DEPARTMENT OF CHEMISTRY

SUBJECT : ALLIED CHEMISTRY (II- PHYSICS)

SUBJECT CODE: ACH301S

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UNIT-1
NUCLEAR CHEMISTRY
PART-A

1. 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.
    (e) atomic masses that indicate fissile isotopes.

2. The actual mass of a ^{37}Cl atom is 36.966 amu. Calculate the mass defect (amu/atom) for a ^{37}Cl atom.
    (a) 0.623 amu
    (b) 0.388 amu
    (c) 0.263 amu
    (d) 0.341 amu
    (e) none of these

3. The mass defect for an isotope was found to be 0.410 amu/atom. Calculate the binding energy in kJ/mol of atoms. $(1 \text{ J} = 1 \text{ kg} \cdot m^2/s^2)$
    (a) 3.69×10^{10} kJ/mol
    (b) 1.23×10^{20} kJ/mol
    (c) 3.69×10^{13} kJ/mol
    (d) 1.23×10^{3} kJ/mol
    (e) 1.23×10^{23} kJ/mol

4. Calculate the binding energy per nucleon (in units of MeV) for ^9Be, for which the atomic mass is 9.01219 amu. Particle masses in amu are: proton = 1.007277; neutron = 1.008665; electron = 0.0005486. Conversion factor for $E = mc^2$ is 931 MeV/amu.
    (a) 6.46 MeV
    (b) 6.33 MeV

(c) 6.23 MeV
(d) 11.39 MeV
(e) 56.93 MeV

5. Which isotope below has the highest nuclear binding energy per gram? No calculation is necessary.
      (a) ^{4}He
      (b) ^{16}O
      (c) ^{32}S
      (d) ^{55}Mn
      (e) ^{238}U

6. Which of the following statements is incorrect?
      (a) Mass defect is the amount of matter that would be converted into energy if a nucleus were formed from initially separated protons and neutrons.
      (b) Nuclear binding energy is the energy released in the formation of an atom from subatomic particles.
      (c) Nuclei with highest binding energies are the most stable nuclei.
      (d) Einstein postulated the Theory of Relativity in which he stated that matter and energy are equivalent.
      (e) Mass number is the sum of all protons and electrons in an atom.

7. A positron has a mass number of _____, a charge of _____, and a mass equal to that of a(an) _____.
      (a) 0, 1+, proton
      (b) 1, 2+, proton
      (c) 0, 1+, electron
      (d) 1, 2+, electron
      (e) 0, 0, proton

8. Emission of which one of the following leaves both atomic number and mass number unchanged?
      (a) positron
      (b) neutron
      (c) alpha particle
      (d) gamma radiation
      (e) beta particle

9. Which type of radiation is the least penetrating?
      (a) alpha
      (b) beta
      (c) gamma
      (d) x-ray
      (e) neutron

10. A radioisotope of argon, ^{35}Ar, lies below the "band of stability: (n/p ratio too low). One would predict that it decays via _____.
    (a) neutron emission
    (b) beta emission
    (c) positron emission
    (d) alpha emission
    (e) fission

11. A Geiger-Muller tube is a _____ .
    (a) gas ionization detector
    (b) cloud chamber
    (c) fluorescence detector
    (d) spectrophotometer
    (e) photographic detector

12.

The half life of ^{231}Pa is 3.25 x 10^4 years. How much of an initial 10.40 microgram sample remains after 3.25 x 10^5 years?
    (a) 0.0102 micrograms
    (b) 0.240 micrograms
    (c) 2.18 micrograms
    (d) 0.0240 micrograms
    (e) 1.04 micrograms

13. Consider the case of a radioactive element X which decays by electron (beta) emission with a half-life of 4 days to a stable nuclide of element Z. Which of the following statements is CORRECT?
    (a) After 8 days the sample will consist of one-fourth element Z and three-fourths element X.
    (b) Element Z will weigh exactly the same as element X when decay is complete (weighed to an infinite number of significant figures).
    (c) 2.0 g of element X is required to produce 1.5 g of element Z after 8 days (to 2 significant figures).
    (d) If element X as an atomic number equal to n, then element X has an atomic number equal to n-1.
    (e) None of the above.

14. Carbon-11 is a radioactive isotope of carbon. Its half-life is 20 minutes. What fraction of the initial number of C-11 atoms in a sample will have decayed away after 80 minutes?
    (a) 1/16
    (b) 1/8
    (c) 1/4
    (d) 7/8
    (e) 15/16

15. How old is a bottle of wine if the tritium (^{3}H) content (called activity) is 25% that of a new wine? The half-life of tritium is 12.5 years.
    (a) 1/4 yr
    (b) 3.1 yr
    (c) 25 yr
    (d) 37.5 yr
    (e) 50 yr

16. A Geiger counter registered 1000 counts/second from a sample that contained a radioactive isotope of polonium. After 5.0 minutes, the counter registered 281 counts/second. What is the half-life of this isotope in seconds?
    (a) 87
    (b) 110
    (c) 164
    (d) 264
    (e) 2.18

17. The ^{14}C activity of some ancient Peruvian corn was found to be 10 disintegrations per minute per gram of C. If present-day plant life shows 15 dpm/g, how old is the Peruvian corn? The half-life of ^{14}C is 5730 years.
    (a) 1455 years
    (b) 1910 years
    (c) 3350 years
    (d) 3820 years
    (e) 9080 years

18. Which of the following describes what occurs in the fission process?
    (a) A heavy nucleus is fragmented into lighter ones.
    (b) A neutron is split into a neutron and proton.
    (c) Two light nuclei are combined into a heavier one.
    (d) A proton is split into three quarks.
    (e) A particle and anti-particle appear in an area of high energy density.

19. Which of the following statements about nuclear fission is always correct?
    (a) Very little energy is released in fission processes.
    (b) Nuclear fission is an energetically favorable process for heavy atoms.
    (c) Due to its instability, ^{56}Fe readily undergoes fission.
    (d) In fission reactions, a neutron is split into a proton and an electron.
    (e) All nuclear fission reactions are spontaneous.

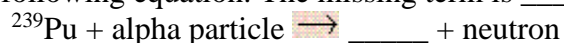20. Which one of the following would be most likely to undergo thermonuclear fusion?
    (a) ^{2}H
    (b) ^{4}He

(c) ^{56}Fe
(d) ^{141}Ba
(e) ^{235}U

21. Which one of the following statements about nuclear reactions is false?
   (a) Particles within the nucleus are involved.
   (b) No new elements can be produced.
   (c) Rate of reaction is independent of the presence of a catalyst.
   (d) Rate of reaction is independent of temperature.
   (e) They are often accompanied by the release of enormous amounts of energy.

22. Complete and balance the following equation. The missing term is _____ .
$$^{239}\text{Pu} + \text{alpha particle} \longrightarrow \_\_\_\_\_ + \text{neutron}$$
   (a) 2 ^{115}Ag
   (b) 2 ^{106}Rh
   (c) ^{235}U
   (d) ^{233}Pa
   (e) ^{242}Cm

23. When ^{59}Cu undergoes positron emission, what is the immediate nuclear product?
   (a) ^{59}Ni
   (b) ^{58}Ni
   (c) ^{58}Cu
   (d) ^{59}Zn
   (e) ^{58}Zn

24. As a result of the process of electron capture ("K-capture") by ^{211}At, the new isotope formed is:
   (a) ^{210}At
   (b) ^{212}At
   (c) ^{211}Po
   (d) ^{211}Rn
   (e) ^{207}Bi

25. When ^{235}U is bombarded with one neutron, fission occurs and the products are three neutrons, 94Kr, and _____ .
   (a) ^{139}Ba
   (b) ^{141}Ba
   (c) ^{139}Ce
   (d) ^{139}Xe
   (e) ^{142}I

PART-B

1. What is nuclear energy?

2. What is nuclear fission reaction?

3. What is nuclear fusion reaction? Give one example.

4. Differentiate nuclear fission and fusion reaction.

5. Define nuclear chain reaction.

6.What are fissile and fertile nucleides?

7. What are solar cells? Give one example./What is a photo galvanic cells?

8. What is solar energy conversion?

9. What are the merits of wind energy?

10. What are batteries?

11. Define breeder reactor.

12. What are non-conventional energy sources? Give two examples.

13. What is a fuel cell?

14. What are the advantages of fuel cell? Or What are the advantages of H2-O2 fuel cell?

15. What are the applications of lithium batteries?

16. List any two advantages of lithium batteries.

15.Define alkaline battery.

16.What are the general components in nuclear reactor?

PART- C

1 Distinguish between Nuclear fission and Nuclear fusion reaction.

2. Define Nuclear fission reaction. Explain with one example in detail.

3. Explain Nuclear Reactor-Power Generator with neat diagram./ Light Water Reactor

4. Explain Breeder reactor with reactions.

5. Define solar cell. Explain solar energy conversion in detail.

6. Write a short note on Wind Energy.

7. Define Battery. Explain with its types.

8. Explain Alkaline Battery with neat diagram and cell reactions.

9. Explain Lead acid storage battery.

10. Explain Nickel – Cadmium battery with cell reactions.

Cell Representation: Cd/Cd(OH)2//KOH(aq)/NiO2/Ni

11. Explain Lithium batteries in detail.

12. Explain Hydrogen- Oxygen Fuel cell / [H2 – O2] Fuel cell.

UNIT-2
SPECTROSCOPY

PART-A

1. Visible light's wavelength range _____.

(a) 0.39 – 0.77 mm   (b) 0.39 – 0.77 µm (c) 0.39 – 0.77 nm   (d) 0.39 – 0.77 cm

2. Planck's constant

(a) 6.62x10-34 J.sec (b) 6.62x10-34 J.min (c) 6.62x10-34 Cal.sec (d) 6.62x10-34 Cal.min

3. Sum of these is unity

(a) Reflectivity (b) Reflectivity + Refractivity   (c) Reflectivity + Refractivity + Transmitivity (d) Any

4. Metals can _____ the light beams.

(a) Reflect (b) Refract (c) Transmit (d) Any

5. Metals are _____.

(a) Transparent (b) Opaque (c) Translucent (d) None

6. Metals can transmit these ____.

(a) Radio ways (b) Visible light (c) Microwaves (d) x-rays

7. Reflectivity of metals

(a) 0.05 (b) 0.50 (c) 0.95 (d) None

8. Refractive index of materials is approximately equal to square root of

(a) electrical permittivity   (b) magnetic permeability (c) electrical permittivity x magnetic permeability (d) None

9. Snell's law relates _____.

(a) Light relfection (b) Light refraction (c) Light transmission (d) Light Absorption

10. Bouguer's law relates _____.

(a) Light relfection (b) Light refraction (c) Light transmission (d) Light Absorption

11. Sky looks blue because the sun light is subjected to _____.

(a) Rayleigh scattering (b) Compton scattering (c) Both (d) None

12. Luminescence is because of

(a) Photons emitted while excited electrons drops down (b) Knocking out of electrons by photons (c) Photons stimulated by photons (d) All

13. Fluorescence occurs within _____.

(a) 10-5 s. (b) 10-5 ms. (c) 10-5 μs. (d) 10-5ns.

14. Electro-luminescence occurs in _____.

(a) Electrical conductors (b) Electrical insulators (c) p-n junctions (d) all

15. Pyrometer works based on

(a) Laser technology (b) Photo-conduction (c) Thermal emission (c) Tyndall effect

16. Solar cell works based on

(a) Laser technology (b) Photo-conduction (c) Thermal emission (c) Tyndall effect

17. Optical fiber operates on the principle of

(a) Total internal reflectance (b) Tyndall effect (c) Photo-electric effect (d) Laser technology

PART-B

I. What is spectroscopy? Discuss the various types of spectroscopy with respectelectromagneticradiation.

2. What arc electromagnetic radiations? Name different parts of them. How can different parts of electromagnetic radiations be differentiated.

3. Define the Beer-Lambert law. Give their limitations.

4. Explain the difference between:

(a)   Allowed transition and forbidden transition.

(b) Chromophore and auxochrome.

(c) Bathochromic shift and hypsocluomic shift.

5. Describe the various parts of a.uv-visible spectrometer- and their working.

6. How will you measure the concentration of KMn04 solution by uv-visible spectroscopy?

7. How is IR spectrometer different from a uv-visible spectronieter?

8. Discuss the vibrational modes of molecules responsible for an IR spectrum.

9. Give the IR stretching wave number of C- N, C=0, N-H and O-H groups.

10. Discuss the interpretation of different peaks of 1-hexene.

11. Write down the applications of uv-visible and IR spectroscopy.s

UNIT-3

SOLID STATE CHEMISTRY

1.Which of the following compounds has hexagonal structure?
- Diamond
- Graphite
- NaCl
- KCl.

2.Rate of evaporation of a liquid does not depend upon

○ nature of liquid

○ temperature

○ Atmospheric pressure

○ Size of vessel.

3.Which of the following is not a property of crystalline solid?

○ Isotropy

○ Anisotropy

○ Sharp melting point

○ Definite geometry.

4.In a face centred cubic lattice the number of nearest neighbours for a given lattice point is

○ 6

○ 4

○ 8

○ 12.

5.NaCl is an example of

○ ionic solid

○ covalent solid

○ metallic solid

○ molecular solid.

6.In rock salt structure what percentage of the octahedral voids are occupied by cations?

○ 50%

○ 100%

○ 25%

○ 33%.

7.The maximum proportion of volume available in FCC arrangement of spheres is

○ 52%

○ 26%

○ 32%

○ 68%.

8.Which of the following compounds is an example of network solid?

○ Corrundum

○ Carborundum

○ Dry ice

○ Ice.

9.The number of octahedral and tetrahedral voids per sphere in a cubic close packed arrangement is respectively.

○ 1 and 3

○ 6 and 4

○ 1 and 2

○ 2 and 1.

10.A simple cubic lattice consists if eight identical spheres of Radius R in contact, placed at the corners of the cube, what fraction of the total volume of cube is actually occupied by the cube?

○ 74%

○ 68%

○ 52.4%

○ 66%.

11.When a cation leaves its normal position in the crystal and moves to some interstitial space, the defect in the crystal is known as

○ Schottky defect

○ F-centre

○ Frenkel defect

○ Non-stochiometric defect.

12.What type of defect creates F-centres in the crystal?

○ Non-stoichiometric defect

○ Metal excess defect due to anion vacancies

○ Metal excess defect due to extra cation

○ Frenkel defect.

13. A crystal may have one or more planes of symmetry as well as one or more than one axis of symmetry but it has only

○ two centres of symmetry

○ one centre of symmetry

○ four centres of symmetry

○ no centre of symmetry.

14. During evaporation of liquid

○ temperature of liquid will rise

○ temperature of liquid will fall

○ temperature of liquid may rise or fall depending upon its nature

○ temperature of liquid remains unaffected.

15. Which of the following is an example of molecular solid?

○ ZnS

○ MgO

○ Ice

○ Diamond.

16. Which of the following is hcp crystal structure?

○ NaCl

○ CsCl

○ Zn

○ RbCl.

17. When electrons are trapped in the crystal lattice in place of anion vacancy, the defect in the crystal is known as

○ Frenkel defect

○ Schottky defect

○ F-centre

○ Dislocations.

18.A match box exhibits

○ cubic geometry

○ rectangular geometry

○ orthorhombic geometry

○ monoclinic geometry.

19.The percentage of the available space occupied in a hexagonal close packing of spheres in three dimensions is

○ 26%

○ 76%

○ 52.4%

○ 74%.

20.Which type of silicates involve sharing of two oxygen atoms between silicon atoms?I. single chain silicate II. ring silicateIII. sheet silicate IV. double chain silicate.

○ I, III

○ I, II

○ II, IV

○ III, IV.

21.A binary solid AB having radius ratio 0.52 is most likely to have

○ zinc blende structure

○ rock-salt structure

○ fluorite structure

○ antifluorite structure.

22.In antifluorite structure what percentage of the tetrahedral voids is occupied by cations?

○ 0%

○ 50%

○ 100%

25%.

23.Number of mirror planes in a cube is

○ 4

○ 6

○ 9

○ 5

24.Ionic solids with Schottky defects contain in their structures

○ equal number of cation and anion vacancies

○ interstitial anions and anion vacancies

○ cation vacancies only

○ cation vacancies and interstitial cations.

25.A metal M has FCC arrangement and edge length of the unit cell is 400 pm. The atomic radius of M is

○ 100 pm

○ 200 pm

○ 141 pm

○ 173 pm.

26.How many four fold axes and three fold axes are there in a cube respectively?

○ 1, 1

○ 2, 3

○ 3, 3

○ 4, 3.

27.A pure crystalline substance on being heated gradually first forms a turbid liquid at constant temperature and still at a higher temperature, the turbidity completely disappears. The behaviour is a characteristic of substance forming

○ allotropic crystal

○ liquid crystal

○ isomeric crystal

○ isomorphous crystal.

28.Pure silicon doped with phosphorus is

○ amorphous

○ p-type conductor

○ n-type conductor

○ insulator.

29.Which of the following unit cells has the highest symmetry?

○ Hexagonal

○ Orthorhombic

○ Cubic

○ Monoclinic.

PART-B

1.What are superconductors?Give any one of its applications

2.Write any two uses of superconductors

3.Determine the number of CsCl units per unit cell.CsCl has BCC arrangement.

4.Mention the types of Crystals.

5.Write a note on molecular crystals.

6.State Braggs law.

7.Sketch the (a)sc (b)fcc (c)bcc lattices.

8.What are point defects.

PART-C

1.Explain Braggs Spectrometer method in crystal study.

2.Explain Schottky and Frenkel defects.

3.Explain the types of Crystals.

4.Write the Properties of ionic crystals.

5.explain X-ray diffraction.

ACID BASE TITRATIONS

1. Which of the following combinations cannot produce a buffer solution?
     (a) HNO_2 and $NaNO_2$
     (b) HCN and NaCN
     (c) $HClO_4$ and $NaClO_4$
     (d) NH_3 and $(NH_4)_2SO_4$
     (e) NH_3 and NH_4Br

2. What is the pH of a solution composed of 0.20 M NH_3 and 0.15 M NH_4Cl?
     (a) 2.15
     (b) 4.62
     (c) 8.26
     (d) 9.38
     (e) 8.89

3. Calculate the ratio $[CH_3COOH]/[NaCH_3COO]$ that gives a solution with pH = 5.00?
     (a) 0.28
     (b) 0.36
     (c) 0.44
     (d) 0.56
     (e) 0.63

4. Consider a solution which is 0.10 M in CH_3COOH and 0.20 M in $NaCH_3COO$. Which of the following statements is true?
     (a) If a small amount of NaOH is added, the pH decreases very slightly.
     (b) If NaOH is added, the OH^- ions react with the CH_3COO^- ions.
     (c) If a small amount of HCl is added, the pH decreases very slightly.
     (d) If HCl is added, the H^+ ions react with CH_3COOH ions.
     (e) If more CH_3COOH is added, the pH increases.

5. A buffer was prepared by mixing 1.00 mole of ammonia and 1.00 mole of ammonium chloride to form an aqueous solution with a total volume of 1.00 liter. To 500 mL of this solution was added 30.0 mL of 1.00 M NaOH. What is the pH of this solution?
     (a) 8.96
     (b) 9.83
   (c) 9.31
     (d) 9.11

(e) 9.57

6. How many grams of NaF would have to be added to 2.00 L of 0.100 M HF to yield a solution with a pH = 4.00?
      (a) 300 g
      (b) 36 g
      (c) 0.84 g
      (d) 6.9 g
      (e) 60. G

7. Calculate the pH that results when the following solutions are mixed.
      (1) 35 mL of 0.20 M formic acid
      (2) 55 mL of 0.10 M sodium formate
      (3) 110 mL of water
      (a) 3.64
      (b) 3.11
      (c) 4.58
      (d) 3.39
      (e) 4.20

8. Consider an indicator that ionized as shown below for which its $K_a = 1.0 \times 10^{-4}$

$$HIn \quad + \quad H_2O \quad \rightleftarrows \quad H_3O^+ \quad + \quad In^-$$
      yellow   red
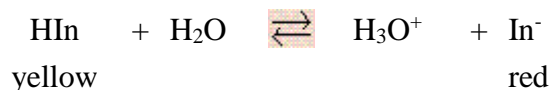
Which of the responses contains all the true statements and no others?
(1) The predominant color in its acid range is yellow.
(2) In the middle of the pH range of its color change a solution containing the indicator will probably be orange.
(3) At pH = 7.00, a solution containing this indicator (and no other colored species) will be red. (Hint: Write the equilibrium constant expression for the indicator.)
(4) At pH = 7.00, most of the indicator is in the un-ionized form.
(5) The pH at which the indicator changes color is pH = 4.
      (a) 1, 3, 5
      (b) 2, 4
      (c) 3, 4, 5
      (d) 1, 2, 3, 5
      (e) another combination

9. Calculate the pH of the solution resulting from the addition of 20.0 mL of 0.100 M NaOH to 30.0 mL of 0.100 M HNO_3.
      (a) 1.35
      (b) 1.70
      (c) 1.95
      (d) 2.52

10. Which indicator (identified by a letter) could be used to titrate aqueous NH_3 with HCl solution?

Indicator	Acid Range Color	Color-Change pH	Basic Range Color
(a)	pink	1.2 - 2.8	yellow
(b)	blue	3.4 - 4.6	yellow
(c)	yellow	6.5 - 7.8	purple
(d)	colorless	8.3 - 9.9	red
(e)	none of these		

11. Consider the titrations of the pairs of aqueous acids and bases listed on the left. For which pair is the pH at the equivalence point stated incorrectly?

Acid-Base Pair	pH at Equivalence Point
(a) $HCl + NH_3$	less than 7
(b) $HNO_3 + Ca(OH)_2$	equal to 7
(c) $HClO_4 + NaOH$	equal to 7
(d) $HClO + NaOH$	less than 7
	greater than 7
(e) $CH_3COOH + KOH$	

12. What is the pH at the equivalence point in the titration of 100.0 mL of 0.20 M ammonia with 0.10 M hydrochloric acid?
(a) 4.6
(b) 5.2
(c) 7.0
(d) 5.5
(e) 4.9

13. Calculate the pH of a solution prepared by mixing 300 mL of 0.10 M HF and 200 mL of 0.10 M KOH.
(a) 2.82
(b) 2.96
(c) 3.32
(d) 3.44
(e) 3.53

14. What is the approximate pH of a solution prepared by mixing equal volumes of 0.05 M methylamine and 0.20 M hydrochloric acid?
(a) 2.57
(b) 1.12
(c) 1.63
(d) 10.5
(e) 9.8

15. Which of the following salts give acidic aqueous solutions?

       (1) KNO_3 (2) KCH_3COO (3) NH_4NO_3 (4) RbI

       (5) $(NH_4)_2SO_4$ (6) $BaCl_2$ (7) NaCN   (8) KNO_2

       (a) 2, 7, 8

       (b) 3, 5

       (c) 2, 4, 6

       (d) 1, 4, 7, 8

       (e) 1, 4, 6

16. The following titration curve is the kind of curve expected for the titration of a _____ acid with a _____ base.
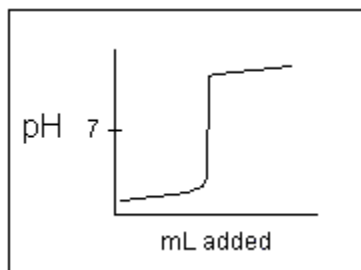
       (a) strong, strong

       (b) weak, strong

       (c) strong, weak

       (d) weak, weak

       (e) none of these

17. Consider the titration of 30.0 mL of 0.20 M nitrous acid by adding 0.0500 M aqueous ammonia to it. The pH at the equivalence point is _____. (Note: This is the titration of a weak acid with a weak base.)

       (a) greater than 7

       (b) equal to 7

       (c) less than 7

       (d) cannot be determined without more data (not including K_a and K_b)

       (e) is impossible to predict

PART -B

1. Explain Normality (N) Molarity (M)Molality (m)

2. Explain conditions of Volumetric Analysis Acid base titration

3. Define Acid–Base Indicators

4.Briefly Explain Precipitation Titration

5.Define Complexometric Titration

6.Write Applications of Complexometric titration:

7.Explain Types of Complexometric Titration:

8. Briefly Explain Redox titration:

9.what is Iodometry and Iodimetry Titration Explain

UNIT-5

ELECTROCHEMISTRY & CORROSION

PART-A

1.Process in which substance gains electrons is called

A. oxidation
B. hydrogenation
C. sublimation
D. reduction

2. On industrial scale sodium metal is prepared by electrolysis of fused

A. NaOH
B. NaCl
C. NaO
D. NH_3

3. Corrosion can be prevented by

A. Alloying
B. Tinning
C. Galvanizing
D. all of above

4. Electrolyte used for tin plating is

A. sulphide ore
B. stannous sulphate
C. hydrogen sulphate
D. sodium chloride

5. An electrolytic cell uses electrical energy to drive

A. chemical reaction
B. physical reaction
C. no reaction
D. none of above

6.Loss of hydrogen atoms by an element is called

A. hydrogenation
B. oxidation
C. reduction
D. sublimation

7. Elements whose oxidation number is increased are

A. reduced
B. hydrogenated
C. oxidized
D. none of above

8. Oxidation state of group IIIA metals is

A. -3
B. 3
C. 0
D. 1

9. In a dry cell anode is made up of

A. zinc
B. calcium
C. sodium
D. graphite

10. An electrochemical cell is also called

A. battery cell
B. galvanic cell
C. cell
D. chargeable cell

11.As compare to iron, aluminum has

A. higher tendency to oxidize
B. less tendency to oxidize
C. equal tendency to oxidize
D. none of above

12. Oxidation-reduction reaction involves

A. transfer of neutrons
B. transfer of protons

C. transfer of electrons

D. none of above

13. Lead and Zinc metals occur naturally as

A. oxides
B. sulphite ores
C. carbon ores
D. chloride ores

14. Conditions for good electroplating are

A. high current density
B. low temperature
C. high concentration of metal in electrolyte
D. all of above

15. Electrochemical cells convert

A. mechanical energy in to electrical energy
B. potential energy in to electrical energy
C. kinetic energy in to electrical energy
D. chemical energy in to electrical energy

16. Electrolyte among following is

A. NaOH
B. urea
C. glucose
D. benzene

17. Process used to deposit one metal over another metal is called

A. electrolysis
B. electroplating
C. carbon plating
D. none of above

18. A physical or chemical process that occurs by itself is called

A. non spontaneous
B. self occurring process
C. spontaneous process
D. thermodynamic process

19. Voltaic cells generates electricity by

A. spontaneous redox reaction
B. non spontaneous redox reaction
C. sublimation reaction
D. thermochemical reaction

20. Oxidation state of any free element is always

A. 1
B. 2
C. 3
D. 0

21.Galvanic cells are also named as

A. electrolytic cells
B. battery cells

C. Daniel cells
D. john cells

22. When zinc is plated on steel, anode is made up of

A. steel
B. oxygen
C. zinc
D. carbon

23. Electrolysis of brine produces

A. chlorine gas
B. hydrogen gas
C. sodium hydroxide
D. all of above

24. A reactant containing element that is oxidized is called

A. reducing agent
B. oxidizing agent
C. hydrogen
D. sublime

25. By losing one or two electrons atoms of metal are

A. oxidized
B. reduced
C. hydrogenated
D. none of these

26.sublimated . In chromium plating few drops of Sulphuric acid are added to electrolyte in order to prevent

A. oxidation
B. reduction
C. hydrolysis
D. sublimation

27. Electrodes used in production of sodium metal are

A. iron cathode and graphite anode
B. sodium cathode and carbon anode
C. aluminum cathode and fluoride anode
D. none of above

28. In thermal power stations carbon atoms undergo oxidation to form

A. CO_2
B. CO
C. H_2O
D. O_2

29. Electrolytes convert electricity in

A. solid state
B. liquid state
C. gaseous state
D. plasma state

30. A concentrated aqueous solution of sodium chloride is called

A. aqueous solution
B. salt solution
C. brine

D. lemonade

01. Define an Electrochemical cell. Give one example.

02. What do you mean by redox reaction?

03. What is electrode potential?

04. Define an origin of electrode potential.

05. Define oxidation potential and reduction potential.

06. How an electrochemical is measured? Define EMF of an electrochemical cell.

07. What are the applications of electrochemical cell?

08. Define electrochemical series.

09. Write the significance of electrochemical series.

10. Write the mathematical form of Nernst equation and give one application.

11. Define corrosion.

12. What are the types of corrosion?

13. What are the factors which affect corrosion?

14. Define chemical corrosion. What are the types of chemical corrosion?

15. Define an Electrochemical corrosion. What are the types of Electrochemical

18. Bolt and Nut made of the same metal is preferred in practice . Why?

19. What are the methods used to control the corrosion?

20. What is paint?

21. Differenciate Electroplating and Electro less plating

22. Define Electro plating and Electroless plating

PART C

1. What is electrochemical cell? Explain with example of Daniel cell.

2.How electrochemical cell is measured by potentiometrically? Or What is emf? How emf is measured by pogendroff's method?

3. What are electrochemical series? Give its applications.

4. Derive Nernst equation.

5.What is Chemical corrosion? Explain with its types.

6.   Explain Electrochemical corrosion with its types.

7. Distinguish between Chemical corrosion and Electrochemical corrosion.

8. What are the factors influencing corrosion?

9. What is paint? What are the constituents and their functions in paint?

10.Explain the electroplating of Gold?

11. Explain the Electroless plating of Nickel corrosion ?

16. What are the differences between chemical and electrochemical corrosion?

17.What isBedworth rule?