**GOVERNMENT COLLEGE FOR WOMEN (AUTONOMOUS)**

**KUMBAKONAM**

**DEPARTMENT OF CHEMISTRY**

**I.M.SC., CHEMISTRY**

**INORGANIC CHEMISTRY – II (P21CHC205)**

**MULTIPLE CHOICE QUESTIONS**

1. Which of the following variables govern the different X-ray techniques?

a)Radiation, sample, detector

b) Radiation, diffraction, detector

c) Heat, mass, proteins

d)Energy, sample, temperature

Ans : a

.2. Which of the following rays are used in the powder method of crystals?

a) Gamma rays

b) α-rays

c) β-rays

d) Monochrom rays

Ans : d

3. A convergent beam is obtained by placing which of the following material between the X-ray source and the sample?

a) Soil particles

b) Single crystal of carbon

c) Linear double crystal of graphite

d) Bent single crystal of quartz

Ans : d

4..Atoms diffract or scatter X-rays because of\_\_\_\_\_\_\_\_\_\_

a) incident visible light

b) incident X-ray beam

c) Incident gamma ray

d) Incident electrons

Ans : b

5. For the non-crystalline beams are scattered by the atoms \_\_\_\_\_\_\_\_\_

a) From top to bottom

b) In horizontal direction

c) In vertical direction

d) In all direction

Ans : d

6. A powder diffractometer is an\_\_\_\_\_\_\_\_\_\_\_

a) Electron density instrument

b) Powder electron refraction instrument

c) X-ray spectrum detector instrument

d) Powder X-ray instrument

Ans : d

7..The intensities in the powder diffractometer is taken as\_\_\_\_\_\_\_\_

a) very low height

b) peak height

c) constant height

d) variable height

Ans : b

8. The neutrons which are used for fission purposes are

a) slow neutrons

b) fast neutrons

c) moderate neutrons

d) protons

Ans : a

9. Diffraction of light is a property of

a) liquids

b) gases

c) nitrogen

d) liquid crystals

Ans :. d

10.The intensity of the initial neutron in neutron diffraction is reduced by a factor of \_\_\_\_\_\_\_\_

a)102

b) 103

c) 105

d) 107

Ans : b

11.The defect that occurs due to a displacement of an ion is known as \_\_\_\_\_\_\_\_\_\_

a) Vacancy defect

b) Schottky defect

c) Frankel defect

d) Interstitial defect

Ans : c

12. What type of stoichiometric defect is shown by ZnS?

a) Schottky defect

**b) Frenkel defect**

c) Both Frenkel and Schottky defects

d) Non-stoichiometric defect

Ans : b

13..Which of the following is a point defect in crystals?

a) edge dislocation

b) Interstitialcies

c) Grain boundaries

d) Cracks

Ans : b

14.\_\_\_\_\_\_\_ occurs when a foreign substance replaces an atom in a crystal.

a) Vacancy defect

b) Substitutional impurity

c) Frankel defect

d) Interstitial impurity

Ans : b

15..What are two-dimensional defects?

a) Boundary defect

b) Point defect

c) Line defect

d) Volume defect

Ans : a

16..In which type of point defect are the cations and anions absent in stoichiometric proportions?

a) Schottky defect

b) Frenkel defect

c) Impurity defect

d) The given situation does not occur for any point defect.

Ans : a

17.Metals are good conductors of heat and electricity. This property is conferred by \_\_\_\_\_\_\_ bonds.

a) covalent

b) ionic

**c) metallic**

d) hydrogen

Ans : c

18..For a metallic crystal, which band do the delocalized electrons occupy?

a) Conduction band

b) Valence band

c) Both, conduction and valence bands

d) There are no delocalized electrons

Ans : a

19..Which among the following compounds can show the properties of a Ferroelectric substance?

**a) BaTiO3**

b) PbZrO3

c) MnO2

d) CrO4

Ans : a

20.Which among the following compounds is Antiferro electric?

a) NiO

b) V2O3

c) PbZrO3

d) Fe3O4

Ans : c

21.Which of the following elements have a negative value of magnetic susceptibility?

a) Iron

b) Oxygen

c) Aluminium

d) Nitrogen

Ans : d

22.General formula of Spinels

a) AB2O4

b) ABX

c) ABX5

d) A2B5C6

Ans : a

23. Example for normal Spinels

a) Mn3O4

b) ClO2

c) PCl5

d) ZnO

Ans : a

24. Example for Inverse Spinels

a) FeCl3

b) ClF3

c) Fe3O4

d) POCl3

Ans : c

25. The structure of Cadmium Iodide

a) Hexagonal close packed

b) Hexagon

c) Pentagon

d) Tetra hydron

Ans : a

26. The pervoskite is known as

**a) Solar cell**

b) Battery

c)Lighter

d) Conductivity cell

Ans : a

27. Some of the other Pervoskite materials

a) Ammonium chloride

b) Ferric chloride

c) Methyl ammonium lead halides

d) halogens

Ans: c

28. The structure of Pervoskite

a) ABX3

b) ABC

c) AB2C3

d) A2B2C2

Ans : a

29.The absorption of photons in a photodiode is dependent on \_\_\_\_\_\_\_\_\_\_

a) Absorption Coefficient α0

b) Properties of material

c) Charge carrier at junction

d) Amount of light

Ans : a

30.In optical fiber communication, the only weakly absorbing material over wavelength band required is?

a) GaAs

b) Silicon

c) GaSb

d) Germanium

Ans : c

**31.** Conduction band and valance band are almost overlapped in….

a) conductorsb) insulatorsc) semiconductorsd) all of these

**Ans: A**

32. The most commonly used semiconductor is \_\_\_

a)Germanium b)Carbon c) Sulfur d)Silicon

**Ans:D**

33. An n-type semiconductor is

a)Positivelycharged b)Electrically neutral c)Negatively charged d)None of the above

**Ans:B**

34. In a semiconductor, current conduction is due\_\_\_\_

a) Only to holes b)Holes and free electrons c)Only to free electrons d)None of the above

**Ans:B**

35. In an intrinsic semiconductor, the number of free electrons

a) Equals the number of holes b)Is greater than the number of holes c) Is less than the number of holes d)None of the above

**Ans:A**

36.Which of the following cannot move?

a) Holes b)Free Electrons c)Ions d)Majority carriers

**Ans:C**

37. In an intrinsic semiconductor

a) There are no free electrons b)There are only holes c)Free electrons are thermally produced

d) Cannot say

**Ans: C**

38.Doping of germanium with arsenic leads to

a)Conductor b)Insulator c)P-type semiconductor d)N-type semiconductor

**Ans: D**

39. A piece of germanium is cooled from room temperature to 100 K. It’s conductivity will

a) Increase b)Decrease c)Remain unchanged d) First, increase and then decreased

**Ans:B**

 40. If the temperature of a piece of germanium increase, its conductance

a) Increase b)Decrease c)Remain unchanged d)Become zero

**Ans:**A

40. A 0 K, an intrinsic semiconductor behaves as a

a)Superconductor b)Semiconductor c)Perfect insulator d)Perfect conductor

**Ans:**C

41.. The process of adding, impurities to a semiconductor is known as\_\_\_

a)Polling b)Intrusion c)Plugging d)Doping

**Ans:**D

42. Ohm’s law is not obeyed by

a) Conductor b)Semiconductor c)Both (1) and (2) d)None of the above

**Ans:**B

43.. In a semiconductor crystal, if the current flows due to breakage of crystal bonds, then the semiconductor is called

a) Acceptor b)Donor c)Intrinsic semiconductor d)Extrinsic semiconductor

**Ans:**C

44. Which one of the following materials is the semiconductor

a) Chromium b)Selenium c)Bismuth d)Silica

**Ans:**B

44. What is the direction of magnetic field lines outside a magnet?

a) East pole to West pole b)West pole to East pole c)North pole to South pole

d)South pole to North pole

**Ans: C**

45.Natural magnet is also called as

A)Emerald b)Lodestone c)Moonstone d)Sunstone

**Ans:B**

46. Electromagnets are made of soft iron because:

a) It has high permeability and low retentivity.B)It has low susceptibility and high retentivity.

c) It has low susceptibility and low retentivity. D) It has low permeability and low retentivity.

**Ans:A** :

47. Which of the following is independent of temperature?

a) Ferromagnetic substance b)Diamagnetic substance c)Paramagnetic substance

d) Superconductors

**Ans: B**

48. Magnetic materials having relative permeability < 1 are called \_\_ materials.

a) Paramagnetic b)Ferromagnetic c) Ferrimagnetic d)Diamagnetic

**Ans: D**

48.For diamagnetic material's magnetic susceptibility (χ) is \_\_\_\_.

a) positive and small b)negative and large c)negative and small d)positive and large

**Ans: C**

49. Which among the following is a Diamagnetic substance?

a)Copper b)Iron c) Nickel d)Oxygen

**Ans: A**

49.Most of substances show which of the magnetic property?

a) diamagnetism b)paramagnetism c)ferromagnetism d)none of these

**Ans: B**:

50. Diamagnetic materials are

a) Attracted by Both poles b)Attracted by North pole c)Repelled by North pole

d)Repelled by both poles

**Ans: D**

51. Which of the following is not a magnetic material?

a)Nickel b)Iron c)Cobalt d)Wood

**Ans: D**

52. Hard ferrites are used for making \_\_.

a) Light weight permanent magnet b)Transformer cores c)Electrical machinery

d)High frequency equipment

**Ans: A**

53. Which of the following material is repelled by a magnet?

a)Iron b)Aluminum c)Nickel d)Gold

**Ans: D**

54. Which of the following materials is used in memory cores of computers?

a) Ferromagnetic b)Diamagnetic c)Paramagnetic d)Ferrite

**Ans: D**

55 Conduction band and valance band are almost overlapped in….

a) conductors b) insulators c) semiconductors d) all of these

**Ans: A**

**56.** Good conductors have many loosely bound

a)atoms b)protons c)molecules d)electrons

**Answer: (d)**

57. The reciprocal of resistivity of a conductor is

a)conductance b)capacitance c)conductivity d)none of these

**Answer: c**

58. The unit of conductance cannot be expressed in

a)mho b)(ohm)-1 c)siemens d)ohm/m

**Answer: (d)**

59. A p-type semiconductor is \_\_\_.

a)positively charged b)negatively charged c )electrically neutral

d)not used in semiconductor devices

**Answer: c**

60.Temperature coefficient of resistance in a pure semiconductor is \_\_\_\_.

a)zero b)positive c)negative d)dependent on size of specimen

**Answer: c**

**UNIT II NUCLEAR CHEMISTRY - I**

1. X-rays are an example of what type of radiation?

a)alpha  b)beta  c)gamma d)transmutation

**Ans:**C

2. Which scientist discovered Radio-activity.

a). J.J. Thomson b) Madame Curie c)Henry Becquerel d)Rutherford

**Ans:**C

3. When a radioactive substance is subjected to a vacuum, the rate of disintegration per second

a)Increases only if the products are gaseous b)Increase considerably c) Decreases

d)Is not affected

**Ans:** D

4. Which one of the following has no charge?

a) Gamma rays b)Beta rays c)Alpha rays d)Cathode rays

**Ans:** A

5. Which of the following is the smallest particle of an element that retains the properties of that element?

a) Isotope b) Atom c) Radioisotope d)None of these

**Ans:** B

6. Beta emission is associated with \_\_\_\_

a. conversion of a neutron to a proton. b. conversion of a proton to a neutron.

c. increase in mass number. d. decrease in mass number by 4 and atomic number by 2.

**Ans:** A

7. The angular frequency of the charged particle in a cyclotron is

a) inversely proportional to its mass b)directly proportional to mass c)directly propotional to its speed d)inversely proportional to its speed

**Ans:** A

8. When a neutron leaves the nucleus, it’s mass

a) Triples b)Decreases c)Increases d)Stays the same

**Ans: B**

9. The element with the least mass per nucleon is

a)Hydrogen b)Iron c)Helium d)Uranium

**Ans: B**

10. Nuclear energy is based on the conversion of

 (a) Protons into neutrons  (b) Mass into energy  (c) Neutrons into protons

 (d) Uranium into radium

**Ans: B**

11. Which of the following is the heaviest metal

 (a) Hg (b) Pb (c) Ra (d) U

**Ans: D**

12. X-rays are produced due to

(a) Bombarding of electrons on solids (b) Bombarding of a-particle on solids

(c) Bombarding of g-rays on solids  (d) Bombarding of neutron on solids

**Ans:** A

13. The atomic number of a radioactive element increases by one unit in

 (a) Alpha emission (b) Beta emission (c) Gamma emission (d) Electron capture

**Ans: B**

**14.**. A Geiger-Muller tube is a \_\_\_ .

(a) gas ionization detector (b) cloud chamber c) fluorescence detector

(d) spectrophotometer

**Ans:** A

15. When 235U is bombarded with one neutron, fission occurs and the products are three neutrons, 94Kr, and \_\_\_ .

(a) 139Ba (b) 141Ba (c) 139Ce (d) 139Xe

**Ans:** A

16.Have same atomic numbers but different atomic masses

A. Isotope B. Atom C. Radioisotope D. None of these

**Ans:** A

17. Hydrogen bomb is based on the phenomenon of

A. Nuclear explosion B. Chemical reaction C. Nuclear fusion D. Nuclear fission

**Ans:** C

18. which of the following Uranium gives stable isotope of

A. Radon B. Krypton C. Polonium D. Radium

**Ans:** C

19. .Which of the following is radioactive element?

A) Polonium B)Tellurium C)Selenium D)Sulphur

**Ans:** A

20. Radioactivity is due to

**A)Unstable nucleus** B)Stable nucleus C)Stable electronic configuration

D) Unstable electronic configuration

**Ans:** A

21. Nucleons are

a) Protons and neutrons B)Electrons and neutrons C)Protons and electrons

D) Electrons, protons and neutrons

**Ans:** A

22.Isotopes are atoms having the same

A) Atomic number B)Atomic mass C)Mass number D)Number of neutrons

**Ans:** A

23. Isotones are elements having

a) Same mass number but different neutrons b)Same atomic number, mass number and neutrons

c)Different atomic and mass number but same neutrons

D) Same atomic number but different neutrons

**Ans:** C

24. In a radioactive decay, an emitted electron comes from

A)Orbit having principal quantum number one B)Outermost orbit of the atom

C)Inner orbital of the atom d)Nucleus of the atom

**Ans:** D

25. which of the following Uranium gives stable isotope of

A. Radon B. Krypton C. Polonium D. Radium

**Ans:** C

26. The atomic number is not changed by which type of radioactive decay?

a) Beta b)Gamma c)Alpha d)The atomic number is affected by all forms of radioactive decay

**Ans:** B

27. Helium nuclei particles are called

A)Gamma particles b)Beta particles c)Alpha particles

d)No particles that are helium nuclei

**Ans:(c)**

28. When two atomic nuclei combine it is called as

a)Chain reaction b)Nuclear fusion c)Nuclear decay d)Nuclear fission

**Ans: B**

**29.**Three types of radioactive elements are emitted when unstable nuclei undergo radioactive decay. Which of the following is not one of them

A)Beta b)Gamma c)Alpha d)delta

**Ans: D**

**30.**Which of the following is not used as a moderator in nuclear reactor?

A)graphite b)heavy water c)light water **d)boron**

**Ans: D**

31. Atom bomb is based on the principle of

a) Nuclear fusion b)Nuclear fission c)Radioactivity d)None of these

**Ans: B**

32. Name the moderator used in the nuclear reactor?

a) Plutonium b)Thorium c)Graphite d)Berilium

**Ans: C**

33. Which isotope of Uranium has the capacity to sustain the chain reaction?

a) U-230 **b)U-235** c) U-245 d)U-225

Ans: B

34.. During an atomic explosion, the energy released is due to

a) Conversion of protons to neutrons b)Conversion of chemical energy into heat energy

c) Conversion of mechanical energy into nuclear energy

d) Conversion of mass into energy

**Ans: D**

34. When a neutron leaves the nucleus, it’s mass

a)Triples b)Decreases c)Increases d)Stays the same

**Ans: B**

35. The energy we get in nuclear reaction comes from

a)Energy we put into the reactor b)The mass of the fuel c)Water d)The sun

**Ans: B**

**36.**Atomic hydrogen is called

(a) Protium (b) Deutrium (c) Nascent Hydrogen (d) Tritium

**Ans: C**

**37.**. Hydrogen has isotopes

(a) 2 (b) 3 (c) 4 (d) 5

**Ans: C**

38. This carbon isotope is radioactive and very rare

(a) Carbon – 11 (b) Carbon – 12 (c) Carbon – 13 (d) Carbon – 14

**Ans: D**

39Atomic number of an element in the periodic table represents the numbers of

(a) protons in the nucleus (b) electrons in me nucleus (c) neutrons in the nucleus

(d) electrons in the atom

**Ans:A**

40. Moderator in nuclear plants is used to

(a) reduce temperature (b) extract heat from nuclear reaction (c) control the reaction

(d) cause collision with the fast moving neutrons to reduce their speed

**Ans: D**

41. The most commonly used moderator in nuclear plants is

(a) heavy water (b) concrete and bricks (c) graphite and concrete

(d) graphite

**Ans: D**

42. The nuclear energy is measured as

**(a) MeV** (b) curie (c) farads (d) MW

**Ans: A**

43. Which of the following best explain the process of Nuclear-Fission?

a) Liquid drop model b)Proton-proton cycle c)Independent particle model of the nucleus

d)Sommerfeld Model

**Ans: A**

44. Name the largest nuclear power station of India by capacity?

a) Tarapur b)Kakrapar c)Kaiga d)Kudankulam

**Ans: D**

45. Atom bomb is based on the principle of

A) Nuclear fusion B) Nuclear fission C)Radioactivity D)None of these

**Ans: B**

46. Which of the following is based on the principle of nuclear fusion?

a)Atomic bomb b)Hydrogen bomb c)Both Atomic and Hydrogen bomb

d)No option is correct.

**Ans: B**

47. Neutrons were discovered by

a) James Chadwick b) Ernest Rutherford c)J. J. Thomson d)John Dalton

**Ans: A**

48. The sun gets its energy from which of the following?

a) Nuclear Fission b)Photoelectric effect c) Chemical Reaction d)Nuclear Fusion

**Ans: D**

49. What are Isobars ?

A) The nuclei having equal number of neutrons

B)The atoms of element having same atomic number but different mass number

C)The nuclei which have the same mass number but different atomic number

D) None of these

**Ans: C**

50. Heavy water is used as a moderator in a nuclear reactor. The function of the moderator is

a) To control the energy released in the reactor. B)To repel neutrons and stop the chain reaction

c) To cool the reactor d)To slow down the neutrons

**Ans: D**

51. The function of coolant in a nuclear reactor is to

a) extract heat from reactor b)slow down neutrons c)control the reaction

d)reflect the neutrons

**Ans: A**

52. If a U-238 nucleus splits into two identical parts, the two nuclei so produced will be

a) radioactive b)stable c)Isotope d)Isobar

**Ans: B**

53.An alpha particle is same as?

a) a helium nucleus b)a hydrogen nucleus c)a proton d)a positron

**Ans: A**

54. Which electromagnetic waves are mainly used as a treatment for cancer?

a) Alpha-rays b) β- rays c)X-rays d)Gamma rays

**Ans: D**

55. In radioactive decay which of the following quantity depends on the number of atoms:

a) Half life b)Mean life c)Rate of decay d)Rate of decay and mean life

**Ans: C**

56. . The radius R of a nucleus is given by

a)R = 𝑟0𝐴−1/3 b)R = 𝑟0𝐴1/3 c)R = 𝑟0𝐴3 d) None of these

**Ans:**B

57. Boiling water reactor employs

(a) boiler (b) direct cycle of coolant system (c) double circuit system of coolant cycle

(d) multi pass system

**Ans: B**

58. Which scientist discovered Radio-activity.

a). J.J. Thomson b) Madame Curie c)Henry Becquerel d) Rutherford

**Ans:**C

 59. The main interest of shielding in nuclear reactor is protection against

(a) X-rays (b) infra-red rays (c) a, P, and y rays (d) neutrons and gamma rays

**Ans: D**

60. Reflector in nuclear plants is used to

(a) return the neutrons back into the core (b) shield the radioactivity completely

(c) check pollution (d) conserve energy

**Ans:A**

**UNIT III – NUCLEAR CHEMISTRY - III**

**1.** A cyclotron can accelerate

a) β particles b)α particles c)High-velocity gamma rays d)High-velocity X-rays

**Ans: B**

**2.**The angular frequency of a cyclotron is independent of

a) Speed b)Mass c)Magnetic field d)Charge

**Ans: A**

3. Cyclotron cannot accelerate

a) Electrons b)Neutrons c0Positive ions d)(Both (1) and (2)

**Ans: D**

4. The cyclotron frequency of an electron grating in a magnetic field of 1 T is approximately

a)28 MHz b)280 MHz c)2.8 GHz d)28 GHz

**Ans: D**

5. Cyclotron can be used in

a) Particle therapy to treat cancer b)Source of high energy beam for a nuclear physics experiment

c) Produce short-lived positron-emitting isotopes for PET imaging d)All the above

**Ans: D**

6. In a cyclotron a charged particle

a) undergoes acceleration all the time b)speeds up between the dees because of the magnetic field.

c) speeds up in dee d)slows down within a dee and speeds up between dees

**Ans:A**

**7.** Acceleration is the?

A. rate of change in the speed towards the time change

B. rate of change in the displacement towards the time change

C. rate of change in the velocity towards the time change

D. rate of change in the distance towards the time change

**Ans : C**

8. A cyclotron is used to -

A) Accelerate protons B)Accelerate electrons

C)Accelerate both protons and electrons d)Accelerate neutrons

**Ans: A**

9. Electrons can be accelerated to very high energies by means of:

a) cetatron b)cyclotron c)synchrotron d)metatron

**Ans: B**

10. Hydrogen bomb is based on which Nuclear process?

a)Thermal fusion b)Heavy Water Ability c)Thermal fission d)Rapid breeder reaction

**Ans: A**

11. Source of Sun's energy is:

a)fission **b)fusion** c)both 1) and 2) d)none of these

**Ans: B**

12. The "magic numbers" for atoms are

(a) numbers of electrons that confer atomic stability.

(b) numbers of protons and/or neutrons that confer nuclear stability.

(c) n/p ratios that confer nuclear stability.

(d) atomic masses that confer nuclear stability.

**Ans: B**

**13.** Which of the following is true about radiochemical methods?

a) Eliminate the need for chemical preparation b) Not sensitive

c) Not accurate d) Not specific

**Ans: A**

**14.** Ratio between magnetic induction  and magnetic field intensity is:

a) permeability b)magnetic flux c)magnetic nature d)magnetic permeability

**Ans: D**

**15.** Fast breeder reactor uses

(a) boiler (b) direct cycle of coolant system (c) double circuit system of coolant cycle

(d) multi pass system

**Ans: C**

**16.** . Breeder reactor has a conversion ratio of

(a) unity (b) more than unity (c) less than unity (d) zero

**Ans: B**

17. Which of the following statements with reference to nuclear forces is not true?

a) Short range b)Charge independent c)Strongest force d)Spin independent

**Ans: D**

**18.** The volume of a nucleus in an atom is proportional to the

a)Mass number b)Proton number c)Neutron number d)Electron number

**Ans:A**

**19.**Who was the first person to win two Nobel Prizes?

a) Ernest Rutherford b)Henri Becquerel c0Marie Curie d)Rosalind Franklin

**Ans:**C

20. The source of stellar energy is

a) Nuclear fission b)Nuclear fusionC)Nuclear fission & fusion d)Nuclear decay

**Ans: B**

21.Which of the following is very high for proton?

a)radius b)ionization potential c)charge d)hydration energy

**Ans: d**

22. Burning of hydrogen is an example of

 (a) slow combustion(b) rapid combustion(c) explosion(d) spontaneous combustion

**Ans: C**

23.Which of the following is very high for proton?

(a) radius(b) ionization potential(c) charge(d) hydration energy

**Ans: (d)**

24.Accelerations are scaler quantities?

A. TRUEB. FALSEC. Can be true or falseD. Can not say

**Ans : B**

25. The magnitude of an object's acceleration, as described by?

A. Newton's zero LawB. Newton's first Law

C. Newton's third LawD. Newton's second Law

**Ans : D**

26. Instantaneous acceleration, meanwhile, is the limit of the average acceleration over an infinitesimal interval of time.

**A. TRUE**  B. FALSEC. Can be true or falseD. Can not say

**Ans : A**

27. When a point moves along a straight line, its acceleration will have

A. radial component onlyB. tangential component only

C. coriolis component onlyD. radial and tangential components both

**Ans : B**

28.The area of his hysteresis loss is a measure of

   A. Permittivity B. Permeance  C. Energy loss per cycle D. Magnetic flux

**Answer C.**

29. In order to minimise hysteresis loss, the magnetic material should have

   A. High resistivity  B. Low hysteresis co-efficientC. Large B - H loop area

  D. High retentivity

**Ans: B.**

30.Hysteresis loss least depends on

A. Volume of materialB. FrequencyC. Steinmetz co-efficient of material

**D. Ambient temperature**

**Ans :D.**

31.In a magnetic material hysteresis loss takes place primarily due to

A. Rapid reversals of its magnetisation B. Flux density lagging behind the magnetising force

C. Molecular frictionD. It high retentivity

**Ans :D**

32.Material for good magnetic memory should have

A. Low hysteresis lossB. High permeabilityC. Low retentivityD. High retentivity

**Ans :D.**

33. Combustion is a

        **a. Chemical process** b. Physical process c. Both of these processes

        d. None of these processes

**Ans :A**

34. Which of the following is used as an indicator in the titration of iodine with hypo?

(a) Methyl red(b) Methyl orange(c) Starch(d) Potassium ferricyanide

**Answer: (c)**

35.. What is the pH of the solution at the point of maximum buffering?

A 11.3 B 10.0 C 9.3 D 5.3 E 1.8

**Answer: (c)**

36The first unclear power plant in India is located at

(a) Kota (b) Kalapakkam (c) Tarapur(d) Baraeilly

**Ans: c**

37. On adding a large amount of titrant, an asymptote is obtained in the titration curve, this asymptote represents

(a) Ka of the initial solution(b) pH of the initial solution(c) pH of the titrant

(d) none of the above

**Answer: (c)**

38. The buffer region is represented by

(a) the concave curve after adding titrant(b) the flat curve before the equivalence point

(c) the flat curve after the equivalence point(d) the steep curve after the equivalence point

**Answer: (b)**

39.The pH range of methyl orange as an indicator is

(a) 3-5(b) 8-9(c) 2-4(d) 6-8

**Answer: (a)**

40. Which electromagnetic waves are mainly used as a treatment for cancer?

a)Alpha-rays b)β- rays c)X-rays d)Gamma rays

**Ans : D**

41. Radioactive disintegration of Tritium gives-

a)α particles b)β particles c)Neutrons d)None of these

**Answer: (b)**

**42**. Burning of hydrogen is an example of

(a) slow combustion (b) rapid combustion **(c) explosion** (d) spontaneous combustion

**Answer: (c)**

**43.** A cyclotron accelerates particles of mass m and charge q. the energy of particle emerging is proportional to

A)q2/m b)q/m2 c)q2/m2 d)q

**Answer: (a)**

44. If the magnetic field inside a cyclotron is doubled then the frequency of a moving charge inside the cyclotron-

A)Becomes double B)Becomes halved C)Becomes four times

D)Remains same

**Answer: (a)**

**45.**Which of the following quantity of the charged particle does not change in the cyclotron:

a)Speed b)Momentum c)Time-period d)None of these

**Answer: (c)**

46. The angular frequency of a cyclotron is independent of

a)Speed b)Mass c)Magnetic field d)Charge

**Answer: (a)**

**47.** A cyclotron of radius R has a constant magnetic field B, If the magnetic field strength is decreased then effect on the energy of moving charge in the cyclotron will-

a)Increased b)Decreased c)Not affected

Does not depend upon Magnetic field strength

**Answer: (b)**

**48.**which of the following quantity of the charged particle does not change in the cyclotron

a) speed b) Momentum c) Time-period d) none of these

**Answer: (c)**

**49.** In which year was India's first nuclear reactor formally inaugurated by Prime minister JL Nehru?

a)1955 b)1967 c)1965 d)1957

**Ans : D**

50. Which parts function is to reduce the energy of fast neutrons to thermal neutrons in nuclear power plant?

a) Moderator b) Coolant circulator c) Control rods d) Shielding

**Answer: a**

**51.** Which of the following part in a nuclear reactor minimizes the neutron leakage?

a) Shield b) Control rods c) Reflector d) Moderator

**Answer: c**

**52**. In which of the following reactor is fission caused by slow or thermal neutrons?

a) Thermal reactor b) Burner reactor c) Fast reactor d) Breeder reactor

**Answer: a**

**53**. Which reactor has no moderator and its core size is less?

a) Fast reactor b) Burner reactor c) Thermal reactor d) Breeder reactor

**Answer: a**

**54.** In which reactor is fertile material converted into initial fissile material?

a) Breeder reactor b) Fast reactor c) Burner reactor d) Thermal reactor

**Answer: a**

**55.** Shield is made of \_\_\_

a) Iron Metal enclosure b) Concrete and water c) Ceramics walls d) Copper metal

**Answer: b**

**56.** Moderator in nuclear plants is used to

(a) reduce temperature (b) extract heat from nuclear reaction

(c) control the reaction (d) cause collision with the fast moving neutrons to reduce their speed

**Ans: d**

**57**. The main interest of shielding in nuclear reactor is protection against

(a) X-rays (b) infra-red rays (c) a, P, and y rays (d) neutrons and gamma rays

**Ans: d**

**58.** Reflector in nuclear plants is used to

(a) returnthe neutrons back into the core (b) shield the radioactivity completely

(c) check pollution (d) conserve energy

**Ans: a**

**59.** Reflector in nuclear plants is used to

(a) returnthe neutrons back into the core (b) shield the radioactivity completely

(c) check pollution (d) conserve energy

**Ans: a**

**60**. The breeding gain in case of thermal breeder reactor as compared to fast breeder reactor is

(a) same (b) lower (c) higher (d) unity

**Ans: b**

**UNIT -IV THE CHEMISTRY OF LANTHANIDES , ACTINIDES AND NANO TECHNOLOGY**

1.What is the general electronic configuration of the lanthanides?

a) (n-2)f 1-14 (n-1)d 1-10 ns2

b) (n-2)f 1-14 (n-1)d 1-2 ns2

c) (n-2)f 1-14 (n-1)d 0-1 ns2

d) (n-2)f 1-14 (n-1)d 0 ns2

Ans : c

2.What happens to the atomic size of the lanthanides with increase in atomic number?

a) The radius remains unchanged

b) The radius decreases

c) The radius increases

d) The radius first increases and then decreases

Ans : b

3.What is the most common oxidation state of lanthanides?

a) +2

b) +4

c) +6

d) +3

Ans : d

4.Which of the following lanthanide ions do not exhibit color?

a) Lu+3 and Ln+3

b) Lu+2 and Ln+2

c) Ce+3 and Ce+3

d) Pr+4 and Ce+4

Ans : a

5.Which is the last element of lanthanides?

a) Ytterbium

b) Lutetium

c) Thulium

d) Erbium

Ans : b

6.Which of the following is not a consequence of lanthanide contraction?

a) From La+3 to Lu+3, the ionic radii changes from 106 pm to 85 pm

b) As the size of the lanthanide ions decreases the basic strength increases

c) The basic character of oxides and hydroxides decreases with increase in atomic number

d) The atomic radii of 4d and 5d series is similar

Ans : b

7.Which property of actinoids cannot be explained?

a) Radioactive

b) Oxidation

c) Magnetic

d) Acidic

Ans : c

8.Which is the most stable oxidation state of actinoids?

a) +2

b) +3

c) +4

d) +5

Ans : b

9.Actinoids are mostly attacked by which acid?

a) Hydrochloric acid

b) Nitric acid

c) Sulphuric acid

d) Boric acid

Ans : a

10.Which of the actinoids is used in the treatment of cancer?

a) Plutonium

b) Uranium

c) Curium

d) Thorium

Ans : d

11.Which of the actinoids is used as a nuclear fuel?

a) Actinium

b) Thorium

c) Uranium

d) Californium

Ans : c

12.Which was the first transuraniumactinoid element to be discovered?

a) Neptunium

b) Americium

c) Protactinium

d) Actinium

Ans : a

13.Which isotope of plutonium is used in nuclear bombs?

a) P-238

b) P-239

c) P-240

d) P-241

Ans : b

14.Which metal is used in an aircraft turbine engine?

a) Iron

b) Thorium

c) Titanium

d) Neodymium

Ans : c

15.Which metal is used in making electrical fibres?

a) Actinium

b) Nickel

c) Thorium

**d) Tungsten**

Ans : d

16.Which of the following has the highest density?

a) Os

b) Zn

c) Cr

d) Cd

Ans : a

17.The lanthanides are

a) s- block elements

b) p- block elements

c) f- block elements

d) d- block elements

Ans : c

18.Which of the following is the correct order of arrangement of the first five lanthanides according to atomic number?

a) La, Ce, Pr, Nd, Pm

b) La, Pr, Ce, Pm, Nd

c) La, Pr, Ce, Nd, Pm

d) La, Ce, Pr, Pm, Nd

Ans : a

19. Atomic number actinides are from

a)57- 70

b) 58-71

c) 89-103

d)88-105

Ans : c

20.The element occurring in nature in trace amount is

a) neptunium

b) Lawrencium

c) Mendelevium

d) berkelium

Ans :a

21. Lr3+ is

a) Paramagnetic

b) Diamagnetic

c) Ferrimagnetic

d) None of these

Ans : b

22.In which class of elements, there is regular filling 5f sub energy level

a) Lanthanides

b) Transition elements

c) s-block elements

d) actinides

Ans : d

23.The most important oxidation state of Thorium is

a) +4

b) +2

c) +5

d) +6

Ans : a

24.Which of the following element does not belong to actinides

a) Cm

b) Th

c) Lr

d) Gd

Ans : d

25.The oxidation state of Uranium in UO2Cl2 is

a) +6

b) +4

c) +3

d) +2

Ans : a

26. Lr3+ is

a) Paramagnetic

b) Diamagnetic

c) Ferrimagnetic

d)None of these

Ans : b

27.The elements belonging to 5f-inner transition series are

a) Th, Pu, Np, Cf, No

b) Sm, Pr, Th, Pu, Np

c) Pr, Th, Pu, Np, No

d) Sm, Pr, Np, Cf, No

Ans : a

28.The element occurring in nature in trace amount is

a) neptunium

b) Lawrencium

c) Mendelevium

d) berkelium

Ans : a

29.In aqueous solution, Eu+2 ion acts as

a) Oxidizing agent

b) Reducing agent

c) both a and b

d) None of these

Ans : b

30.Lanthanide contraction is caused due to

a) the appreciable shielding on outer electrons by 4f electrons from the nuclear charge

b) the appreciable shielding on outer electrons by 4f electrons from the nuclear charge

c) the same effective nuclear charge from Ce to Lu

d) the imperfect shielding on outer electrons by 4f electrons from the nuclear charge

Ans : d

31. The reason for the stability of Gd3+ ion is

a) 4f subshell- half filled

b) 4f subshell completely filled

c) Possesses the general electronic configuration of noble gases

d) 4f subshell empty

Ans : a

32.The most common oxidation states shown by cerium are

a) +2,+4

b) +3, +4

c) +3, +5

d) +2, +3

Ans : b

33. The outer electronic configuration of Gd( At.No.=64) is

a) 4f3 5d5 6s2

b) 4f8 5d0 6s2

c) 4f4 5d4 6s2

d) 4f7 5d1 6s2ions

Ans : d

34.Across the lanthanide series, the basicity of the lanthanide hydroxides:

a) Increases

b) Decreases

c) First increases and then decreases

d) First decreases and then increases

Ans: b

35.Nanomaterials are the materials with at least one dimension measuring less than \_\_\_\_\_\_\_\_\_\_\_

a) 1 nm

b) 10 nm

c) 100 nm

d) 1000 nm

Ans : c

36.material with one dimension in Nano range and the other two dimensions are large is called \_\_\_\_\_\_\_\_\_\_\_

a) Micro-material

b) Quantum wire

**c) Quantum well**

d) Quantum dot

Ans: c

37.The colour of the nano gold particles is \_\_\_\_\_\_\_\_\_\_\_

a) Yellow

b) Orange

c) Red

d) Variable

Ans: d

38. The melting point of particles in nano form \_\_\_\_\_\_\_\_\_\_\_

a) Increases

b) Decreases

c) Remains same

d) Increases then decreases

Ans: b

39. The first talk about nano-technology was given by \_\_\_\_\_\_\_\_\_\_\_

a) Albert Einstein

b) Newton

c) Gordon E. Moore

d) Richard Feynman

Ans: d

40.Which of the processes of materials was not described as Nanotechnology?

a) Separation

b) Creation

c) Processing

d) Consolidation.

Ans: b

41.The initial tools used to help launch the nanoscience revolution were \_\_\_\_\_\_\_\_\_\_\_

a) Binoculars

b) Microscope

c) Scanning probe instruments

d) Interferomete

Ans : c

43. What’s the procedure in Top-down fabrication method?

a) Nano-particles -> Powder -> Bulk

b) Powder -> Bulk – > Nano-particles

c) Bulk -> Powder – > Nano-particles

d) Nano-particle – > Bulk -> Powder

Ans. c

44.The size of atoms is nearly \_\_\_\_\_\_\_\_\_\_\_\_

a) 0.01 nm

b) 0.1 nm

c) 1 nm

d) 10 nm

Ans: b

45.Which of the following is an example of Bottom Up approach?

a) Attrition

b) Colloidal dispersion

c) Milling

d) Etching

Ans: b

46. For milling operations, what kind of environment is preferred?

a) Acidic

b) Basic

c) Active

**d) Inert**

Ans: d

47.What kind of metals are used for milling operations?

a) Soft and brittle

b) Soft and elastic

c) Hard and brittle

d) Hard and elastic

Ans: c

48.CVD stands for \_\_\_\_\_\_\_\_\_\_\_\_

a) Carbon vapour density

b) Chemical vapour density

c) Chemical vapour deposition

d) Carbon vapour deposition

Ans: c

49.Chemical solution deposition is also known as \_\_\_\_\_\_\_\_\_\_\_\_

a) Sol-gel

b) CVD

c) Plasma spraying

d) Laser pyrolysis

Ans: a

50.Particles of ZrO2, Y2O2 and Nano whiskers have been produced by \_\_\_\_\_\_\_\_\_\_

a) Sol-gel

b) CVC

c) Plasma spraying

d) Laser pyrolysis

Ans: b

51.Which gas serves as buffer gas in Laser ablation?

a) Nitrogen

b) Oxygen

c) Helium

d) Neon

Ans: c

52.CNTs stands for \_\_\_\_\_\_\_\_\_\_\_\_

a) Carbon Nanotubes

b) Carbon Nanotechnology

c) Carbon Nanoscience and technology

d) Carbon Nine Technology

Ans: a

53. For the synthesis of CNTs, the quartz tube is heated up to \_\_\_\_\_\_\_\_\_\_\_\_

a) 1000℃

b) 1200℃

c) 1400℃

d) 1600℃

Ans: b

54.The main purpose of CNTs in fuel cells is \_\_\_\_\_\_\_\_\_\_\_

a) Production of energy

b) Active medium

c) Catalyst

d) Storage

Ans: d

55.Carbon nanotubes are poor transmitters of electromagnetic radiations due to their \_\_\_\_\_\_\_\_\_\_\_\_

a) High conductivity

b) Large surface area

c) High porosity

d) Chemical Stability

Ans: a

56.Opticalfiber sensors are electrically \_\_\_\_\_\_\_\_\_\_\_\_

a) active

b) passive

c) active as well as passive

d) cannot be determined

Ans: b

57.Fluoroptic temperature sensors work on the principle of \_\_\_\_\_\_\_

a) thermistor

b) thermocouple

c) opticalfiber

d) rtd

Ans: c

58.Endoscopic imaging uses \_\_\_\_\_\_\_\_\_\_\_

a) thermal sensors

b) chemical sensors

c) opticfiber sensors

d) pressure sensors

Ans: c

59.The biological response of the biosensor is determined by \_\_\_\_\_\_

a) biocatalytic membrane

b) physio-chemical membrane

c) chemical membrane

d) artificial membrane

Ans: a

60.Home blood glucose sensor works on which principle?

a) electro-physiological

**b) electrochemical**

c) physio-chemical

d) chemical

Ans: b

**UNIT - V BIO INORGANIC CHEMISTRY**

1. The nature of an enzyme is

a) Lipid

b) Vitamin

c) Carbohydrate

d) Protein

Ans: d

2. This enzyme was first isolated and purified in the form of crystals

a) Urease

b) pepsin

c) Amylase

d) Ribonuclease

Ans: a

3. The enzyme COX-1 is vital for human health in this way:

a) it is a chemical derivative of aspirin

b) catalyzes the hormone-production which maintains the stomach lining

c) critical for the biosynthesis of DNA

d) helps in the transportation of carbon dioxide in the blood

Ans: b

4. What is an apoenzyme?

a) It is a protein portion of an enzyme

b) It is a non-protein group

c) It is a complete, biologically active conjugated enzyme

d) It is a prosthetic group

Ans: a

5. Name the coenzyme of riboflavin (B2)?

a) NAD or NADP

b) FAD and FMN

c) Coenzyme A

d) Thiamine pyrophosphate

Ans: b

6. Which of this vitamin is associated with the coenzyme Biocytin?

a) Nicotinic acid

b) Thiamine

c) Biotin

d) Pyridoxine

Ans: c

7. Name the enzyme secreted by pancreas?

 a) Pepsin

b) Chymotrypsin

c) Trypsin

d) Alcohol dehydrogenase

Ans: c

8. Name the enzyme which catalyzes the oxidation-reduction reaction?

a) Transaminase

b) Glutamine synthetase

c) Phosphofructokinase

d) Oxidoreductase

Ans : d

9. Mark the Correct function of enzyme, Peptidase?

a) Cleave phosphodiester bond

b) Cleave amino bonds

c) Remove phosphate from a substrate

d) Removal of H2O

Ans: b

10. What is the SI unit of enzyme activity?

a) Km

b) Kat

c) Kcat

d) Vmax

Ans: b

11. Carboxypeptidase contains:

a) Zn (II) and hydrolyses CO2.

b) Mg (II) and hydro lyses CO2.

c) Zn (II) and hydrolyses peptide bonds.

d) Mg (II) and hydrolyses peptide bonds.

Ans : c

12. Which one is the cofactor of carbonic anhydrase?

a) Cu

b) Zn

c) Fe

d) Mg

Ans : b

13. Carbonic anhydrase is found in …………………..

 (a) WBC

 (b) RBCs

(c) thrombocytes

(d) blood plasma

Ans: b

14. In photosynthesis dark reaction, is called so because-

a) It occurs in dark.

b) It does not require light energy.

c) It cannot occur during daytime.

d) It occurs more rapidly at night.

Ans: b

15. Rate of photosynthesis does not depend upon:

a) Quality of light

b) Intensity of Light

c) Duration of Light

d) Temperature

Ans: c

16. Photosynthesis is a \_\_\_\_\_ process.

a) Catabolic

b) Anabolic

c) Exothermic

d) Metabolic

Ans: b

17. Name the pigment which is responsible for absorption of light in plants?

a) Chlorophyll

b) Stoma

c) Xylem

d) Phloem

Ans: a

18. .In bacteria name the colour of light which is responsible for photosynthesis?

a) Ultra-Violet

b) Blue

c) Red

d) None of the above

Ans: c

19. Name the metal present in chlorophyll ‘a’ and ‘b’?

a) Iron

b) Copper

c) Magnesium

d) Manganese

Ans: C

20. Name the structural unit of photosynthesis?

a) Thylakoid

b) Grana

c) Stroma

d) Chlorophyll

Ans: a

21.. How many essential nutrients does a plant require?

a) 15

b) 17

c) 16

d) 20

Ans: b

22. Which of the following minerals plays a major role in energy storage and transfer of ADP into ATP molecules?

a) Phosphorus

b) Magnesium

c) Molybdenum

d) None of the above

Ans: a

23. Which of the following minerals is required by the plants in large quantities?

a) Chlorine

**b) Phosphorus**

c) Manganese

d) Molybdenum

Ans: b

24. The main mode of nutrition in plants is \_\_\_\_\_\_\_\_\_\_.

a) Autotrophic

b) Heterotrophic

c) Saprophytic

d) None of the above

Ans: a

25. Which of the following minerals is required for the synthesis of chlorophyll?

a) Copper

b) Potassium

c) Nitrogen

d) Iron

Ans: d

26. Which of the following vitamin is also known as cobalamin?

a) Vitamin B11

b) Vitamin B12

c) Vitamin B6

d) Vitamin B2

Ans: b

27. Name the vitamin which functions as hormone as well as visual pigment?

a) Thiamine

b) Riboflavin

c) Retinol

d) Folic acid

Ans: c

28. Name the coenzyme of riboflavin (B2)?

a) NAD or NADP

b) FAD and FMN

c) Coenzyme A

d) Thiamine pyrophosphate

Ans: b

29. Name the enzyme which catalyzes the oxidation-reduction reaction?

a) Transaminase

b) Glutamine synthetase

c) Phosphofructokinase

d) Oxidoreductase

Ans: d

30. \_\_\_\_\_\_\_\_\_ helps in the regulation of blood volume and blood pressure.

a) Iron

b) Iodine

c) Sodium

d) Phosphorous

Ans : c

31. Excessive intake of calcium in our diet results in \_\_\_\_\_\_\_\_\_\_\_.

a) Stroke

b) Diarrhoea

c) Constipation

d) Kidney stones

Ans: d

32. Minerals are absorbed by the plants, through

a) Pressure flow

b) Diffusion

c) Active transport

d) Osmosis

Ans: c

33.. Potassium is employed in

a) Chlorophyll synthesis

b) Protein synthesis

c) Cementing synthesis

d) Opening and closing stomata

Ans: d

34. Calcium is a component of

a) Middle lamella

b) Primary walls

c) Secondary walls

d) Chlorophyll

Ans: a

35. Critical elements are

a) Na, K and Ca

b) N, P and Mg

c) N, P and K

d) Mn, B and Mo

Ans : c

36. Minerals are absorbed in the form of

a) Molecules

b) Ions

c) Compounds

d) Mixtures

Ans : b

37. A primary deficiency is caused by insufficient by absorption of

a) Magnesium

b) Manganese

c) Calcium

d) Potassium

Ans: d

38. number of minerals like Ca, Mg and K are held over the surface of clay particles because the latter are

a) Negatively charged

b) Positively charged

c) Neutral

d) Having both positive and negative residual valencies

Ans: a

39.The largest reservoir of nitrogen is

a) Rocks

b) Sea

c) Air

d) Soil

Ans: c

40. The enzymes required for nitrogen fixation is

a) Nitrogen deaminase

b) Nitrodioxidase

c) Amino acid decarboxylase

**d) Nitrogenase**

Ans: d

41. Little leaf/leaf rosetting is deficiency symptom of

a) Zn

b) Mn

c) Fe

d) B

Ans: a

42. Common free ion in the cell is

a) Iron

b) Potassium

c) Sulphate

d) Phosphate

Ans: b

43. fertilizer has a formula of three figures 15-9-9. They stand for percentage of

a) N, Ca and Mg

b) Mg, P and K

c) Ca, N and Fe

d) N, P and K

Ans: d

44. Which of the following is macronutrient

a) Ca

b) Mo

c) Mn

d) Zn

Ans: a

45. Which of the following is a micronutrient

a) Mg

b) Zn

c) Ca

d) P

Ans: b

46. Which of the following is present in the core of chlorophyll molecule

a) Fe

b) Mg

c) K

d) Mn

Ans: b

47. Which is not an essential element for plants

a) Iron

b) Potassium

c) Zinc

**d) Sodium**

Ans: d

48. Which one is an inorganic nutrient

a) Cellulose

b) Vitamin

c) Calcium

d) Protein

Ans: c

49. Most of the plants obtain nitrogen from the soil in the form of

a) Free nitrogen gas

b) Nitric acid

c) Nitrites

d) Nitrates

Ans: d

50. Synthesis of indole acetic acid in plant requires

a) copper

b) calcium

c) molybdenum

d) zinc

Ans : d

51. The deficiency of nitrogen in plants develops colouration due to the synthesis of

a) adenine

b) adenosinediphosphate

c) anthocyanin

d) adenosine triphosphate

Ans : c

52. In nitrogen fixation

**a) plants convert atmospheric nitrogen to nitrates**

b) plants absorb ammonia from the soil

c) the bacteria all housed on the plant roots

d) the enzyme nitrogenase produces ammonia from gaseous nitrogen

Ans: a

53. The mineral constituents of cell wall is

a) iron

b) magnesium

c) potassium

d) calcium

Ans: d

54. Biological fixation of nitrogen is helped by

a) zinc

b) copper

c) boron

d) molybdenum

Ans: d

55. Interveinal necrosis in lemon leaves is caused by the deficiency of

a) molybdenum

b) boron

c) zinc

d) copper

Ans: c

56. The excess of nitrogen supply to plants produces

a) no leaves at all

b) yellow leaves

c) less number of leaves

d) dark-green leaves

Ans: d

57. Water core’ of turnip is caused by the deficiency of

a) boron

b) zinc

c) molybdenum

d) calcium

Ans : d

58. The best known nitrogen fixing bacterium is

a) Clostridium

b) Cyanobacteria

c) Rhizobium

d) All

Ans : c

59. Nitrogen fixation is the conversion of

a)N2 to N

b) N2 to NH3

c) N2 to NO3–

d) N2 to urea

Ans : b

60. How many molecules of ATP are required to fix one molecule of nitrogen?

a) 12

b) 20

c) 6

d) 16

Ans : d