
d) None of the above

57) Fragrances in perfumes are generally experienced in three stages or notes because of the

a) color of the ingredients
b) density of the ingredients
c) price of the ingredients
d) none of the above

58) Fragrances for perfumes are created by using

a) Naturally occurring compounds only
b) Synthetic compounds only
c) Both natural and synthetic compounds
d) None of the above

59) The effective chemical ingredients in deodorants are antibacterial agents to

a) Culture bacteria
b) Destroy bacterial responsible for converting certain compounds to unpleasant odors
c) Mask the unpleasant odors
d) Trap the unpleasant odors

60) Curling of hair involves

a) Treating hair with a reducing agent
b) Setting hair in the desired shape
c) Treating hair with an oxidizing agent
d) All of the above

61) Lipstick and mascara are examples of

a) Cosmeceuticals
b) Sunscreens
c) Facial cosmetics
d) Pharmaceuticals

62) Carbon-carbon double bond in organic compounds is formed by the sharing of

a) one pair of electrons
b) two pairs of electrons
c) loss and gain of electrons
d) three pairs of electrons

63) Long chain and cyclic structures are common for organic compounds because carbon can form

a) ionic bonds with other carbon atoms
b) covalent bonds with other carbon atoms
c) no bonds with other carbon atoms
d) none of the above

64) The carbon-carbon single bond in organic compounds is

a) Ionic
b) Covalent
c) Carbonic
d) None of the above

65) The functional group in amine is

a) –SH
b) –COOH
c) –OH
d) None of the above

66) The compound with the formula $CH_3CH_2OCH_2$ is an

a) Ester
b) Ether
c) Alcohol
d) None of the above

67) The compound with the formula $CH_2(CH_2)_3OH$ is an

a) Amine
b) Ether
c) Ester
d) Alcohol

68) How many carbon atoms are there in a compound with the formula $CH_2(CH_2)_4C_4H_2$

a) 8
b) 9
c) 6
d) 20

69) How many hydrogen atoms are there in a compound with the formula $CH_3(CH_2)_6CH_2OH$?

a) 4
b) 18
c) 8
d) 10

70) How many oxygen atoms are there in a compound with the formula $HOCH_2(CH_2)_2COOC_3H_7$?

a) 7
b) 14
c) 10
d) 3

71) Benzene has a ring structure containing three carbon-carbon double bonds

a) True
b) False

72) The number of carbon atoms in a cyclohexane ring is

a) 3
b) 9
c) 12
d) None of the above

73) Chemotherapy involves treatment of cancer using

a) Hypnotherapy
b) Acupuncture
c) Alkylating agents
d) None of the above

74) In the hormone therapy for the treatment of cancer, the chemotherapeutic agent acts against the topoisomerase enzyme to prevent cancer cell growth

a) true
b) False

75) The treatment of depression involves the use of

a) Penicillins
b) Anti-inflammatory agents
c) Protease inhibitors
d) None of the above

76) The treatment of AIDS involves the use of

a) Antibacterial agents
b) OTC's
c) Antiviral agents
d) Antidepressants

77) Certain steroids are used as anti-inflammatory drugs because these drugs are

a) Potent steroids
b) Capable of suppressing the inflammatory responses of the immune system
c) Antidepressants
d) Radioactive

78) The agreement to reduce and ultimately ban the manufacture and use of CFC's goes by the name of

a) Kyoto Protocol
b) Glen Eagle Agreement
c) Montreal Protocol
d) Geneva Convention

79) The weakly acidic nature of rain is due to the formation of

a) O_2
b) N_2
c) H_2CO_3
d) O_3

80) the pH of a water sample is measured to be 1.9. The sample is

a) Acidic
b) Neutral
c) Basic
d) None of the above

81) The pH value for and aqueous solution of citric acid should be

a) Higher than 7.0
b) Equal to 11.0
c) Equal to 7.0
d) None of the above

82) In the stratosphere, oxygen and ozone interact with solar energy to form a

a) Dynamic system
b) Static system
c) Solar system
d) No System

83) The solubility of lead at a pH of 7.0 is lower than at a pH of 1.2

a) True
b) False

84) Adverse effects of acid rain on the aquatic life are due to

a) Increase in pH
b) Decrease in pH
c) Decrease in aqueous concentrations of Al
d) Decrease in aqueous concentrations of Pb

85) The reaction of limestone with H_2SO_4 (aq) generates gaseous

a) Carbon dioxide
b) Sulfur dioxide
c) Carbon monoxide
d) Sulfur trioxide

86) Solar energy is an example of a

a) Fossil energy source
b) Non-fossil energy source
c) No energy source
d) Nuclear energy source

87) One of the gases responsible for global warming is

a) CO
b) N_2O
c) N_2
d) O_2

88) Which of the following is a greenhouse gas?

a) Nitrogen
b) Oxygen
c) Methane
d) None of the above

89) One suggested way to control global warming is

a) Increase CO_2 emissions
b) Use more fossil fuels
c) Destroy CO_2 sinks
d) Conserve energy

90) Welders are at risk of being exposed to ozone in their profession

a) True
b) False

91) The increased intensity of ground-level ultraviolet radiation due to ozone depletion may lead to higher probability (in case of humans) of

a) skin cancer
b) deafness
c) depression
d) none of the above

92) Ground level O_3 is produced during photochemical reactions between

a) VOCs and O_2
b) H_2O and O_2
c) VOCs and NO_x in the presence of sunlight
d) VOCs and N_2 in the presence of O_2

93) Serious damage to lungs may occur on exposure to

a) O_2
b) NO_2
c) N_2
d) CO_2

94) Reye syndrome is a possible side effect to the consumption of

a) Trans fats
b) Candies
c) Ice Creams
d) None of the above

95) It is believed that the effectiveness of Aspirin is due to its ability to lower the production of prostaglandins

a) True
b) False

96) The criterion generally used to designate a drug with OTC status involves

a) Price
b) Availability of the active ingredient
c) Benefit – risk comparison
d) None of the above

97) When Botox is used in providing a more youthful look it is classified as

a) An OTC drug
b) A Cosmeceutical
c) An anti-inflammatory drug
d) And antiviral drug

98) Alkalating agents are used as chemotherapeutic agents.

a) True
b) False

99) Plant debris rest on surface of water bodies due to the

a) low surface tension of water
b) no surface tension of water
c) taste of water
d) high surface tension of water

100) Temperature extremes affect the working efficiency as well as the health of the worker

a) true
b) false