

GOVERNMENT POLYTECHNIC, BARGARH
DEPARTMENT OF MATHEMATICS & SCIENCE

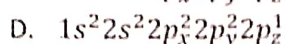
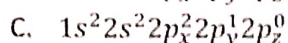
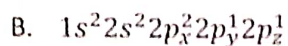


**MCQ SERIES ON
ENGINEERING CHEMISTRY THEORY
FOR
1ST & 2ND SEMESTERS
(BRANCH: COMMON)
(SESSION 2022-23)**

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CHAPTER -1: ATOMIC STRUCTURE

1. According to Rutherford's atomic model, the whole mass of an atom is concentrated at the:
A. Neutron B. Proton C. Nucleus D. Electron
2. Nucleus of an atom consists of _____.
A. Protons only B. Neutrons only
C. Electrons only D. Protons & Neutrons
3. How many protons, electrons and neutrons are present in N^{3-} ion?
A. 7, 7, 7 B. 7, 7, 10 C. 7, 10, 7 D. 10, 10, 7
4. Isotopes differ in the number of _____.
A. Protons B. Electrons C. Positrons D. Neutrons.
5. A_ZM and ${}^{A+2}_{Z+2}N$ are related as:
A. Isobars B. Isotopes C. Isotones D. Isomers
6. A_ZM and ${}^{A+1}_{Z+1}N$ are related as:
A. Isobars B. Isotopes C. Isotones D. Isomers
7. ${}^{23}_{11}Na$ and ${}^{24}_{12}Mg$ are _____ of each other.
A. Isobars B. Isotopes C. Isotones D. Isomers
8. Rutherford's atomic model fails to explain:
A. Spectral lines of Hydrogen
B. Stability of atoms
C. Cause of chemical combination
D. All of the above.
9. Bohr's atomic model is based on:
A. Photoelectric effect.
B. Zeeman effect
C. Stark effect
D. Planck's Quantum theory
10. The Shells of an atom are also called:
A. Energy levels B. Orbits
C. Stationary states D. All the above
11. The energy content of a shell can be calculated by:
A. $E_n = -\frac{2\pi^2me^4Z^2}{nh}$ B. $E_n = -\frac{2\pi^2me^4Z^2}{n^2h^2}$
C. $E_n = -\frac{2\pi^2me^4Z^2}{n^2h^2}$ D. $E_n = -\frac{2\pi^2me^4Z^2}{2\pi^2me^4Z^2}$
12. The energy content of various sub-shells can be compared by:
A. $(4n+2\pi)$ Rule B. $(n+2l)$ Rule
C. $2n^2$ Rule D. $(n+l)$ Rule
13. Which of the following sub-shell has lowest energy content?
A. 4s B. 3d C. 5p D. 4p
14. Which of the following sub-shell is not allowable?
A. 5f B. 8p C. 2d D. 4f
15. The maximum capacity of a p-subshell to hold electron is _____.
A. 2 B. 4 C. 6 D. 10
16. The maximum capacity of a d-orbital to hold electron is _____.
A. 2 B. 6 C. 10 D. 14
17. The correct increasing order of energy content of 3d, 4s, 4d & 5s is:
A. $3d < 4s < 4d < 5s$ B. $4s < 3d < 4d < 5s$
C. $4s < 3d < 5s < 4d$ D. $4d < 5s < 3d < 4s$
18. Which if the following sub-shell can hold maximum number of electrons?
A. 8p B. 3d C. 4f D. 9s
19. The valence shell of an atom can't hold more than _____ electrons.
A. 2 B. 6 C. 8 D. 18
20. The penultimate shell of an atom can't hold more than _____ electrons.
A. 2 B. 6 C. 8 D. 18
21. The electronic configuration of sodium ion is:
A. $1s^2 2s^2 2p^6 3s^1$ B. $1s^2 2s^2 2p^6 3s^2$
C. $1s^2 2s^2 2p^6$ D. $1s^2 2s^2 2p^6 3s^2 2p^1$
22. Which of the following element shows exceptional electron configuration?
A. Ca B. Cu C. Al D. Ar
23. Which of the following electronic configuration refers to a noble gas?
A. $1s^2 2s^2 2p^6 3s^2$ B. $1s^2 2s^2 2p^6 3s^1$
C. $1s^2 2s^2 2p^6$ D. $1s^2 2s^2 2p^3$
24. Electrons jump from lower shell to higher shell by:
A. Radiating energy
B. Absorbing energy
C. Neither radiating nor absorbing energy
D. None of the above.
25. The energy content of shells _____ as we move away from the nucleus.
A. Remain same B. Increases
C. Decreases D. increases and then decreases
26. The energy gap between two adjacent shells _____.
A. Is always same B. increases
C. Decreases D. none of the above
27. Which of the following electronic configurations is incorrect?
A. $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$



28. The angular momentum for the 4th orbit of hydrogen atom is ____.

- A. $\frac{2h}{\pi}$ B. $\frac{h}{2\pi}$ C. $\frac{4h}{\pi}$ D. $\frac{2\pi}{h}$

29. How many vacant orbitals are there in an atom of silicon?

- A. 1 B. 3 C. 6 D. 0

30. How many vacant orbitals are there in an atom of boron?

- A. 1 B. 2 C. 3 D. 4

31. How many unpaired electrons are present in an atom of oxygen?

- A. 1 B. 2 C. 3 D. 4

Answers to Chapter – 1: Atomic Structure

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | D | C | D | B | C | C | D | D | D |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| C | D | A | C | C | A | C | C | C | D |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| B | B | C | B | B | C | C | A | C | B |
| 31 | | | | | | | | | |
| B | | | | | | | | | |

CHAPTER- 2: CHEMICAL BONDING

1. Electrovalent bonds are formed by the ____ of electron/s.

- A. Transfer B. Sharing C. Partial sharing D. None

2. Covalent bonds are formed by the ____ of electron/s.

- A. Transfer B. Sharing C. Partial sharing D. None

3. Dative bonds are formed by the ____ of electron/s.

- A. Transfer B. Sharing C. Partial sharing D. None

4. ____ no. of electrons are shared during the formation of a double bond.

- A. 2 B. 4 C. 6 D. 8

5. ____ no. of electrons are shared during the formation of a single covalent bond.

- A. 2 B. 4 C. 6 D. 8

6. ____ no. of electrons are shared during the formation of a triple bond.

- A. 2 B. 4 C. 6 D. 8

7. How many electrons are shared during the formation of methane?

- A. 2 B. 4 C. 6 D. 8

8. How many electrons are shared during the formation of water molecule?

- A. 2 B. 4 C. 6 D. 8

9. How many electrons are shared during the formation of ammonia molecule?

- A. 2 B. 4 C. 6 D. 8

10. An ionic bond is always formed between the atoms of ____ elements.

- A. Same B. different C. A or B D. None

11. A covalent bond is formed between the atoms of ____ elements.

- A. Same B. different C. A or B D. None

12. Ionic compound is formed between:

- A. Electropositive & Electronegative elements
B. Stable ions.
C. Metals & Non-metals
D. All of the above.

13. Which of the following is not a property of ionic compound?

- A. High Melting point B. Low Density
C. Soluble in water D. Don't show isomerism

14. Which of the following is not a property of covalent compound?

- A. Low Melting point B. High Density
C. Insoluble in water D. Show isomerism

15. ____ bond is formed between Ca & O?

- A. Ionic B. Covalent C. Dative D. Metallic

16. ____ bond is formed between Al & Cl?

- A. Ionic B. Covalent C. Dative D. Metallic

17. ____ bond is formed between C & H?

- A. Ionic B. Covalent C. Dative D. Metallic

18. ____ bond is formed between Na & O?

- A. Ionic B. Covalent C. Dative D. Metallic

19. ____ bond is formed between K & Cl?

- A. Ionic B. Covalent C. Dative D. Metallic

20. Which of the following is a favourable condition for formation of ionic bond?

- A. High Ionisation Potential
B. Low Electron Affinity
C. High Lattice Energy
D. None

21. During the formation of NaCl, sodium attains the electronic configuration of ____.

- A. Ne B. Ar C. Kr D. He
22. During the formation of NaCl, chlorine attains the electronic configuration of _____.
A. Ne B. Ar C. Kr D. He
23. During the formation of CaCl_2 , Ca attains the electronic configuration of _____.
A. Ne B. Ar C. Kr D. He
24. How many electrons are shared by each hydrogen atom during the formation of a molecule of water?
A. 1 B. 2 C. 3 D. 4
25. How many electrons are shared by each oxygen atom during the formation of a molecule of carbon dioxide?
A. 1 B. 2 C. 3 D. 4
26. HCl is a/an _____ compound.
A. Ionic B. Covalent C. Dative D. Metallic
27. H_2O is a/an _____ compound.
A. Ionic B. Covalent C. Dative D. Metallic
28. CO_2 is a/an _____ compound.
A. Ionic B. Covalent C. Dative D. Metallic
29. NH_3 is a/an _____ compound.
A. Ionic B. Covalent C. Dative D. Metallic
30. MgBr_2 is a/an _____ compound.
A. Ionic B. Covalent C. Dative D. Metallic

- C. Lewis D. Bohr's
4. Electron donors are _____.
A. Arrhenius acids B. Bronsted Bases
C. Lewis Acids D. Lewis bases
5. The conjugate acid of HCO_3^- is _____.
A. CO_3^{2-} B. H_2CO_3 C. HCO_3^{2-} D. HCO_3^+
6. NH_3 is a base according to _____ theory.
A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both B & C
7. Arrhenius theory can explain the acidic and basic nature of substances in _____ solvent only.
A. Alcohol B. Ether C. Water D. Benzene
8. Which of the following is a conjugate acid-base pair?
A. NH_3 & H_2O B. CO_2 & CO
C. H_2O & OH^- D. H_2S & S^{2-}
9. According to Bronsted-Lowery theory an acid and a base react to form _____.
A. Salt & Water B. Co-ordinate bond
C. Another pair of acid & base D. Ionic bond
10. Which of the following theories of acids and bases involves the transfer a proton from one substance to another?
A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both A & B
11. Which of the following theories of acids and bases involves the transfer an electron pair from one substance to another?
A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both A & B

Answers to Chapter – 2: Chemical Bonding

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A | B | C | B | A | C | D | B | C | B |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| C | D | B | B | B | B | B | A | A | C |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| A | B | B | A | B | B | B | B | B | A |

CHAPTER – 3: ACID - BASE THEORY

1. According to Arrhenius theory, acids are the substances which furnish _____ in aqueous solution.
A. H^+ ion B. OH^- ion C. Electron D. Neutron
2. HCl is an acid according to _____ theory.
A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both A & B
3. Salt and water are formed when an acid reacts with a base, according to _____ theory.
A. Arrhenius B. Lowery –Bronsted

12. Proton acceptors are bases according to _____ theory?
A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both A & B
13. H_2O is a/an _____.
A. Acid B. Base
C. Amphoteric D. Salt
14. Removing a proton from an acid produces _____.
A. Conjugate base B. Conjugate acid
C. Double salt D. Amphoteric substance
15. BF_3 is a/an _____.
A. Arrhenius acid B. Lowery –Bronsted acid
C. Lewis base D. Lewis acid
16. SiCl_4 is a/an _____.
A. Arrhenius acid B. Lowery –Bronsted acid

- C. Lewis base D. Lewis acid
17. The acidic property of SO_2 can be explained as per _____ theory?
- A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both A & B
18. The basic nature of NH_3 can't be explained as per _____ theory?
- A. Arrhenius B. Lowery –Bronsted
C. Lewis D. Both A & B
19. Which of the following is a strong base?
- A. CO_3^{2-} B. SO_4^{2-}
C. Cl^- D. NO_3^-
20. Which of the following is a weak acid?
- A. CH_3COOH B. HNO_3
C. HCl D. H_2SO_4
21. The chemical reaction in which an acid reacts with a base to form salt and water is called _____ reaction.
- A. Addition B. Substitution
C. Neutralization D. Elimination
22. In a neutralization reaction _____.
- A. Heat is liberated
B. Heat is absorbed
C. Heat is neither emitted nor absorbed
D. None of the above
23. The salt formed when sulphuric acid reacts with sodium hydroxide is:
- A. Na_2CO_3 B. NaSO_4
C. Na_2SO_4 D. NaHCO_3
24. Which of the following is a normal salt?
- A. NaHCO_3 B. Na_2SO_4
C. $\text{Ca}(\text{OH})\text{Cl}$ D. NH_4Cl
25. Which of the following is an acidic salt?
- A. NaHSO_4 B. Na_2SO_4
C. $\text{Ca}(\text{OH})\text{Cl}$ D. MgCl_2
26. Which of the following is a basic salt?
- A. CH_3COONa B. Na_2SO_4
C. MgCl_2 D. NH_4Cl
27. Which of the following is a mixed salt?
- A. CH_3COONa B. Na_2SO_4
C. $\text{KCl.MgCl}_2.6\text{H}_2\text{O}$ D. NaKSO_4
28. Which of the following is a double salt?
- A. CH_3COONa B. Na_2SO_4
C. $\text{KCl.MgCl}_2.6\text{H}_2\text{O}$ D. NaKSO_4
29. Which of the following is a complex salt?
- A. CH_3COONa B. $\text{Li}[\text{AlH}_4]$
C. $\text{KCl.MgCl}_2.6\text{H}_2\text{O}$ D. NaKSO_4
30. Which of the following is a complex salt?

- A. CH_3COONa B. Na_2SO_4
C. $\text{KCl.MgCl}_2.6\text{H}_2\text{O}$ D. NaBH_4
31. A strong acid reacts with a weak base to form _____ salt.
- A. Acidic B. Basic
C. Double D. Complex
32. A weak acid reacts with a strong base to form _____ salt.
- A. Acidic B. Basic
C. Double D. Complex
33. Partial neutralization of a polybasic acid by a base results in the formation of a/an _____ salt.
- A. Acidic B. Basic
C. Double D. Complex
34. Partial neutralization of a poly acidic base by an acid results in the formation of a/an _____ salt.
- A. Acidic B. Basic
C. Double D. Complex
35. A complex salt produces _____ ion when dissolved in water.
- A. Simple B. Complex C. Acidic D. Basic

Answers to Chapter – 3: Acid-Base Theory

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A | D | A | D | B | D | C | C | C | B |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| C | A | C | A | D | D | C | A | A | A |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| C | A | C | B | A | A | D | C | B | D |
| 31 | 32 | 33 | 34 | 35 | | | | | |
| A | B | A | B | B | | | | | |

CHAPTER-4: SOLUTION

- The unit of equivalent weight is _____.
A. Gm B. Kg C. amu D. Unit less
- The equivalent weight of acetic acid is _____.
A. 30 B. 60 C. 45 D. 55
- 'Acidity' means _____.
A. No. of replaceable H atoms
B. No. of replaceable OH groups
C. p^{H} values less than 7
D. None of the above.
- The atomic weights of the elements are compared with the atomic weight of _____.
A. ^{12}C B. ^{14}C C. ^{14}N D. ^{20}Ca
- The molecular weight of Aluminium sulphate is ____ gm/mol.

- A. 432 B. 315 C. 219 D. 123
6. The molecular weight of ammonium carbonate is ____ gm/mol.
A. 96 B. 94 C. 78 D. 76
7. The correct relationship between equivalent weight (E), Atomic weight (A) and Valency (V) is:
A. $A = \frac{E}{V}$ B. $V = \frac{A}{E}$ C. $V = E \times A$ D. $E = A - V$
8. The equivalent weight of sulphuric acid is:
A. 98 B. 50 C. 49 D. 60
9. Basicity of an acid means:
A. No. of replaceable H atoms
B. No. of replaceable OH groups
C. P^H values more than 7
D. None of the above.
10. What is the total valency of the metal Al in $Al_2(SO_4)_3$?
A. 2 B. 3 C. 5 D. 6
11. The P^H value of 1 M HNO_3 solution is _____.
A. 0 B. 1 C. 7 D. 14
12. The P^H value of 0.01 M HCl solution is _____.
A. 1 B. 2 C. 3 D. 4
13. The P^H value of 10^{-2} M NaOH solution is _____.
A. 2 B. 3 C. 11 D. 12
14. The $[H^+]$ ion concentration of a solution having P^H 4 is ____ moles/liter.
A. 10^{-2} B. 10^{-4} C. 10^{-14} D. 10^{-7}
15. The P^H value of an acidic solution should be:
A. Less than 7 B. more than 7
C. Equal to 7 D. Equal to 14
16. The P^H value of lemon juice is:
A. Less than 7 B. more than 7
C. Equal to 7 D. Equal to 14
17. The P^H value of blood is:
A. 3.3 to 3.5 B. 9.3 to 9.5
C. 7.3 to 7.5 D. Equal to 7
18. The basicity of H_3BO_3 is _____.
A. 1 B. 2 C. 3 D. 4
19. The basicity of H_3PO_3 is _____.
A. 1 B. 2 C. 3 D. 4
20. The OH^- concentration of NaOH solution having P^H 8 is ____ moles/liter.
A. 10^{-2} B. 10^{-8} C. 10^{-6} D. 10^{-7}

21. For the manufacture of sugar, the P^H value of sugarcane juice should be maintained at :
A. ≈ 7 B. < 7 C. > 7 D. 14
22. The P^H value of raw pulp for the manufacture of paper is:
A. 1-2 B. 3-4 C. 5-6 D. 7-8
23. The P^H value of pulp is to be maintained between ____ for getting quality paper used for writing.
A. 5-6 B. 8-9 C. 9-10 D. 13-14
24. The process of control of quality and binding of pulp so the ink does not spread on paper is called _____.
A. Matrix B. Reduction C. Cobb D. Oxidation

Answers to Chapter -4: Solution

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|----|----|----|----|----|----|----|----|----|
| D | B | B | A | A | A | B | C | A | D |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | B | D | B | A | A | C | A | B | C |
| 21 | 22 | 23 | 24 | | | | | | |
| A | D | A | C | | | | | | |

Chapter - 5: Electrochemistry

1. The substance which allows electricity to pass through its molten, fused or solution state is called:
A. Conductor B. Electrolyte
C. Non-electrolyte D. Insulator
2. Which of the following is a non-electrolyte?
A. Common salt B. Vinegar
C. Glucose D. Caustic soda
3. Which of the following is an electrolyte?
A. Glucose B. Urea C. Sugar D. Table salt
4. Acetic acid is a/an _____.
A. Strong electrolyte B. Weak electrolyte
C. Tetra basic acid D. Dibasic acid
5. The electrode to which -ve terminal of a battery is attached is called:
A. Cathode B. Anode C. Node D. Antinode
6. During electrolysis electrons flow from:
A. Anode to Cathode B. Cathode to Anode
C. Can't be predicted D. None

7. Faraday's 1st law of electrolysis deals with the quantitative relationship between:
- Mass & Equivalent mass of substance.
 - Mass & Atomic mass of substance
 - Mass of substance & quantity of charge
 - Equivalent mass & quantity of charge.
8. Faraday's 2nd law of electrolysis deals with the quantitative relationship between:
- Mass & Equivalent mass of substance.
 - Mass & Atomic mass of substance
 - Mass of substance & quantity of charge
 - Equivalent mass & quantity of charge.
9. The process of applying a coating of 'Zn' over the surface of a metal is called:
- Animation
 - Calcination
 - Solvation
 - Galvanization
10. Which of the following method is applied to prevent corrosion?
- Oiling
 - Painting
 - Alloying
 - All the above
11. Rusting of iron is an example of ____ corrosion.
- Waterline
 - Stress
 - Atmospheric
 - Pitting
12. If Q = quantity of charge and W = amount of substance formed, then according to Faraday's 1st law of electrolysis:
- $W = Q$
 - $W \approx Q$
 - $W \propto Q$
 - $W \propto \frac{1}{Q}$
13. How many grams of calcium is formed at the cathode by the passage of 96500 C of charge through molten CaCl_2 solution?
- 5 gm
 - 10 gm
 - 20 gm
 - 40 gm
14. Electrolysis of molten NaCl produces:
- Sodium metal at anode, chlorine gas at cathode
 - Sodium metal at cathode, chlorine gas at anode
 - Hydrogen gas at cathode, chlorine gas at anode
 - Hydrogen gas at anode, chlorine gas at cathode
15. The resulting solution after the electrolysis of aqueous NaCl solution is:
- Acidic
 - Alkaline
 - Neutral
 - cannot be predicted
16. During electroplating of Zinc over iron, ____
- Zinc is used as cathode
 - iron is used as anode
 - Zinc is used as Anode
 - FeSO₄ is used as electrolyte.
17. If a coating of silver is to be applied over a steel spoon, then
- Silver is used as anode and AgNO_3 solution is used as electrolyte.
 - Steel is used as anode and AgNO_3 solution is used as electrolyte.
 - Silver is used as cathode and AgNO_3 solution is used as electrolyte.
 - Steel is used as cathode and ZnSO_4 solution is used as electrolyte.
18. How many coulombs of charges are required to get 2.4 grams of magnesium by the electrolysis of molten MgCl_2 ?
- 96500
 - 19300
 - 482500
 - 24125
19. During electrolysis of aqueous solution of NaCl
- Hydrogen gas is liberated at the Anode
 - Chlorine gas is liberated at the Anode
 - Metallic sodium is deposited at the Cathode
 - Oxygen gas is liberated at the Anode.

Answers to Chapter -5: Electrochemistry

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|----|----|----|----|----|----|----|----|----|
| B | C | D | B | A | A | C | A | D | D |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| C | C | C | B | B | A | A | B | B | |

Chapter-6: CORROSION

- The process of gradual deterioration of metallic surfaces due to atmospheric conditions is called ____.
 - Galvanization
 - Calcination
 - Corrosion
 - Fermentation
- Rusting of iron is an example of ____.
 - Waterline corrosion
 - Atmospheric corrosion
 - Pitting corrosion
 - Stress corrosion
- Waterline corrosion is a ____ type of corrosion.
 - Differential oxygen concentration
 - Differential hydrogen concentration
 - Differential water concentration
 - Differential CO₂ concentration
- The rate of rusting of iron is enhanced by the presence of ____.
 - CO₂
 - He
 - NH₃
 - N₂

5. The essential conditions for rusting of iron are the presence of:
 - A. Moisture, N_2 , O_2
 - B. Moisture, Air, O_2
 - C. Air, CO_2 , HCl
 - D. CO_2 , HCl, N_2
6. Duriron is an alloy of ____
 - A. Iron and Silicon
 - B. Iron and copper
 - C. Copper and Zinc
 - D. Copper and Tin
7. The process of applying a coating of zinc on the surface of iron is called:
 - A. Galvanization
 - B. Calcination
 - C. Corrosion
 - D. Fermentation
8. Corrosion of metals can be prevented by:
 - A. Alloying
 - B. Oiling
 - C. Galvanization
 - D. All of the above
9. Rust is nothing but
 - A. Hydrated copper oxide
 - B. Hydrated zinc oxide
 - C. Anhydrous iron oxide
 - D. Hydrated iron oxide
10. Presence of saline water ____ the process of rusting.
 - A. Enhances
 - B. Reduces
 - C. Doesn't affect
 - D. none.
4. The process of heating an ore below its melting point in absence of air is called:
 - A. Calcination
 - B. Roasting
 - C. Smelting
 - D. None
5. The process of heating an ore below its melting point in presence of air is called:
 - A. Calcination
 - B. Roasting
 - C. Smelting
 - D. None
6. In which step of metallurgical operation ores are converted into their oxides?
 - A. Concentration
 - B. Oxidation
 - C. Reduction
 - D. Distillation
7. In the reduction step of metallurgical operation:
 - A. Ores are converted into oxides
 - B. Ores are converted into metals
 - C. Metal oxides are converted into metals
 - D. Metals are refined.
8. The correct order of the steps of metallurgical operation is
 - A. Concentration, Reduction, Oxidation, Refining
 - B. Refining, Reduction, Oxidation, Concentration
 - C. Oxidation, Reduction, Concentration, Refining
 - D. Concentration, Oxidation, Reduction, Refining
9. The chemical substance added during the process of smelting which reacts with impurities is called:
 - A. Flux
 - B. Slag
 - C. Matrix
 - D. Gangue
10. The molten material which is obtained during smelting is:
 - A. Flux
 - B. Slag
 - C. Matrix
 - D. Gangue
11. During the process of smelting the roasted ore is heated with a suitable quantity of:
 - A. Coke
 - B. Gangue
 - C. Matrix
 - D. CaO

Answers to Chapter –6: Corrosion

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | B | A | A | B | A | A | D | C | A |

METALLURGY & ALLOYS

1. The earthly impurities contaminated with ores are called:
 - A. Flux
 - B. Slag
 - C. Gangue
 - D. Clinker
2. Which of the following method of concentration is employed for the concentration of carbonate and oxide ores?
 - A. Oil-floatation
 - B. Leaching
 - C. Gravity Separation
 - D. Magnetic separation
3. Which of the following method of concentration is generally employed for the concentration of sulphide ores?
 - A. Oil-floatation
 - B. Leaching
 - C. Gravity Separation
 - D. Magnetic separation
12. Which of the following method is used to refine volatile metals?
 - A. Van-Arkel Method
 - B. Zone Refining
 - C. Cupellation
 - D. Distillation
13. An alloy must contain a _____.
 - A. Metal
 - B. Non-metal
 - C. Metalloid
 - D. Semi-metal
14. An alloy containing mercury as one of the components is called:
 - A. Mercuria
 - B. Amalgam
 - C. Ferro-alloy
 - D. None
15. Ferro alloys contain _____ as the main constituent.
 - A. Zinc
 - B. Iron
 - C. Aluminium
 - D. Copper
16. The average composition of Brass is:
 - A. $Cu = 60-80\%$; $Zn = 20-40\%$
 - B. $Zn = 60-80\%$; $Cu = 20-40\%$

- C. Cu = 75-90%; Zn = 10-25%
D. Cu = 75-90%; Sn = 10-25%

17. The composition of Bronze is:

- A. Cu = 60-90%; Zn = 10-40%
B. Zn = 60-80%; Cu = 20-40%
C. Cu = 75-90%; Zn = 10-25%
D. Cu = 80-95%; Sn = 5-20%

18. Steel Alnico contains _____% of steel.

- A. 30 B. 40 C. 50 D. 60

19. Which of the following is a ferroalloy?

- A. Brass B. Bronze C. Steel D. Bell metal

Answers to Chapter -7, 8: Metallurgy & Corrosion

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | C | A | A | B | B | B | D | A | B |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| A | D | A | B | B | A | D | C | C | |

Chapter -9: Hydrocarbons

1. The general formula of alkane is:

- A. C_nH_{2n} B. C_nH_{2n+1} C. C_nH_{2n+2} D. C_nH_{2n-2}

2. The general formula of alkene is:

- A. C_nH_{2n} B. C_nH_{2n+1} C. C_nH_{2n+2} D. C_nH_{2n-2}

3. The general formula of alkyne is:

- A. C_nH_{2n} B. C_nH_{2n+1} C. C_nH_{2n+2} D. C_nH_{2n-2}

4. Which of the following is a saturated hydrocarbon?

- A. C_2H_4 B. C_3H_4 C. C_4H_{10} D. C_5H_{10}

5. Which of the following is an unsaturated hydrocarbon?

- A. C_2H_4 B. C_3H_8 C. C_4H_{10} D. C_5H_{12}

6. Which of the following is an alkane?

- A. C_2H_4 B. C_3H_4 C. C_4H_{10} D. C_5H_{10}

7. Which of the following is an alkene?

- A. C_2H_4 B. C_3H_4 C. C_4H_{10} D. C_5H_{10}

8. Which of the following is an alkyne?

- A. C_2H_2 B. C_3H_6 C. C_4H_{10} D. C_5H_{10}

9. Which of the following is the chemical formula of benzene?

- A. C_2H_4 B. C_6H_{10} C. C_6H_6 D. C_5H_{10}

10. Aromatic compounds obey _____ rules.

- A. Faraday's B. Bohr's C. Huckel's D. Burry's

11. Saturated hydrocarbons contain:

- A. Carbon – Carbon single bonds only
B. Carbon – Carbon double bonds only
C. Carbon – Carbon triple bonds only
D. Both Carbon – Carbon single & double bonds.

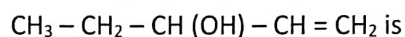
12. Unsaturated hydrocarbons may contain:

- A. Carbon – Carbon single bonds only
B. Carbon – Carbon double bonds only
C. Carbon – Carbon triple bonds only
D. Carbon – Carbon double &/or triple bonds.

13. IUPAC name of the compound $(CH_3)_2CH - CH_3$ is:

- A. 2 – methylpropane B. 2 – methylbutane
C. 3 – methylpropane D. 3 – methylbutane

14. IUPAC name of the compound



- A. Pent – 3 – en – 2 – ol B. Pent – 1 – en – 2 – ol
C. Pent – 1 – en – 3 – ol D. Pent – 3 – en – 3 – ol

15. According to Huckel's Rule "the cyclic hydrocarbons containing _____ electrons are aromatics."

- A. $(4n + 1)\pi$ B. $(2n + 4)\pi$ C. $(4n + 2)\pi$ D. $(n+1)\pi$

16. Which of the following is not an example of aromatic compound?

- A. Benzene B. Pentene
C. Naphthalene D. Anthracene

17. Who proposed the "vital force" theory?

- A. Wohler B. Berzelius C. Bohr D. Rutherford

18. The first organic compound synthesized in laboratory is:

- A. Acetic acid B. Butane C. Urea D. Propane

19. The IUPAC name of neo-pentane is:

- A. 2-Methylpropane B. 3-Methylpentane
C. 2,2-Dimethylpropane D. 2,2-Dimethylpentane

20. The IUPAC name of iso -pentane is:

- A. 2-Methylpropane B. 2-Methylbutane
C. 2,2-Dimethylpropane D. 2,2-Dimethylpentane

Answers to Chapter -9: Hydrocarbons

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | A | D | C | A | C | A | A | C | C |

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | D | A | C | C | B | B | C | C | B |

Chapter – 10: WATER TREATMENT

- Which of the following source is considered to be the purest form of natural water?
 - River Water
 - Sea Water
 - Rain Water
 - Spring Water
- Which of the following source is considered to be the impurest form of natural water?
 - River Water
 - Sea Water
 - Rain Water
 - Spring Water
- About ____% of sea water contains dissolved sodium chloride.
 - 1
 - 2
 - 2.6
 - 3.5
- Water which lathers with soap solution is called:
 - Soft Water
 - Hard Water
 - Heavy Water
 - Distilled Water
- Water which does not lather with soap solution is called:
 - Soft Water
 - Hard Water
 - Heavy Water
 - Distilled Water
- Temporary hardness arises due to the presence of ____ in water.
 - Carbonates of Ca & Mg
 - Chlorides of Ca & Mg
 - Bicarbonates of Ca & Mg
 - Sulphate of Fe
- Permanent hardness arises due to the presence of ____ in water.
 - Carbonates of Ca & Mg
 - Chlorides of Ca & Mg
 - Bicarbonates of Ca & Mg
 - Chloride of Fe
- Temporary hardness is also called _____.
 - Bicarbonate hardness
 - Chloride hardness
 - Carbonate hardness
 - Non-carbonate hardness
- Permanent hardness is also called _____.
 - Bicarbonate hardness
 - Chloride hardness
 - Carbonate hardness
 - Non-carbonate hardness
- Temporary hardness of water can be eliminated by:
 - Adding bleaching powder
 - Boiling
 - Adding chlorine Soda
 - Adding Soda
- The unit of hardness of water is:
 - Gm
 - mg
 - amu
 - ppm
- The residual hardness left in cold lime-soda process is about ____ppm.
 - 2
 - 10 – 15
 - 15 – 30
 - 50 – 60
- The residual hardness left in hot lime-soda process is about ____ppm.
 - 2
 - 10 – 15
 - 15 – 30
 - 50 – 60
- In hot L-S process super-heated steam at ____ is passed through hard water.
 - 15° – 30°C
 - 50° – 60°C
 - 80° – 150°C
 - 150° – 200°C
- In cation exchange resin, the active group is:
 - Acidic functional group
 - Basic functional group
 - Neutral functional group
 - None of the above.
- In anion exchange resin, the active group is:
 - Acidic functional group
 - Basic functional group
 - Neutral functional group
 - None of the above.
- Cation exchange resin can be regenerated by the treatment of _____.
 - Dilute NaOH
 - Dilute KOH
 - Dilute H₂SO₄
 - Dilute NaCl
- Anion exchange resin can be regenerated by the treatment of _____.
 - Dilute KCl
 - Dilute KOH
 - Dilute H₂SO₄
 - Dilute NaCl
- The precipitate formed during softening of hard water by lime-soda method is called:
 - Slag
 - Flux
 - Gangue
 - Sludge
- The residual hardness left in ion-exchange process is about ____PPM.
 - 2
 - 10 – 15
 - 15 – 30
 - 50 – 60

Answers to Chapter –10: Water Treatment

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | B | C | A | B | C | B | C | D | B |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| D | D | C | C | A | B | C | B | D | A |

Chapter-12: FUEL

- Which of the following is a renewable source of energy?
A. Coal B. Petrol C. Wood D. Diesel
- Which of the following is not a characteristic of good fuel?
A. Non-volatile B. High Calorific value
C. High Ignition temperature D. Low cost
- The quantity of heat liberated by the complete combustion of a unit mass or unit volume of fuel is called _____.
A. Ionization value
B. Calcination value
C. Calorific value
D. Heat value
- Which of the following has highest calorific value?
A. Kerosene B. Wood C. Petrol D. Coal
- Which of the following is a unit of calorific value?
A. N/m^2 B. KJ/Kg C. m/S^2 D. None
- The form of coal which contains highest percentage of carbon is _____.
A. Lignite B. Anthracite
C. Bituminous D. Peat
- The form of coal which contains lowest percentage of carbon is _____.
A. Lignite B. Anthracite
C. Bituminous D. Peat
- Various components of petroleum are separated from each other by the process called _____.
A. Crystallization B. Distillation
C. Fractional distillation D. Liquefaction
- Producer gas is a mixture of:
A. $\text{CO}_2, \text{N}_2, \text{O}_2, \text{H}_2$ B. $\text{CO}, \text{N}_2, \text{O}_2, \text{SO}_2$
C. $\text{N}_2, \text{CO}_2, \text{H}_2, \text{SO}_2$ D. $\text{N}_2, \text{CO}_2, \text{H}_2, \text{CO}$
- The major component of producer gas is?
A. H_2 B. N_2 C. CO D. CO_2
- The major component of Water gas is :
A. H_2 B. N_2 C. CO D. CO_2
- The calorific value of producer gas is:
A. $1,300 \text{ kca/m}^3$ B. $2,800 \text{ kcl/m}^3$

Chapter -11: LUBRICANTS

- The chemical substance used in between two surfaces in contact with a view to reduce frictional resistance between them is called:
A. Applicant B. Slag C. Flux D. Lubricant
- Which of the following is a solid lubricant?
A. Graphite B. Mica
C. Molybdenum disulphide D. All the above
- Solid lubricants are preferred where:
A. The working temperature is very low.
B. The working temperature is very high.
C. There is a chance of heavy jerk.
D. None of the above
- Semi-solid lubricants are preferred where:
A. The working temperature is very low
B. The working temperature is very high
C. There is a chance of heavy jerk
D. None of the above
- Boron trinitride is an example of:
A. Solid lubricant B. Liquid lubricant
C. Semi-solid lubricant D. None of the above
- Which of the following lubricants is preferred when there is a chance of heavy jerk?
A. Solid lubricant B. Liquid lubricant
C. Semi-solid lubricant D. None of the above
- Which of the following is not a function of lubrication?
A. It reduces wearing & tearing of moving parts
B. It enhances the durability of machines.
C. It increases the efficiency of engines.
D. It enhances the loss in energy.

Answers to Chapter –11: Lubricants

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| D | D | B | C | A | C | D |

- C. $2,300 \text{ kca/m}^3$ D. $1,800 \text{ kca/m}^3$

13. The major component of CNG is:

- A. C_2H_6 B. CH_4 C. C_2H_2 D. C_4H_{10}

Answers to Chapter -12: Fuel

| | | | | | | | | | |
|----|----|----|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | C | C | C | B | B | D | C | D | B |
| 11 | 12 | 13 | | | | | | | |
| A | A | B | | | | | | | |

Chapter -13: POLYMER CHEMISTRY

1. The single repeating unit of a polymer is called:

- A. Polymer B. Homomer C. Monomer D. Unit

2. The polymer containing monomer units of identical chemical composition is called:

- A. Co-polymer B. Homopolymer
C. Identical polymer D. Isomer

3. The polymer containing monomer units of different chemical composition is called:

- A. Co-polymer B. Homopolymer
C. Identical polymer D. Isomer

4. Degree of polymerization is the no. of _____ present in a polymer.

- A. polymers B. Monomers
C. Identical monomers D. Isomers

5. Polythene is an example of _____.

- B. Co-polymer B. Homopolymer
C. Identical polymer D. Isomer

6. Bakelite is an example of _____.

- A. Co-polymer B. Homopolymer
C. Identical polymer D. Isomer

7. The polymer obtained by the polymerization of phenol and formaldehyde is:

- A. Teflon B. Polyester
C. Bakelite D. Nylon - 6, 6

8. The monomer used to prepare PVC is:

- A. Vinyl nitrite B. Vinyl Chloride
C. Vinyl Chlorate D. Phenol

9. Bakelite is a _____.

- A. Natural polymer B. Homopolymer
C. Thermoplastic D. Thermosetting

10. PVC is a _____ polymer.

- A. Natural B. Co-polymer
C. Thermoplastic D. Thermosetting

11. Which of the following polymer can be remoulded?

- A. Bakelite B. Terylene
B. Urea-formaldehyde resin D. PVC

12. Which of the following polymer can't be remoulded?

- A. polythene B. Nylon
C. PVC D. Bakelite

13. Which of the following is a homopolymer?

- A. Bakelite B. Terylene
C. Nylon D. PVC

14. Which of the following is a copolymer?

- B. PVC B. Terylene
C. Polythene D. Polystyrene

15. Thermosetting plastics:

- A. Can be remoulded.
B. Are formed by addition polymerization.
C. Are soluble in most of the solvents.
D. Are condensation polymers.

16. Thermoplastics polymers:

- A. Can be remoulded.
B. Are condensation polymers.
C. Are insoluble in most of the solvents.
D. Have three dimensional structures.

17. Which of the following is a monomer of Bakelite?

- A. Acetic acid B. Formaldehyde
C. Ethene D. vinyl chloride

18. The monomer of PVC is _____.

- A. Vinyl chlorate B. Phenol
C. Vinyl chloride D. Formaldehyde.

19. The IUPAC name of Vinyl chloride is _____.

- A. 1-Chloroethane B. 1-Chloroethene
C. 2-Chloroethane D. 2-Chloroethyne

20. The chemical process in which a large no. of smaller molecular units are joined together to get a bigger unit is called:

- A. Calcination B. Distillation
C. Polymerisation D. Decomposition.

21. The monomer unit present in natural rubber is _____.

- A. Isoprene B. Neoprene
C. Chloroprene D. Disprene

22. What is the IUPAC name of the monomer present in natural rubber?

- A. 2-Methylbuta-1,3-diene

- B. 3-Methylbuta-1,3-diene
C. 2-Chlorobuta-1,3-diene
D. 3-Chlorobuta-1,3-diene
23. The chemical name of natural rubber is _____.
A. Polytrans-isoprene
B. Polycis-isoprene
C. Polytrans-chloroprene
D. Polycis-chloroprene
24. The chemical process in which raw rubber is heated to $100^{\circ} - 140^{\circ}\text{C}$ with 4% to 6% sulphur or sulphur containing compound is called _____.
A. Calcination B. Distillation
C. Vulcanization D. Sublimation
25. During vulcanization of natural rubber _____ are formed between the carbon chains.
A. vanadium crosslinks
B. Silicon crosslinks
C. Phosphorous crosslinks
D. Sulphur crosslinks.

Answers to Chapter –9: Hydrocarbons

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | A | D | C | A | C | A | A | C | C |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | D | A | C | C | B | B | C | C | B |


CHEMICALS IN AGRICULTURE

1. Which of the following is an important insecticide?
A. Bleaching powder
B. Gammaxane
C. Paraquat
D. Mancozeb
2. Which of the following is an important fungicide?
A. Rhizobium
B. Gammaxane
C. Paraquat
D. Mancozeb
3. Which of the following is an important bio-fertilizer?
A. Rhizobium
B. Gammaxane
C. Paraquat
D. Mancozeb

4. Which of the following is an important herbicide?
A. Rhizobium
B. Gammaxane
C. Paraquat
D. Mancozeb
5. The chemical substances used to kill unwanted weeds/plants are called _____.
A. Fungicides
B. Herbicides
C. Insecticides
D. Bactericides
6. Carbamate is an important _____.
A. Fungicides
B. Herbicides
C. Insecticides
D. Bactericides
7. Blue green algae are important _____.
A. Fungicides
B. Herbicides
C. Insecticides
D. Biofertilizers
8. DDT is an important _____.
A. Fungicide
B. Herbicide
C. Insecticide
D. Bactericide

Answers to Chapter –9: Hydrocarbons

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| C | A | D | C | A | C | A | A | C | C |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | D | A | C | C | B | B | C | C | B |


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