9th Science Lesson 16 Questions in English

16] Applied Chemistry

1. Assertion (A): Applied chemistry is used to resolve the real-world problems.
Reasoning(R): Chemical principles and theories are applied in various fields.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Chemical principles and theories are applied to various fields in order to achieve specific results or to solve real-world problems. This is called applied chemistry.

2. Which of these does not influence the characteristics of a material?
a) Size
b) Shape
c) Source
d) Physical quantities
Explanation
The size and shape of materials influence their characteristics. Scientists found that materials having size about 1/1,000,000,000 metres show special characteristics.

3. Which of these studies are made by the Nano chemistry branch?
a) Reusing Nano materials.
b) Effect of size of materials on properties.
c) Effect of chemical properties.
d) Physical characteristics of Nano materials.
Explanation
The Scientist started producing kind of special materials and studied the effect of size on properties. Thus a new branch of chemistry called 'Nano chemistry' was developed.

4. Choose the Incorrect statements.
i) The chemical applications of Nano technology is dealt with the Nano chemistry.
ii) Nano chemistry involves synthesis and manipulation of materials at atomic and molecular level.
iii) The study of chemical properties alone is done by Nano chemistry.
a) i only
b) ii only
c) iii only
d) None of the above

Explanation

Nano chemistry is a branch of Nano science that deals with the chemical applications of nanomaterial's in nanotechnology. It involves synthesis and manipulation of materials at atomic and molecular level and the study of their physical and chemical properties.

5. From which of this language Nano is derived?

a) Greek

b) Latin

c) Persian

d) Roman

Explanation

The word Nano has been derived from the Greek word 'Nanos' which is designated to represent billionth fraction of a unit.

6. Which of this value is equal to one nanometer?

a) 0.000000001meter

b) 0.0000000001 meter

c) 0.000000010 meter

d) 0.1000000000 meter

Explanation

One nanometer (nm) is 10−9 or 0.000,000,001 meter.

7. What is the approximate value of human DNA?

a) 4nm

b) 0.2 nm

c) 2nm

d) 20nm

Explanation

The DNA double helix is 2 nm across.

8. What is the diameter of an hydrogen atom?

a) 20nm

b) 200nm

c) 2nm

d) 0.2nm

Explanation

The diameter of one hydrogen atom is around 0.2 nm.

9. What are the properties of nano materials?

a) Reduced Imperfections

b) Spatial confinement
c) High surface energy
d) All the above
Explanation
The properties of materials with nano meter dimensions are significantly different from those of atoms and bulk materials. This is mainly because the nano meter size of the materials render them, larger surface area, high surface energy, spatial confinement and reduced imperfections which do not exist in the corresponding bulk materials.

10. Which of these characteristics are considered mainly for a nano material?
a) Surface characteristics
b) Temperature
c) Atom arrangement
d) Energy
Explanation
The surface characteristics of nanoparticles are the main criteria to be considered for applications.

11. Which of these instruments are not used to analyze the surface properties of nano material?
a) Scanning Electron Microscope
b) Compound Light Microscope
c) Tunneling Electron Microscope
d) Atomic Force Microscope
Explanation
Highly sophisticated instruments like Scanning Electron Microscope (SEM), Tunneling Electron Microscope (TEM) and Atomic Force Microscope (AFM) are used to analyze the surface properties of a nanoparticle with high resolution.

12. What is the usage of metallic nano particles in the sophisticated instruments?
a) Active catalysts
b) High resolution
c) Easy configuration
d) None of the above
Explanation
The metallic nanoparticles can be used as very active catalysts to analyze the surface properties of a nanoparticle with high resolution.

13. What are the applications of nano coatings?
a) Sports equipment's
b) Bicycles
c) Automobiles

d) All the above

Explanation

Nano coatings and nano composites are found useful in making variety of products such as sports equipment, bicycles and automobiles etc.

14. In which of these Nano particles are not used?

a) Microchips

b) Implant surgery

c) Microscopes

d) Cosmetics

Explanation

Nanotechnology is applied in the production of synthetic skin and implant surgery. Nano materials that conduct electricity are being used in electronics as minute conductors to produce circuits for microchips. Nano materials have extensive applications in the preparation of cosmetics, deodorants and sun screen lotion.

15. Which of this growth is prevented by nanoparticles in fabrics?

a) Virus

b) Bacteria

c) Fungi

d) Algae

Explanation

Nanoparticle substances are incorporated in fabrics to prevent the growth of bacteria.

16. Assertion (A): Nanoparticles are unstable with oxygen and can cause explosion.

Reasoning(R): Nano particles are highly reactive with impurities.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Nanoparticles are unstable when they react with oxygen. Their exothermic combustion with oxygen can easily cause explosion. Because nanoparticles are highly reactive, they inherently interact with impurities as well.

17. Choose the correct statements.

i) Nano materials are biologically safe and non-toxic.

ii) Nano materials are easy to synthesis and isolate.

iii) Nano materials do not have any hard and fast safe disposal policies.

a) i only

b) ii only
c) iii only
d) All the above
Explanation
Nano materials are biologically harmful and toxic. It is difficult to synthesis, isolate and apply them. There are no hard-and-fast safe disposal policies for nano materials.

18. Assertion (A): Pharmaceutical chemistry is the study of drugs.
Reasoning (R): The general laws of chemistry are followed to study drugs.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Pharmaceutical chemistry is the chemistry of drugs which utilizes the general laws of chemistry to study drugs.

19. Which of these are not related to Pharmaceutical chemistry?
a) Drugs preparation
b) Storage conditions of drugs
c) Study of chemical composition of drugs
d) Disadvantages of drugs
Explanation
Pharmaceutical chemistry deals with preparation of drugs and the study of chemical composition, nature, behavior, structure and influence of the drug in an organism, condition of their storage and the therapeutic uses of the drugs.

20. What is the core of pharmaceutical chemistry?
a) Study of drugs
b) Drug discovery
c) Usage of drugs
d) Influence of drugs
Explanation
Drug discovery is the core of pharmaceutical chemistry.

21. What is the origin of the word Drug?
a) French
b) Arab
c) Latin
d) Greek

Explanation

The chemicals used for treating diseases are termed as drug. The word drug is derived from the French word 'droque' which means a dry herb.

22. Which of these organ defined drug is used to modify or explore physiological systems?

a) National Institute of Health

b) National Library of Medicine

c) World Health Organization

d) Centers for Disease control and Prevention

Explanation

According to World Health Organization a drug is defined as follows: 'It is a substance or product that is used or intended to be used to modify or explore physiological systems or pathological states for the benefits of the recipient'.

23. Which is not a characteristic of drugs?

a) Non-toxic

b) Cheap and easily available

c) Not affect normal physiological activities

d) No side effects

Explanation

A drug must possess the following characteristics: It should not be toxic. It should not cause any side effects. It should not affect the receptor tissues. It should not affect the normal physiological activities. It should be effective in its action.

24. Assertion (A): Animals and plants are the main sources of drugs.

Reasoning(R): Synthesized drugs are adopted by modern manufacturers for specialized treatments.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

The main sources of drugs are animals and plants. The modern manufacturers adopt many chemical strategies to synthesize drugs for specialized treatments which are more uniform than natural materials.

25. Identify the Incorrect match.

A. Microorganism	i) Aspirin
B. Minerals	ii) Liquid Paraffin
C. Plants	iii) Morphine
D. Genetic Engineering	iv) Human growth Hormone

a) i only
b) ii only
c) iii only
d) iv only
Explanation

Source or Process	Drug
Plants	Morphine, Quinine
Chemical Synthesis	Aspirin, Paracetamol
Animal	Insulin, Heparin
Minerals	Liquid Paraffin
Microorganism	Penicillin
Genetic Engineering	Human growth Hormone

26. How many categories of drugs are characterized?
a) 3
b) 5
c) 2
d) 4
Explanation
Drugs fall into two general categories:

- The drugs that are used in the treatment and cure of any specific disease.
- The drugs that have some characteristic effect on the animal organism but do not have any remedial effect for a particular disease. This class includes, morphine, cocaine etc.

27. Which does not have a characteristic effect on animal organism?
a) Cocaine
b) Morphine
c) Paracetamol
d) Heroin
Explanation
The drugs that have some characteristic effect on the animal organism do not have any remedial effect for a particular disease. This class includes, morphine, cocaine etc.

28. Which of this drug causes loss of sensation?
a) Penicillin
b) Anesthetics
c) Aspirin
d) Insulin
Explanation

The drugs which cause loss of sensation are called Anesthetics. They are given to patients when they undergo surgery.

29. Assertion (A): General anesthetics agents bring loss of all modalities of sensation.
Reasoning(R): It causes loss of pain with reversible loss of consciousness.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
General anesthetics: They are the agents, which bring about loss of all modalities of sensation, particularly pain along with 'reversible' loss of consciousness.

30. Choose the correct statements regarding the local anesthetics.
i) It is used in major surgeries to relieve pain.
ii) Used to prevent pain in localized areas without affecting the degree of consciousness.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii
Explanation
Local anesthetics: They prevent the pain sensation in localized areas without affecting the degree of consciousness. For example, dentist give patients this kind of anesthetics when carry out a minor surgery in teeth.

31. How many major anesthetics chemicals are used?
a) 5
b) 2
c) 4
d) 3
Explanation
Chemicals as Anesthetics: There are three major chemicals which are used as anesthetics.

32. Choose the Incorrect statements regarding Nitrous oxide.
i) It is a red color organic gas.
ii) It is mixed with general anesthetics like ether.
iii) It is the safest anesthetic agent.
a) i only
b) ii only
c) iii only

d) None of the above

Explanation

Nitrous Oxide (N2O): It is a colorless, nonirritating, inorganic gas. It is the safest of the anesthetic agents. This is used after mixing general anesthetics like ether.

33. Which of these forms a toxic in reaction with oxygen?

a) Ether

b) Penicillin

c) Nitrous Oxide

d) Chloroform

Explanation

Chloroform (CHCl3): It is a volatile liquid. It has pleasant smell and sweet taste. With oxygen it forms a toxic carbonyl chloride. Hence it is not used now.

34. Which is not ether?

a) Diethyl ether

b) C_2H_5-O-C_2H_5

c) C_6H_6

d) Simple ether

Explanation

Ether: Diethyl ether or simple ether (C_2H_5-O-C_2H_5) is a volatile liquid.

35. Which is used as a stabilizer with ether?

a) Acetylene

b) Propyl Halide

c) Xylene

d) Cyclohexane

Explanation

Ether is mixed with a stabilizer 0.002% propyl halide. After absorption by tissues it attacks the central nervous system and makes the patient unconscious.

36. What is the effect of analgesics?

a) Local anesthetics

b) Loss of consciousness

c) Antibiotic

d) Pain killers

Explanation

Analgesics are the compounds which relieve all sorts of pains without the loss of consciousness. These are also called as pain killer or pain relievers.

37. Which of these are healed by analgesics?
a) Headache
b) Myalgia
c) Arthralgia
d) All the above
Explanation
Analgesics are effective in healing headaches, myalgia and arthralgia.

38. Which is not used as analgesics?
a) Aspirin
b) Penicillin
c) Novalgin
d) Opioids
Explanation
Aspirin and Novalgin are the commonly used analgesics. Aspirin acts both as antipyretic as well as analgesic. Certain narcotics (which produce sleep and unconsciousness) are also used as analgesics.

39. Assertion (A): The Analgesics are given orally or applied externally.
Reasoning(R): Externally applicable pain killers are available in gel form.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
The analgesics are given either orally or applied externally. In general externally applicable pain killers come as 'gels'.

40. What is the usage of antipyretics compounds?
a) Pain reliever
b) Lowering body temperature to normal
c) Antibiotics
d) Anesthetics
Explanation
Antipyretics are the compounds which are used for the purpose of reducing fever (lowering the body temperature to the normal). They are taken orally as tablets and capsules.

41. Which of these are not used as antipyretics?
a) Phenacetin
b) Novalgin

c) Aspirin
d) Paracetamol
Explanation
The most common antipyretics are aspirin, antipyrine, phenacetin and paracetamol.

42. For which of these infections antiseptic are used?
a) Pathogens
b) Fungus
c) Protozoa
d) Bacteria
Explanation
Antiseptic is a substance that prevents infections caused by disease causing microorganisms or pathogens.

43. Choose the correct statements regarding the antiseptics.
i) They are used to kill micro-organism and prevent their growth.
ii) It is only used for cleansing externally wounds.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii
Explanation
Antiseptics either kill the micro-organism or prevent their growth. Antiseptics are used externally to cleanse wounds and internally to treat infections of the intestine and bladder.

44. Which of these statements are not correct?
a) Iodoform is used as antiseptic and disinfectant.
b) Phenol is used only as a disinfectant.
c) Hydrogen peroxide is a minor antiseptic.
d) CHI_3 is the molecular formula for Iodoform.
Explanation
Iodoform (CHI3) is used as an antiseptic and its 1% solution is a disinfectant. 0.2 % solution of phenol acts as an antiseptic and its 1% solution is a disinfectant. Hydrogen peroxide is a minor antiseptic mainly used for cleansing wounds.

45. What are the effects of malaria disease?
a) Fever and shivering
b) Body temperature is raised to 106°F
c) Causes Anemia.
d) All the above

Explanation
Malaria is a vector borne disease which causes shivering and fever. It raises the body temperature to 103-106 °F. It causes physical weakness with the side-effects in liver and also causes anemia.

46. From which of these Quinine is obtained?
a) Neem
b) Turmeric
c) Aloe Vera
d) Cinchona bark
Explanation
Extracts of roots and stems of certain plants are extensively used as antimalarial. Quinine is a natural antimalarial obtained from Cinchona bark.

47. Which of this is not an antimalarial?
a) Pyrimethamine
b) Ether
c) Primaquine
d) Chloroquine
Explanation
The last antimalarial discovered in 1961 is pyrimethamine. However, quinine, primaquine and chloroquine are some of the best antimalarial.

48. Which is used to control the malarial parasites?
a) Chloroquine
b) Quinine
c) Iodoform
d) Hydrogen peroxide
Explanation
Chloroquine is used specially to control malarial parasites such as plasmodium ovale, plasmodium vivax etc. It is not used in curing the disease. It is used as an additive with other antimalarial drugs.

49. Which of this chemical compound is not an antibiotic?
a) Protozoa
b) Bacteria
c) Fungi
d) Molds
Explanation
Many microorganisms (bacteria, fungi and molds) produce certain chemicals which inhibit the growth or metabolism of some other disease causing micro-organisms. Such chemical compounds are known as antibiotics.

50. Assertion (A): The effective antibiotics are present only in low concentration.
Reasoning(R): Antibiotics involves in the growth or metabolism of disease causing micro-organisms.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Antibiotics are chemicals inhibit the growth or metabolism of some other disease causing micro-organisms these need to be present only in low concentration to be effective in their antibiotic action.

51. From which of this mold the first antibiotic was discovered?
a) Black mold
b) Penicillum digitatum
c) Penicillium notatum
d) Mucor racemosus
Explanation
The first antibiotic 'penicillin' was discovered by Alexander Fleming in 1929 from the mold Penicillium notatum.

52. Which of these diseases are cured by penicillin?
a) Rheumatic fever
b) Bronchitis
c) Pneumonia
d) All the above
Explanation
Penicillin is extensively used for rheumatic fever, narrowing of heart wall, bronchitis, and pneumonia etc.

53. Which is not a source of antibiotics?
a) Bacteria
b) Virus
c) Fungi
d) Actinomycetes
Explanation
There are three main sources of antibiotics: (i) Bacteria (ii) Fungi and (iii) Actinomycetes

54. Which of these are natural antibiotics?

a) Honey
b) Ginger
c) Neem
d) All the above
Explanation
The original antibiotics like a lot of today's antibiotics are derived from natural sources. Certain plant extracts, essential oils, and even foods have antibiotic properties. Example: Honey, garlic, ginger, clove, neem and turmeric.

55. Which of these drugs is used to balance the acidity in Human body?
a) Antacids
b) Azithromycin
c) Amoxicillin
d) Ativan
Explanation
Quite often after eating oily and spicy food one may feel uncomfortable due to some burning sensation in stomach / food pipe. This is due to imbalance in the acidity in the stomach. Certain drug formulations provide relief from such burning sensation. These are known as antacids.

56. Choose the correct statements.
i) Antacids are available only in tablet form.
ii) Magnesium and Aluminium hydroxides are added for color and flavoring agents of antacids.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii
Explanation
Antacids are available in tablet as well as gel / syrup forms. These antacids contain magnesium and Aluminium hydroxides in addition to flavoring agents and color.

57. Assertion (A): Electrochemistry is the branch of applied chemistry.
Reasoning(R): The chemical energy can be converted into electrical energy and vice versa.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
The chemical reactions (chemical energy) that take place in the battery produce electricity (electrical energy). So when scientists realized that chemical energy can be converted into

electrical energy and vice versa another branch of applied chemistry was developed. It is Electrochemistry.

58. Which of these processes is mainly considered in Electrochemistry?
a) Electrode and electrolyte
b) Chemical energy
c) Process of conversion
d) Energy consumption
Explanation
Electrochemistry is a branch of chemistry which deals with the relation between electrical energy and chemical change. It is mainly concerned with the processes taking place between the electrode and solution having ions called electrolyte.

59. Which of this reaction produce electricity in Electrochemistry?
a) Double Replacement
b) Decomposition
c) Redox
d) Combustion
Explanation
Only redox reactions that take place in a specific device can produce electricity.

60. Which of this device produce electricity by using chemical changes?
a) Electrochemical cell
b) Microbial fuel cell
c) Both a and b
d) None of the above
Explanation
The device that makes use of a chemical change to produce electricity or electricity to produce chemical change is called Electrochemical Cell.

61. How many components are comprised in an electrochemical cell?
a) Three
b) Two
c) Four
d) Ten
Explanation
An electrochemical cell may comprise of two major components.

62. Choose the Incorrect statements.
i) Electrodes are solid electrical conductor made of metal and some non-metals.

ii) A cell consists of more than two electrodes.
iii) Anode and Cathode are used in cells.
a) i only
b) ii only
c) iii only
d) All the above
Explanation
Electrode: It is a solid electrical conductor made of metal (sometimes non-metal like graphite). A cell consists of two electrodes. One is called Anode and the other is called Cathode.

63. Which of these have molten salts or ion solutions?
a) Electrode
b) Electrolyte
c) Anode
d) Cathode
Explanation
Electrolyte: It is made up of solutions of ions or molten salts which can conduct electricity.

64. How many reactions are involved in an electrochemical cell?
a) 2
b) 3
c) 1
d) 4
Explanation
An electrochemical cell involves two reactions simultaneously.

65. Oxidation is _____ of electron takes place at _____.
a) Loss, Anode
b) Gain, Anode
c) Loss, Cathode
d) Gain, Cathode
Explanation
Oxidation: As we know already an oxidation is loss of electron. In electrochemical cells oxidation takes place at anode. Metal → Metal ion + electron (e-)

66. Where the reduction takes place in a electrochemical cell?
a) Anode
b) Electrolyte
c) Cathode
d) Electrode

Explanation
Reduction: It involves gain of electron. Reduction takes place at cathode. Metal ion + electron (e-) → Metal

67. Which of this reaction is involved in the inter conversion of electrical and chemical energy?
a) Oxidation
b) Redox
c) Galvanization
d) Hydrogen replacement
Explanation
Both the reactions take place simultaneously, the inter conversion of electrical and chemical energy in electrochemical cells involves a redox reaction.

68. On what basis the electrochemical cells are classified?
a) Elements
b) Source of energy
c) Type of chemical reaction
d) Nature of energy conversion
Explanation
Based on the nature of the energy conversion, electrochemical cells are broadly classified.

69. Choose the Incorrect statements about the Galvanic cell.
i) It is a type of electrochemical cell converts chemical energy into electrical energy.
ii) It consists of three cells.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii
Explanation
Galvanic Cell: It is an electrochemical cell which converts chemical energy into electrical energy i.e. it produces electricity from chemical reactions. It consists of two half cells namely anodic half-cell and cathodic half-cell.

70. Choose the correct statements.
i) Anode is in contact with its electrolyte in anodic half-cell.
ii) Anode and cathode are connected by conducting wire.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii

Explanation

In anodic half-cell of galvanic cell the anode is in contact with its electrolyte whereas in cathodic half-cell, the cathode is in contact with its electrolyte. The anode and cathode are connected by a conductor wire.

71. What connects the electrolytes of half-cells in a galvanic cell?

a) HCl solution

b) Salt bridge

c) Copper wire

d) None of the above

Explanation

The electrolytes of half-cells are connected through a tube containing a saturated salt solution. It is called salt bridge. Thus in galvanic cell, both the half-cells are kept separately but stay connected electrically.

72. Which of this process produces electricity in the galvanic cell?

a) Oxidation reaction only

b) Reduction reaction only

c) Redox reaction

d) None of the above

Explanation

At anode, oxidation takes place which releases electrons. These electrons are attracted by cathode and hence the electrons flowing from anode to cathode are gained in reduction reaction. As long as the redox reaction proceeds, there is a flow of electrons and hence electricity.

73. Which is not a feature of the electrolytic cell?

a) Converts chemical energy to electrical energy.

b) Anode and cathode are in contact with same electrolyte.

c) Anode and cathode half cells are separated.

d) Redox reaction produces electricity.

Explanation

Electrolytic Cell: It is an electrochemical cell which converts electrical energy into chemical energy i.e. in electrolytic cells; electricity is used to bring about chemical reactions. Here, both anode and cathode are in contact with same electrolyte and thus the half-cells are not separated. As seen in galvanic cells, electrolytic cell also involves redox reaction.

74. Which is not a usage of electrochemistry?

a) To predict occurrence of a reaction.

b) Production and purification of non-ferrous metals.

c) Electro-synthesis of organic compounds.

d) Type of chemical reaction.

Explanation

Electrochemistry: It has been used to discover important technical processes for the production and purification of non-ferrous metals, and for the electro- synthesis of organic compounds. Electrochemistry is used to predict whether a particular reaction will occur or not.

75. Which of this redox reaction is identified in the alcohol detection?

a) Ethanol

b) Methane

c) Benzene

d) Ether

Explanation

The detection of alcohol in drunken drivers is possible through the electrochemical redox reaction of ethanol.

76. Which of these metals are produced from the electrochemical reaction of their ores?

a) Tin

b) Aluminum

c) Gold

d) Steel

Explanation

Production of metals like aluminum and titanium from their ores involve electrochemical reactions.

77. Which of these directly convert chemical energy into electrical energy?

a) Lead acid batteries

b) Fuel cells

c) Lithium-ion batteries

d) All the above

Explanation

Lead acid batteries, lithium-ion batteries and fuel cells are based on electrochemical cells. Fuel cell is used to bring about direct conversion of chemical energy into electrical energy.

78. Assertion (A): Isotopes are atoms with same number of protons and electrons and different number of neutrons.

Reasoning(R): All the isotopes found in nature are stable and stay forever.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation
Isotopes are atoms with same number of protons and electrons and a different number of neutrons. Some isotopes are stable and stay forever. These are the elements that we see around us and find in nature.

79. In which form the isotopes lose their energy?
a) Radiation
b) Conduction
c) Convection
d) All the above
Explanation
Some isotopes are unstable and they undergo disintegration by losing their energy in the form of radiation.

80. Choose the correct statements.
i) Every element tries to attain stability by sharing, losing or gaining electrons.
ii) The Unstable isotopes lose their energy in the form of radiation.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii
Explanation
Every element tries to attain stability by sharing, losing or gaining electrons (octet rule). Thus the unstable isotopes of elements lose their energy in the form of radiation to become stable.

81. Assertion (A): The radioactive decay of isotopes is called as Radioactivity.
Reasoning (R): Radioactive isotope is also called as radioisotope.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
The Isotope which undergoes radioactive decay is called radioactive isotope or radioisotope. This property of isotopes is known as radioactivity.

82. Which of this gas is acquired by decaying uranium?
a) Neon
b) Carbon
c) Radon
d) Argon

Explanation

Uranium in the ground can decay into radon gas which can be very dangerous to humans. It is thought to be the second leading isotope to cause lung cancer.

83. Assertion (A): Radiochemistry is the study of radioactive and non-radioactive isotopes.
Reasoning(R): Artificial isotopes are only included in radiochemistry.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Radiochemistry is the study of chemistry of radioactive and non-radioactive isotopes. It includes both natural and artificial isotopes.

84. What is the application of radiochemistry?

a) Chemical reactions of isotopes

b) Effects of isotopes in environment.

c) Study of chemical reactions of non-radioactive isotopes

d) Source of isotopes

Explanation

Radiochemistry mainly deals with application of radioisotopes to study the nature of chemical reactions of non-radioactive isotopes of elements and applications of radioisotopes to various fields.

85. Choose the correct statements.
i) Radioisotopes are easily detected and estimated quantitatively.
ii) Radiochemistry is applied in medical field and environmental management.

a) i only

b) ii only

c) Both i and ii

d) Neither i nor ii

Explanation

Radioisotopes can easily be detected and estimated quantitatively. So they are used in radiochemistry for various applications. Radiochemistry mainly deals with study of chemical reactions of non-radioactive isotopes using radioisotopes. In addition to that it could find applications in medical field and environmental management also.

86. Which of this isotope is used for radiocarbon dating?

a) C-4

b) C-14

c) C-250
d) C-100

Explanation

Radiocarbon dating: It is a method by which the age of fossil wood or animal is determined using C-14 isotope.

87. Identify the Incorrect match.

A. Iron -59	i) Anemia diagnosis
B. Hydrogen-3	ii) Water content of Human body
C. Cobalt-60	iii) Brain tumor detection
D. Sodium-24	iv) Heart pumping action

a) i only
b) ii only
c) iii only
d) iv only

Explanation

Radioisotope	Diagnosis used for
Iodine-131	Location and detection of brain tumor, thyroid gland disorder.
Sodium-24	Location of blood clot and circulation disorders, pumping action of heart.
Iron-59	Diagnosis of anaemia, pregnancy disorder.
Cobalt-60	Diagnosis of cancer.
Hydrogen-3	Water content of the human body.

88. Which of these uses radioactive isotopes for treating diseases?
a) Chemotherapy
b) Radiotherapy
c) Cognitive therapy
d) Nano therapy

Explanation

Radiotherapy: Radioactive isotopes are used in the treatment of many diseases. This kind of treatment is called radiotherapy.

89. Match

A. Skin disease	i) Iodine-131
B. Cancer	ii) Phosphorous-32

C. Hyperthyroidism iii) Gold-198

a) i, iii, ii

b) ii, i, iii

c) ii, iii, i

d) iii, i, ii

Explanation

Radioisotope	Treatment used for
Gold-198	Cancer
Iodine-131	Hyperthyroidism and cancer
Phosphorous-32	Blood disorder and skin disease
Cobalt-60	Cancer

90. Which are added to the food stuffs to give them color?

a) Colorants

b) Coolants

c) Catalysts

d) Compounds

Explanation

We eat colored food stuffs and use numerous colored materials in our daily life. Because they contain some kind of chemicals in them which are called colorants.

91. For which purpose the colorants were used by civilized people in history?

a) Clothing

b) Painting

c) Dyeing

d) Both b and c

Explanation

The uses of colorants by mankind for painting and dyeing dates back to the dawn of civilization.

92. Which of these inorganic pigments are used as colorants?

a) Soot

b) Manganese oxide

c) Hematite

d) All the above

Explanation

Inorganic pigments such as soot, manganese oxide, and hematite were used as colorants.

93. From which of these organic colorants were extracted?
a) Insects
b) Plants
c) Fungi
d) All the above
Explanation
Organic natural colorants have also a timeless history of application, especially for coloring textiles. The organic compounds that are used as colorants are called dyes. These dyes are all aromatic compounds, originating from plants and also from insects, fungi and lichens

94. Which is not correct regarding the Dye chemistry?
a) Study of dyes.
b) Applications of synthetic dyes.
c) History of dyes.
d) Theories and structures of dyes
Explanation
After the evolution of modern organic chemistry, many kinds of synthetic dyes were prepared and used by mankind. Dye chemistry is the study of such kind of dyes. It provides us information on theory, structure, synthesis and applications of synthetic dyes.

95. Assertion (A): Dyes are colored compounds firmly fixed in fabrics by chemical bonding.
Reasoning (R): All colored compounds are dyes.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
All colored compounds are not dyes. Dyes are those colored compounds which can be firmly fixed in fabrics by chemical or physical bonding.

96. Which is not a characteristic of a dye?
a) Capable to fix in fabric.
b) It must be slow to light.
c) Water resistant.
d) Suitable color.
Explanation
A dye should have the following characteristics:
• It should have a suitable color.
• It should be able to fix itself or be capable of being fixed to the fabric.
• It should be fast to light.

• It should be resistant to the action of water, dilute acids and alkalis.

97. Assertion (A): All the dyes are synthetic and prepared from coal tar.
Reasoning (R): Coal tar dyes may differ in their structure and applications.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Practically all the dyes are synthetic, and are prepared from aromatic compounds obtained from coal tar. Therefore, such dyes are sometimes called as coal tar dyes. But, they may differ in their basic structure and the way of application.

98. In how many ways dyes are classified?
a) 3
b) 5
c) 2
d) 4
Explanation
Dyes are classified in two ways: one, based on the method of application and other based on their parent structure.

99. Choose the correct statements regarding Acid dyes.
i) It is used for dyeing animal and synthetic fibers.
ii) This can be used for wool and silk.
iii) Picric acid is an example of acid dye.
a) i only
b) ii only
c) iii only
d) All the above
Explanation
Acid dyes: These are acidic in nature and used for dyeing animal fibers and synthetic fibers. These can be used for protein fibers such as wool and silk. E.g. Picric acid, Naphthol yellow-s

100. Which is not a basic group of dyes?
a) NH_2
b) R_2
c) NR_2
d) NHR
Explanation

Basic dyes: These are basic dyes containing basic group (-NH2,- NHR, - NR2). They are used for dyeing animal fibers and plant fibers.

101. Which is called as indirect dyes?
a) Organic dyes
b) Mordant dyes
c) Inorganic dyes
d) Synthetic dyes
Explanation
Mordant dyes or indirect dyes: These dyes have a poor affinity for cotton fabrics and hence do not dye directly. They require pretreatment of the fiber with a mordant.

102. What can be combined to mordant to form dyes?
a) Plants
b) Alkalis
c) Fibers
d) Acids
Explanation
Mordant (latin : mordere = to bite) is a substance which can be fixed to the fiber and then can be combined with the dye to form an insoluble complex called lake.

103. Which of these are used as mordants?
a) Aluminum
b) Chromium
c) Iron salts
d) All the above
Explanation
Aluminium, chromium, and iron salts are widely used as mordants. E.g. alizarin

104. To which of these direct dyes have high affinity?
a) Cotton
b) Rayon
c) Cellulose fibers
d) All the above
Explanation
Direct dyes: They have high affinity for cotton, rayon and other cellulose fiber. So, they are applied directly as they fix firmly on the fabric. E.g. Congo red

105. In which of this material vat dyes can be used?
a) Silk

b) Cotton
c) Wool
d) Jute
Explanation
Vat dyes: It can be used only on cotton and, not on silk and wool. This dyeing is a continuous process and is carried out in a large vessel called vat. So, it is called as vat dye. E.g. Indigo

106. Which of this dye is not classified based on its structure?
a) Phthalo cyanine
b) Nitroso
c) Congo red
d) Triphenyl methane
Explanation
Based on the structure, dyes are classified as: Azo dyes, Diphenyl methane dye, Triphenyl methane dye, Phthalein dye, Anthraquinone dye, Indigo dyes, Phthalo cyanine dye, Nitro and nitroso dyes.

107. Choose the correct statements regarding Agricultural chemistry.
i) It involves the application of chemical and biochemical principles in agriculture.
ii) It includes agricultural production and processing of raw materials into food and beverages.
iii) It provides scientific relation between plants, animals, bacteria and environment.
a) i only
b) ii only
c) iii only
d) All the above
Explanation
Agricultural chemistry involves the application of chemical and biochemical knowledge to agricultural production, processing of raw materials into foods and beverages, and environmental monitoring and remediation. It deals with scientific relation between plants, animals, bacteria and environment.

108. Assertion (A): Modernized agricultural practices involve synthetic fertilizers, modified crops and equipment.
Reasoning (R): It aims in producing sufficient nutritious food for the population.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Indian chemists and biochemists applied their knowledge and developed modernized agricultural practices which involve use of synthetic fertilizers, genetically modified crops, and equipment's. It

aims at producing sufficient nutritious food and feed the population in a sustainable way while being responsible stewards of our environment and ecosystem.

109. Which of this issue is not addressed by the agricultural chemistry?
a) Improved food quality
b) Modified techniques
c) Cost reduction of production
d) Crop yield and livestock increase
Explanation
Based on the issues and challenges in agricultural production, agricultural chemistry mainly focuses to achieve the following:
• Increase in crop yield and livestock
• Improvement of food quality
• Reducing cost of food production

110. What are the effects of chemical principles in agriculture?
a) Increase yield
b) Protect crops
c) Simplified practice
d) All the above
Explanation
Chemical principles and reactions are most widely used in agriculture in order to increase yield, to protect crops from diseases and to simplify the practice of agriculture.

111. What is the main criterion for soil testing process?
a) Soil type
b) Soil pH
c) Crop type
d) All the above
Explanation
Soil Testing: Crop lands may have different kinds of soil with varying pH. Soil pH is one of the main criteria to be considered for the selection of crop or remediation of soil.

112. Which of these are determined by soil testing?
a) pH
b) Texture
c) Porosity
d) All the above
Explanation
Soil testing involves determination of pH, porosity and texture.

113. Choose the correct statements regarding chemical fertilizers.
i) Fertilizers are chemical compounds added to crop field for essential micro and macro nutrients.
ii) Fertilizers are used single or mixture compound based on the nature of soil.
iii) Ammonium nitrate, calcium phosphate, urea and NPK are some of the fertilizers.
a) i only
b) ii only
c) iii only
d) All the above
Explanation
Chemical Fertilizers: Fertilizers are chemical compounds added to crop field for supplying essential micro and macro nutrients required for crop growth. Ammonium nitrate, calcium phosphate, urea, NPK (Nitrogen, Phosphorous and Potassium), etc. are some of the fertilizers. Depending on the nature of soil, these fertilizers are used singly or as mixtures.

114. Which of these are not used as pesticides and insecticides?
a) Chlorinated hydrocarbons
b) Sodium benzoate
c) Organophosphates
d) Carbonates
Explanation
Pesticides and Insecticides: Crops are prone to diseases caused by pests and insects. Chemically synthesized pesticides and insecticides are used to solve these issues. Chlorinated hydrocarbons, organophosphates and carbonates are used as pesticides and insecticides.

115. Assertion (A): Food is the basic need of human and animal.
Reasoning (R): Food is also made of chemicals.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Food is one of the basic needs of human and animal. The foods we eat also are made of chemicals. Any human might require the three kinds of food.

116. Match

A. Fat	i) Protective foods
B. Minerals	ii) Physical growth
C. Protein	iii) Energy supply

a) i, ii, iii

b) iii, i, ii
c) ii, i, iii
d) iii, ii, i
Explanation
Body building foods: These are required for physical growth of body. E.g. Proteins
Energy giving foods: These are the foods that supply energy for the functioning of parts human body. E.g. Carbohydrates and Fats.
Protective foods: These protect us from deficiency diseases. E.g. Vitamins and Minerals

117. Assertion (A): Balanced diet contains three kinds of foods in right proportion.
Reasoning(R): Human requires three kinds of food in right proportion for smooth functioning of body.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Every human requires all these three kind of foods in right proportion for the smooth functioning of the body. The diet that contains all these three foods in right proportion is called Balanced diet.

118. Choose the correct statements.
i) Food chemistry involves the analysis processing and packaging of food.
ii) Utilization of food materials including bioenergy for food safety and quality.
a) i only
b) ii only
c) Both i and ii
d) Neither i nor ii
Explanation
Food chemistry is the chemistry of foods which involves the analysis, processing, packaging, and utilization of materials including bioenergy for food safety and quality.

119. What is the main goal of food chemistry?
a) Food research
b) Quality of food to population.
c) New innovations for quality food.
d) All the above
Explanation
Goals of food chemistry: The main goal of food chemistry is to cater the needs of quality food to the population in a sustainable way.

120. What are the foods properties studied and analyzed by the food chemists?
a) Fat
b) Starch
c) Additives
d) All the above
Explanation
In basic research, food chemists study the properties of proteins, fats, starches, and carbohydrates, as well as micro components such as additives and flavorings to determine how each works in a food system.

121. Which of these are the new ingredients developed by research applications?
a) Nutrients
b) Antioxidants
c) Sugar replacements
d) Carbohydrates
Explanation
In application research, they often develop new ways to use ingredients or new ingredients altogether, such as fat or sugar replacements.

122. Assertion (A): Human food contains only the natural chemicals.
Reasoning (R): The chemicals in food are used for different functions in human body.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is False but R is True.
d) Both A and R is False.
Explanation
Chemicals in Food we eat in our day to day life contain natural or synthetic chemicals. They serve different functions in human body.

123. Which is not true regarding the nutrients of food?
a) Required for Human growth.
b) Most essential chemical in food.
c) Good and Bad nutrients are present in food.
d) Physiological and metabolic activities of human body.
Explanation
Nutrients: They are the most essential chemicals present in food. They are required for the growth, physiological and metabolic activities of body.

124. Which of these are not included in nutrients?
a) Proteins

b) Bacteria
c) Minerals
d) Carbohydrates
Explanation
The Nutrients are natural or synthetic. E.g. Carbohydrates, proteins, vitamins and minerals.

125. Assertion (A): Food additives are the chemicals added to food for specialized functions.
Reasoning (R): Monosodium glutamate is a chemical used to enhance the flavor of food.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.
Explanation
Food additives: These are the chemicals added to food for specialized functions.

126. What is the percentage of people employed in agriculture worldwide?
a) 56%
b) 28%
c) 40%
d) 78%
Explanation
40% of today's global population works in agriculture, making it the single largest employment in the world.

127. What is the purpose of adding preservatives in food?
a) Protects from spoilage by microorganism in storage.
b) Used to enhance the flavor.
c) To give pleasant colors.
d) Protect against cardiovascular disease.

128. Match

A. Saccharin	i) Colorant
B. Curcumin	ii) Antioxidant
C. Benzoic acid	iii) Artificial sweetener
D. Carotene	iv) Preservative

a) iv, ii, i, iii
b) iii, i, iv, ii
c) ii, iii, i, iv
d) iii, ii, i, iv

129. Which of this additive is used to prevent the oxidation of food?
a) Flavor enhancers
b) Colorants
c) Antioxidants
d) Preservatives
Explanation

Type of additive	Function of the additive	Example
Preservatives	They protect food from spoilage by microorganism in storage.	Vinegar, Sodium benzoate, benzoic acid, sodium nitrite
Colourants	They give pleasant colours to food	Carotenoids, Anthocyanin, Curcumin
Artificial Sweeteners	They add sweet taste to food	Saccharin, Cyclamate
Flavor enhancers	They are used to enhance the flavour of food items	Monosodium glutamate, Calcium diglutamate
Antioxidants	They prevent the oxidation of food. They protect us against cardiovascular disease.	Vitamin C, Vitamin E, Carotene

130. Which of these are applied in a forensic chemistry?
a) Scientific principles
b) Scientific techniques
c) Scientific methods
d) All the above
Explanation
Forensic chemistry applies scientific principles, techniques, and methods to the investigation of crime.

131. How many steps of investigation in a crime is worked out by the forensic chemists?
a) 10
b) 4
c) 5
d) 2
Explanation
In general, forensic chemists work in four steps in the investigation of crime.

132. Which of these evidences can be chemically analyzed in a crime?
a) Blood
b) DNA
c) Hair
d) All the above
Explanation

Analysis of evidences: In criminal cases, chemists analyze substances such as blood and DNA to attempt to determine when and by whom the crime was committed.

133. Choose the Incorrect statements.
i) Finger print is the most important evidences in crime investigation.
ii) Fingerprints on smooth surfaces can be made visible by applying dark or light powders.
iii) Occult fingerprints can also be made visible by using dark or light powders.
a) i only
b) ii only
c) iii only
d) None of the above
Explanation
Finger print: Finger print is one of the most important evidences in crime investigation. Fingerprints on smooth surfaces can often be made visible by the application of light or dark powder, but fingerprints on cheques or other documents are often occult (hidden).

134. Which is used to make the occult fingerprints visible?##
a) Ninhydrin
b) Alcohol
c) Glue
d) Ether
Explanation
Occult fingerprints are sometimes made visible by the use of ninhydrin which turns purple due to reaction with amino acids present in perspiration.

135. Which of these are used to make the fingerprints visible?###
a) Fluorescent dyes
b) Cyanoacrylate ester fume
c) High-powered laser light
d) All the above
Explanation
Fingerprints or other marks are also sometimes made visible by exposure to high-powered laser light. Cyanoacrylate ester fumes from glue are used with fluorescent dyes to make the fingerprints visible.

136. Assertion (A): Biometrics is the study and analysis of human body prints.
Reasoning(R): The biometric system compares the body prints of stored specimen data with unknown person data.
a) Both A and R is True and R is the correct explanation of A.
b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.
d) Both A and R is False.
Explanation
Biometrics: The science that involves the study and analysis of human body prints is known as biometrics. The biometric system compares the body prints to the specimen data stored in the system to verify the identity of a person.

137. Which of these chemicals is not present in the alcohol test equipment?
a) Silver nitrate
b) Hydrogen sulphides
c) Potassium dichromate
d) Sulfuric acid
Explanation
Alcohol test: Drinkers can be easily identified by the use of applied chemistry. The person being tested blows through a tube which bubbles the breath through a solution of chemicals containing sulfuric acid, potassium dichromate, water, and silver nitrate.

138. Which of this reaction converts dichromate to chromic ion in the alcohol test?
a) Oxidation
b) Reduction
c) Redox
d) Single replacement
Explanation
Oxidation of the alcohol results in the reduction of dichromate to chromic ion with a corresponding change in color from orange to green.

139. Which of these statements are not true regarding the alcohol test equipment?
a) An electrical device with a photocell is used to compare the test solution.
b) The test provides a quick and reproducible determination of alcohol amount.
c) The equipment is used to just identify the alcohol presence in bloodstream.
d) It gives the numerical amount of alcohol of the person's bloodstream.
Explanation
In alcohol test equipment an electrical device employing a photocell compares the color of the test solution with a standard solution, giving a quantitative determination of the alcohol content. The test provides a quick and reproducible determination of the amount of alcohol in a person's breath and is a numerical measure of the amount of alcohol in the bloodstream.

140. What are the applications of applied chemistry?
a) Synthetic materials
b) Daily life products

c) Inevitable

d) All the above

Explanation

Applications of Applied Chemistry

• Many of the advantages of applied chemistry are around us. It is inevitable.

• Applied chemistry has given us innumerous synthetic materials to lead our day to day life.

• The applied chemistry makes a most important contribution to our society.

• It makes a major contribution to the country's economic development and plays vital role worldwide.

• The products of applied chemistry are so widespread that they are used in our daily.