1 - The impact of household cleaners 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 immediately after use

2 - A cationic surfactant is:
a) Positively charged
b) Negatively charged
c) Both positively and negatively charged
d) None of the above

3 - In the process of hair coloring, the desired color is obtained by:
a) Oxidation of the natural hair pigment
b) Application of an organic synthetic dye
c) Setting the hair in the desired shape
d) Treating the hair with a reducing agent

4 - Fragrances in perfumes are generally experienced in three stages or notes because of the:
a) Volatility of the ingredients
b) Density of the ingredients
c) Price of the ingredients
d) Color of the ingredients

5 - Sunscreen products contain chemicals to absorb:
a) Microwaves
b) Vibration
c) Infrared radiation
d) UV Radiation

6 - The effective chemical ingredients in deodorants are:
a) Antibacterial agents and perfumes
b) Water and table salt
c) Pigments
d) Dyes

7 - Surfactants are effective in:
a) Reducing the density of water
b) Increasing the surface tension of water
c) Decreasing the surface tension of water molecules
d) Heating water molecules

8 - Which ions are responsible for the hardness of water?
a) Na^+ and K^+
b) F^- and Cl^-
c) Al^{3+} and Br^-
d) None of the above

9 - In the cleaning process the soap (or detergent) provides:
a) Mechanical interaction
b) Thermal interaction
c) Chemical interaction
d) None of the above

10 - Laundry detergents are formulated by mixing many ingredients because they perform diverse functions.
a) True
b) False

11 -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

12 - The compound with the formula CH_3OH is an:
a) Alcohol
b) Ether
c) Amine
d) Ester

13 - The compound with the formula C_4H_9OH is an:
a) Alcohol
b) Ether
c) Amine
d) Ester

14 - How many hydrogen atoms are there in a compound with the formula $CH_3(CH_2)_3OH$?
a) 4
b) 9
c) 6
d) 10

15 - How many hydrogen atoms are there in a compound with the formula $CH_3(CH_2)_3NH_2$?
a) 4
b) 9
c) 11
d) 8

16 - The number of hydrogen atoms in a cyclohexane ring is:
a) 6
b) 9
c) 12
d) None of the above

17 - The number of hydrogen atoms in a benzene ring is:
a) 6
b) 9
c) 12
d) None of the above

1 - Which of the following is a bacterial infection?
a) Cancer
b) AIDS
c) Depression
d) None of the above

19 - Which of the following is a bacterial infection?
a) Cancer
b) AIDS
c) Depression
d) Tuberculosis

20 - Tetracyclines are used as:
a) Anticancer drugs
b) Antiviral drugs
c) Antibiotics
d) None of the above

21 - Cephalosporins are used as:
a) Antiviral drugs
b) Antibiotics
c) Anti-inflammatory drugs
d) None of the above

22 - Topoisomerase inhibitors are used for the treatment of:
a) AIDS
b) Cancer
c) Influenza
d) Arthritis

23 - Chemotherapy involves treatment of cancer using:
a) Chemicals
b) Hypnotherapy
c) Surgery
d) None of the above

24 - The treatment of AIDS involves the use of
a) Antibacterial agents
b) OTCs
c) Antiviral agents
d) Antidepressants

25 - The treatment of AIDS involves the use of:
a) Antibacterial agents
b) OTCs
c) Antidepressants
d) None of the above

26 - SSRIs are used as:
a) Fungicide
b) Insecticide
c) Antidepressants
d) Growth hormone

27 - The treatment of depression involves the use of:
a) Penicillins
b) Protease inhibitors
c) Anti-inflammatory agents
d) SSRIs

28 - It is believed that the effectiveness of Aspirin is due to its ability to increase the production of prostaglandins.
a) True
b) False

29 - A functional group can be visualized as the chemically functioning part of the molecule.
a) True
b) False

30 - Weakly acidic nature of rain is due to dissolved:
a) CO_2 (g)
b) O_2 (g)
c) O_3 (g)
d) N_2 (g)

31 - The pH of a solution is measured to be 7.0. The solution is:
a) Acidic
b) Basic
c) Neutral
d) None of the above

32 - Hydroelectric is an example of a:
a) Fossil energy source
b) Non-fossil energy source
c) No energy source
d) Solar energy source

33 - One of the gases responsible for global warming is:
a) CO
b) N_2
c) N_2O
d) O_2

34 - The combined interaction of ozone/oxygen in the stratosphere with solar radiation protects us from the harmful effects of:
a) UV radiation
b) IR radiation
c) Microwaves
d) None of the above

35 - The pH value for a solution of sodium acetate (a basic solution) should be:
a) Above 7.0
b) Below 7.0
c) Equal to 7.0
d) Equal to 1.5

36 - The solubility of lead at a pH of 9.5 is higher than at a pH of 4.2.
a) True
b) False

37 - The agreement to reduce and ultimately ban the manufacture and use of CFCs goes by the name of:
a) Kyoto protocol
b) EC Free Trade Agreement
c) Geneva Convention
d) Montreal Protocol

38 - Energy conservation is one of the suggested ways to control global warming.
a) False
b) True

39 - The reaction of calcium carbonate with sulfuric acid generates gaseous:
a) CO
b) CO_2
c) O_2
d) O_3

40 - Solve the following problems and express the answers in scientific notation with the correct number of significant digits.
a) 0.030 g / 0.99732 g ml^{-1}
b) 53.032 g – 27.932 g
c) 0.1315 g + 12.03 g + 1.342 g + 5.39 g
d) (81.35 ml – 31.321 ml) / 81.321 ml
e) $3.12 \times 10^{-2} + 12.08 + 31.01 \times 10^{-2}$

41 - A metal block weighs 29.454 g and is 2.35 cm long, 1.34 cm wide and 1.05 cm high. Which one of these answers has the correct density? What is the name of the element?
a) Ni 8.91 g/cm^3
b) Zn 7.14 g/cm^3
c) Ti 4.00 g/cm^3
d) Sn 7.23 g/cm^3

42 - A microchip contains 5.68 mg of Si (silicon).
a) How many moles does it contain?
b) How many atoms are there?

43 - How many protons, neutrons and electrons are found in the following?
a) Mg
b) Mg^{2+}
c) Co^{2+}
d) Co
e) Cl^-

44 - Identify the element (whole name and abbreviation) based on the atomic number and atomic mass:
a) Atomic number: 15, Atomic mass: 31 _____ _____
b) Atomic number: 53, Atomic mass: 127_____ _____
c) Atomic number: 19, Atomic mass: 39 _____ _____
d) Atomic number: 47, Atomic mass: 108_____ _____
e) Atomic number: 82, Atomic mass: 207_____ _____

45 - Soaps are considered water-soluble, whereas detergents are water-insoluble
a) False
b) True

46 - The term hydrophilic means water-soluble, whereas hydrophobic means water hating
a) False
b) True

47 - There are four different types of surfactants that are categorized based on the number of carbon atoms in their structure
a) False
b) True

48 - Cleaning process can be viewed as a combination of several interactions; chemical, mechanical and vibrational interactions
a) False
b) True

49 - An anionic surfactant is without charge
a) False
b) True

50 - For water to be classified as hard, it should contain (Na+) ions.
a) False
b) True

51 - Household soaps and detergents are classified into several types, depending on their brand name
a) False
b) True

52 - Household cleaners are considered environmentally friendly, b/c they are solely made of natural ingredients.
a) False
b) True

53 - One of the main differences between soaps and detergents is that soaps are synthetic surfactants.
a) False
b) True

54 - There are different types of personal care products, which are categorized according to their colour and small.
a) False
b) True

55 - Hair conditioner contains amphoteric surfactant, whereas shampoo contains cationic surfactants
a) False
b) True

56 - There are 5 steps that are used in curling of hair
a) False
b) True

57 - Hair colouring involves two step, using a bleaching agent as an oxidation agent
a) False
b) True

58 - Sunscreen products are used to absorb X-ray radiation
a) False
b) True

59 - Lipsticks and mascara are examples of hair care products
a) False
b) True

60 - The ingredients in perfumes are blended based upon their taste
a) False
b) True

61 - Surfactants are only used with detergents and soaps, and are not ingredients in personal care products
a) False
b) True

62 - UV radiation stands for infrared radiation
a) False
b) True

63 - Elements can form compounds with all other elements?
a) True
b) False

64 - If you are traveling at a speed of 100km per hour, how long will it take to travel 340 X 10^3km?

65 - Convert the following measurements:
a) 100ml into µl
b) 0.025mg into g
c) 3000m/s into km/hr

66 - What is the formula of calcium hydrogen carbonate also known as calcium bicarbonate?
a) $CaHC0_3$
b) Ca_2HC0_3
c) $Ca(HC0_3)_2$

67 - A sample of your tap water contains 45 mg of NaCl (sodium chloride, also known as table salt) in a total volume of 10ml.
a) How many moles of NaCl does it contain?
b) How many atoms are there in this sample?
c) Do you think this water would taste salty?

68 - Name each of the following compounds.

a) Na_2SO_4 _____
b) $NaHCO_3$_____
c) $Fe(NO_3)_3$ _____
d) N_2O_3 _____
e) PCl_5 _____
f) N_2O_5 _____

69 - What are the coefficients for the reactants and the products when the equation for the reaction:
$Ca(OH)_2$ (aq) + H_2SO_4 (aq) → $CaSO_4$ (s) + H_2O (ℓ) Is balanced?
a) 2, 2, 2, 4
b) 1, 1, 1, 1
c) 1, 1, 1, 2
d) None of the above

70 - What is the mass in grams of one mole of sulfur atoms?
a) 32.06 g
b) 64.12 g
c) 16.02 g
d) 96.18 g

71 - What is the mass in grams of 6.022×10^{23} atoms of calcium?
a) 6.022×10^{23} g
b) 40.08 g/mol
c) 6.022 g/mol
d) 1.022×10^{23} g

72 - Potassium nitrate has the formula:
a) KNO_3
b) $K_2(NO_3)_2$
c) $K(NO_3)_2$
d) K_2NO_3

73 - The correct name for $FeCl_3$ is:
a) Iron chloride
b) Iron trichloride
c) Iron (III) chloride
d) Monoiron trichloride

74 - If 5.0 mL of a liquid has a mass of 4.90 g, its density is:
a) 0.098 g/mL
b) 9.8×10^{-1} g/mL
c) 98.0×10^{-2} g mL^{-1}
d) 9.80×10^{-1} g/mL

75 - After performing a calculation, Frank's calculator displayed the result as 5.25916. If the answer can have only three significant figures and must be expressed using scientific notation, it should be reported as:
a) 5.25
b) 5.25×10^0
c) 0.525×10
d) 5.26×10^0

76 - How many liters (expressed in scientific notation and with appropriate number of significant figures) are there in 3.00 µL?
a) 3.00×10^{-6} L
b) 30.00×10^{-5} L
c) (300/1000) L
d) 0.300×10^{6} L

77 - Element with an atomic number of 54 is a:
a) Metal
b) Non-metal
c) Metalloid
d) None of the above

78 - If an atom contains 8 protons and 10 electrons it is:
a) A cation
b) An anion
c) An atom with no charge
d) None of the above

79 - An object had a mass of 4.1876 g when weighed on an analytical balance. The uncertain digit in the measurement is:
a) 7
b) 8
c) 5
d) 6

80 - The final answer for the calculation, $(5.173 \times 10^{5}) \times (11.5 \times 10^{2})$ contains:
a) 4 significant figures
b) 3 significant figures
c) 1 significant figure
d) 10^{6} significant figures

81 - The volume of a room measuring 6.5 m × 6.2 m × 3.0 m is given by:
a) 120.9 m^3
b) 120.9
c) 1.21 x 10^{2} m^3
d1.2 x 10^{2} m^3

82 - The smallest volume is represented by:
a) 1.0 L
b) 1000 mL
c) 1.0×10^{4} µL
d) 1.0×10^{4} cm^3

83 - In the Periodic Table, the halogens are in the same
a) Group
b) Period
c) Section
d) None of the above

84 - 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 substances and the processes
d) All of the above

85 - A doctor working in an area with the possibility of exposure to X-Rays is at risk of being exposed to which of the following agents?
a) Chemical
b) Physical
c) Biological
d) None of the above

86 - The hazard posed by concentrated solutions of potassium permanganate (an oxidizing agent) is classified as:

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

87 - Which of the following statements is false?
a) Severe damage to eyes may result from excessive exposure to ultraviolet radiation
b) Microwaves do not penetrate appreciably below the skin
c) X-Rays are highly penetrating and damaging to tissue
d) Radiation can be detected by human senses

88 - According to WHMIS, the cost of effective worker training must be paid by the:
a) Employer
b) Employee
c) Supplier
d) Regulators

89 - Chemicals causing changes in DNA are known as:
a) Carcinogens
b) Mutagens
c) Teratogens
d) Irritants

90 - Spray painting generates fine liquid droplets suspended in air called:
a) Paint Spray mist
b) Solid mist
c) Acid mist
d) All of the above

91 - The unit used to express exposure to vapors is:
a) m3/L
b) L
c) ppm
d) All of the above

92 - The abbreviation WHMIS stands for:
a) World Human Migration Institute Stand
b) Workplace Hazardous Materials Information System
c) Workplace Helpful Materials Indexing System
d) None of the above

93 - Ergonomic stresses arise as a result of optimal adjustment between the worker and the workplace.
a) False
b) True

94 - A concentration of of 15.0 ppb for a gas in air is equal to:
a) 1.50 × 102 ppb
b) 1.50 × 10-2 ppm
c) 1.50 × 105 %
d) 1.50 × 10-3 %

95 - Which of the following poses the most risk (based upon TLV-TWA values given in parentheses):
a) Compound A (2 ppb)
b) Compound B (2.5 × 104 ppb)
c) Compound C (100 ppb)
d) Compound D (3.0 × 10-4 %)

96 - Nitrogen is a minor component of the air we breathe.
a) True
b) False

97 - The electron pair in the O-H bond of water is more strongly attracted by the oxygen atom due to its higher:
a) Electronegativity
b) Molar mass
c) Atomic radius
d) None of the above

98 - Exposure to O3 may cause:
a) Reduced lung function
b) Enhanced lung function
c) Hair loss
d) Memory loss

99 - NOx represents:
a) NO2 only
b) Mixture of oxides of nitrogen
c) Droplets of HNO3
d) Particles of nitrate salts

100 - The concentration of air contaminants is determined by:
a) Exposing humans to the contaminant
b) Sampling and analyzing to the contaminant
c) Exposing animals to the contaminant
d) None of the above

101 - A worker is repeatedly exposed to a concentration of 2.5 × 10-4 % of a substance. If the TLV-TWA for the substance is 5.0 ppm, is it a safe work environment for the worker?
a) Yes
b) No

102 - Risk characterization integrates the exposure and effects components to estimate the risk.
a) True
b) False

103 - The presence of hydrogen bonding in water accounts for its:
a) Taste
b) Odor
c) Color
d) None of the above