

UNIT 01

FUNDAMENTALS OF CHEMISTRY

Long Answers Questions

- Q1. Define Chemistry. Give its importance in daily life.
09201001
- Q2. Describe the various branches of Chemistry. (Board 2017)
09201002
- Q3. Define Matter, Substance, Physical Properties and Chemical Properties.
09201003
- Q4.(Ex. Q.1) Define element and classify the elements with examples. (Board 2016)
09201004
- Q5. Describe the occurrences of some major elements.
09201005
- Q6. Define valency. Write a detailed note on the concept of valency.
09201006
- Q7. Define Compound. How is it classified?
09201007
- Q8. Define Mixture. How is it classified?
09201008
- Q9. What is relative atomic mass and atomic mass unit?
09201009
- Q10.(Ex. Q.2) List five characteristics by which compounds can be distinguished from mixtures.
- Q11. What do you know about atomic number and mass number? Explain them with examples.
(Board 2014, 15) 09201011
- Q12. How to write a Chemical Formula? Explain with examples. (Board 2014)
09201012
- Q13. Describe the significance of chemical formula.
(Board 2014) 09201013
- Q14. Define Empirical Formula. Explain it with examples.
09201014
- Q15. Define Molecular Formula. Explain it with examples.
09201015
- Q16. Define Molecular Mass and Formula Mass. Give examples.
09201016
- Q17. Write a note on the following Chemical Species.
09201017
- Q18. Differentiate between atoms and ions. (Board 2014)
09201018
- Q19. Differentiate between molecule and molecular ion. (Board 2013, 14, 18)
09201019
- Q20. Differentiate between ions and free radicals.
(Board 2014) 09201020
- Q21. Define Molecule. Write down its types.
(Board 2018) 09201021

Q22. Write a note on the followings:

09201022

Q23. What is Avogadro's Number? Explain with examples.

09201023

Q24.(Ex. Q.4) Mole is SI unit for the amount of a substance. Define it with examples.

09201024

Q25. Differentiate between the following with examples:

09201025

- i) **Molecule and gram molecule**
- ii) **Atom and gram atom**
- iii) **Molecular mass and molar mass**

(Board 2013, 14)

- iv) **Chemical formula and gram formula**

(Board 2013, 14)

Book Examples

Example 1.1

09201026

How many protons and neutrons are there in an atom having $A = 238$ and $Z = 92$.

Example 1.2

(Board 2017)

09201027

Calculate the molecular mass of nitric acid (HNO_3).

Example 1.3

09201028

Calculate the formula mass of potassium sulphate (K_2SO_4).

Example 1.4

09201029

Calculate the gram molecule (number of moles) in 40 g of H_3PO_4 . (Board 2013, 2014)

Example 1.5

09201030

You have a piece of coal (carbon) weighing 9.0 gram. Calculate the number of moles of coal in the given mass.

Example 1.6

09201031

Calculate the number of moles, number of molecules and number of atoms present in 6 grams of water.

Example 1.7

09201032

There are 3.01×10^{23} molecules of CO_2 present in a container. Calculate the number of moles and its mass.

Exercise Numericals

Q1. Sulphuric acid is the king of chemicals. If you need 5 moles of sulphuric acid for a reaction, how many grams of it will you weigh?

09201033

Q2. Calcium carbonate is insoluble in water. If you have 40 g of it; how many Ca^{2+} and CO_3^{2-} ions are present in it?

09201034

Q3. If you have 6.02×10^{23} ions of aluminum; how many sulphate ions will be required to prepare $\text{Al}_2(\text{SO}_4)_3$?

09201035

Q4. Calculate the number of molecules in the following compounds:

09201036

a. 30g of $\text{C}_6\text{H}_{12}\text{O}_6$ 16 g of H_2CO_3 b. 20g of HNO_3 c.

Q5. Calculate the number of ions in the following compounds:

09201037

a. 10g of AlCl_3 b. 30g of BaCl_2 c. 58 g of H_2SO_4

Q6. What will be the mass of 2.05×10^{16} molecules of H_2SO_4 ?

09201038

Q7. How many atoms are required to prepare 60 g of HNO_3 ?

09201039

Q8. How many ions of Na^+ and Cl^- will be present in 30 g of NaCl ?

09201040

Q9. How many molecules of HCl will be required to have 10 grams of it?

09201041

Q10. How many grams of Mg will have the same number of atoms as 6 grams of C have?

09201042

Short Answers Questions

Exercise Short Answers Questions

Q1. Define industrial chemistry and analytical chemistry. (Board 2014)

09201043

Q2. How can you differentiate between organic and inorganic chemistry?

OR

09201044

(Define organic and inorganic chemistry.) (Board 2014, 15)

Q3. Give the scope of biochemistry.

09201045

Q4. How does homogeneous mixture differ from heterogeneous mixture? (Board 2017,18)

09201046

Q5. What is the relative atomic mass? How is it related to gram? OR

09201047

Define relative atomic mass based on C-12 scale.

Q6. Define empirical formula with an example.

09201048

Q7. State three reasons why do you think air is a mixture and water a compound?

09201049

Q8. Explain why hydrogen and oxygen are considered elements whereas water a compound.

09201050

Q9. What is the significance of the symbol of an element?

09201051

Q10. State the reasons. Soft drink is a mixture and water is a compound.

09201052

Q11. Classify the following into element, compound or mixture.

09201053

- (i) He and H₂ (ii) CO and Co
(iii) Water and milk
(iv) Gold and brass (v) Iron and steel

Q12. Define atomic mass unit. Why is it needed?

(Board 2014)

09201054

Q13. State the nature and name of the substance formed by combining the following:

- i) Zinc + Copper ii) Water + Sugar
iii) Aluminium + Sulphur
iv) Iron + Chromium + Nickel

Q14. Differentiate between molecular mass and formula mass. Which of the following have molecular formula? H₂O, NaCl, KI, H₂SO₄

09201056

Q15. Which one has more atoms: 10g of Al or 10g of Fe?

09201057

Q16. Which one has more molecules: 9g of water or 9g of sugar (C₁₂H₂₂O₁₁). OR

09201058

(Find out the molecules in 9 gram of water.)

(Board 2015)

Q17. Which one has more formula units: 1g of NaCl or 1g of KCl.

09201059

Q18. Differentiate between homoatomic and heteroatomic molecules with examples.

09201060

Q19. In which one of the following the number of hydrogen atoms is more?

09201061

2 moles of HCl or 1 mole of NH₃

[Hint: 1 mole of a substance contains as much number of moles of atoms as are in 1 molecule of a substance]

ADDITIONAL SHORT ANSWER QUESTIONS

Q20. Define Science.

09201062

Q21. What is Chemistry? (Board 2018)

09201063

Q22. Define Physical Chemistry.

09201064

Q23. What is nuclear chemistry?

09201065

Q24. What is environmental chemistry?

09201066

Q25. What is matter? Show classification of matter.

09201067

Q26. What is valency? (Board 2016)

09201068

Q27. What is meant by variable valency?

09201069

Q28. What is a radical? (Board 2016)

09201070

Q29. What is atomic number and mass number?

(Board 2016)

09201071

Q30. What is molecular formula? How is molecular formula derived from empirical formula?

09201072

Q31. What is ion? What are its types?

(Board 2014)

09201073

Q32. Define free radicals. How are they generated?

(Board 2017)

09201074

Q33. What is Avogadro's number?

(Board 2015, 16)

09201075

Q34. Define a mole.

(Board 2016)

09201076

Q35. Write the composition of following mixtures.

09201077

	(i)	Air	(ii)
Soil	(iii)	Milk	(iv)
Brass			

Q36. How does chemistry provides a basis of 'molecularity' of the physical world?

09201078

Q37. Who put forward the theory of dual nature of matter?

09201079

Q38. How de-Broglie explain the corpuscular nature of matter?

09201080

Q39. Differentiate between Physical chemistry and Biochemistry.

(Board 2014)

09201081

Q40. Write the chemical formulae of Aluminum sulphate and calcium phosphate.

09201082

(Board 2015)

Q41. Define Physical properties. Give examples.

09201083

Q42. What is meant by Chemical properties?

09201084

Q43. Describe modern definition of Element.

09201085

Q44. Which elements constitute major part of our body?

09201086

Q45. Which elements are present in minor quantity in our body?

09201087

Q46. How much water may be present in a living body?

09201088

Q47. Define Molecule. Give examples.

09201089

Q48. What is plasma?

09201090

Q49. Define Monoatomic molecules. Give an example.

09201091

Q50. Define diatomic molecules and Triatomic molecules.

09201092

Q51. Describe quantitative definition of Mole.

09201093

Q52. Mole is a huge quantity of substance. Justify with examples.

09201094

Q53a. Define symbol of elements.

09201094(a)

Test yourself 1.1

Q53. In which branch of chemistry is behaviour of gases and liquids studied?

09201095

Q54. Define biochemistry.

09201096

Q55. Which branch of chemistry deals with preparation of paints and paper?

09201097

Q56. In which branch of chemistry are the metabolic processes of carbohydrates and proteins studied?

09201098

Q57. Which branch of chemistry deals with atomic energy and its uses in daily life?

09201099

Q58. Which branch of chemistry deals with the structure and properties of naturally occurring molecules?

09201100

Test yourself 1.2

Q59. Can you identify mixture, element or compound out of the following:

09201101

Coca cola, petroleum, sugar, table salt, blood, gun powder, urine, aluminum, silicon, tin, lime and ice cream.

Q60. Name the elements represented by the following symbols:

(Board

2013)

09201103

Hg, Au, Fe, Ni, Co, W, Sn, Na, Ba, Br, Bi.

Q61. How can you justify that air is a homogenous mixture? Identify substances present in it.

09201102

Q62. Name a solid, a liquid and a gaseous element present at the room temperature.

09201104

Q63. What elements do the following compounds contain?

09201105

Sugar, common salt, lime water and chalk.

Test yourself 1.3

Q64. How many amu, 1g of a substance has?

09201106

Q65. Is atomic mass unit a SI unit of an atomic mass?

09201107

Q66. What is the relationship between atomic number and atomic mass?

09201108

Q68. Why is atomic mass of an atom defined as relative atomic mass?

09201110

Q67. Define relative atomic mass.

(Board

2014)

09201109

Test yourself 1.4

Q69. What is the relationship between empirical formula and formula unit?

09201111

Q70. How can you differentiate between molecular formula and empirical formula?

09201112

Q71. Identify the following formulae as formula units or molecular formulae:

09201113

H_2O_2 , CH_4 , $\text{C}_6\text{H}_{12}\text{O}_6$, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$, BaCO_3 , KBr

Q72. What is empirical formula of acetic acid (CH_3COOH)? Find out its molecular mass.

Q73. Calculate the formula masses of:

09201115

Na_2SO_4 , ZnSO_4 and CuCO_3 .

Test yourself 1.5

Q74. Identify the following as diatomic, triatomic or polyatomic molecules:

09201116

H_2SO_4 , H_2 , CO_2 , HCl , CO , C_6H_6 , H_2O

Q75. Identify among the following as cation, anion, free radical, molecular ion or molecule:

Na^+ , Br^- , N_2^+ , Cl_2 , CO_3^{2-} , H^- , O_2 , O^{2-}

09201117

Test yourself 1.6

Q76. Which term is used to represent the mass of 1 mole of molecules of a substance?

09201118

Q77. How many atoms are present in one gram atomic mass of a substance?

09201119

Q79. Find out the mass of 3 moles of oxygen atoms.

09201121

Q80. How many molecules of water are present in half mole of water?

09201122

Test yourself 1.7

Q81. How many atoms of sodium are present in 3 moles of sodium and what is the mass of it?

09201123

Q82. How many atoms are in 1 amu and 1 g of hydrogen (H)?

09201124

Q83. How many atoms are present in 16 g of O and 8g of S?

09201125

Q84. Is the mass of 1 mole of O and 1 mole of S same?

09201126

Q85. What do you mean by 1 atom of C and 1 gram atom of C?

09201127

Q86. If 16 gram of oxygen contains 1 mole of oxygen atoms, calculate the mass of one atom of oxygen in grams.

09201128

Q87. How many times is 1 mole of oxygen atom heavier than 1 mole of hydrogen atom?

Q88. Why does 10 g nitrogen gas contain the same number of molecules as 10 g of carbon monoxide?

09201130

Multiple Choice Questions

Exercise MCQs

1. Industrial chemistry deals with the manufacturing of compounds:

09201131

(a) in the laboratory

(Board 2015)

(b) on micro scale

(c) on commercial scale

(d) on economic scale

2. Which one of the following compounds can be separated by physical means?

(a) Mixture

(b) Element 09201132

(c) Compound

(d)

Radical

3. The most abundant element occurring in the oceans is:

09201133

(a) Oxygen

(b) Hydrogen

(c) Nitrogen

(d) Silicon

4. Which one of the following elements is found in most abundance in the Earth's crust?

09201134

(a) Oxygen

(b) Aluminium

(c) Silicon

(d) Iron

5. The third abundant gas found in the Earth's atmosphere is:

(Board 2018)

09201135

(a) Carbon monoxide

(b) Oxygen

(c) Nitrogen

(d) Argon

6. One amu (atomic mass unit) is equivalent to:

09201136

(a) 1.66×10^{-24} mg

(b) 1.66

$\times 10^{-24}$ g

(c) 1.66×10^{-24} kg

(d) 1.66

$\times 10^{-23}$ g

7. Which one of the following molecules is not tri-atomic? (Board 2014,17)

09201137

- (a) H_2
- (b) O_3
- (c) H_2O
- (d) CO_2

8. The mass of one molecule of water is:

(Board 2014,16,17)

09201138

- (a) 18 amu
- (b) 18 g
- (c) 18 mg
- (d) 18 kg

9. The molar mass of H_2SO_4 is:

(Board 2015,17,18) 09201139

(a) 98g

(c) 9.8g

9.8amu

(d)

10. Which one of the following is molecular mass of O_2 in amu?

(Board 2014)

09201140

(a) 32 amu

(b)

53.12×10^{-24} amu

(c) 1.92×10^{-25} amu (d) 192.64×10^{-25} amu

Additional MCQs

14. The valency of noble gases is:

09201144

(a) Three

(b) Zero

(c) Two

(d) One

15. Structure of atom is studied in which branch of chemistry?

09201145

(a) Organic Chem (b) Physical Chem

(c) Inorganic Chem (d) Nuclear Chem

16. Nuclear Chemistry has its applications in:

09201146

(a) Medical treatment

(b)

Ecology

(c) Metallurgy

(d) Agriculture

17. Which one is a physical property of substance?

09201147

(a) Smell

(b) Taste

11. How many number of moles are equivalent to 8 grams of CO_2 ?

09201141

(a) 0.15

(b) 0.18

(c) 0.21

(d) 0.24

12. Which one of the following pairs has the same number of ions?

09201142

(a) 1mole of NaCl and 1 mole of $MgCl_2$

(b) $1/2$ mole of NaCl and $1/2$ mole of

$MgCl_2$

(c) $1/2$ mole of NaCl and $1/3$ mole of

$MgCl_2$

(d) $1/3$ mole of NaCl and $1/2$ mole of

$MgCl_2$

13. Which one of the following pairs has the same mass? (Board 2016)

09201143

(a) 1 mole of CO and 1 mole of N_2

(b) 1 mole of CO and 1 mole of CO_2

(c) 1 mole of O_2 and 1 mole of N_2

(d) 1 mole of O_2 and 1 mole of CO_2

(c) Hardness

(d) All

of these

18. Elements exist in the state may be:

09201148

(a) Solid

(b)

Liquid

(c) Gas

(d) All of these

19. Valency of carbon is:

09201149

(a) 1

(b) 2

(c) 3

(d) 4

20. 80 percent elements are:

09201150

(a) Metals

(b)

Non-metals

(c) Metalloids

(d) All of these

21. Valency of oxygen is:

09201151

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

22. The ratio of mass of carbon and oxygen in CO₂ is:

09201152

- (a) 1:8
- (b) 2:3
- (c) 3:8
- (d) 1:2

23. Brass is a mixture of:

09201153

- (a) Cu & Zn
- (b) Cu & Sn
- (c) Cu & Al
- (d) Al & Fe

24. Mixture can be separated by means of:

09201154

- (a) Nuclear method
- (b) Chemical method
- (c) Physical method
- (d) All of these

25. Number of protons in the nucleus of an atom is called:

09201155

- (a) Mass no.
- (b) Atomic no.
- (c) Electron no.
- (d) Mass Unit

26. Empirical formula of sand is:

09201156

- (a) SiO₃
- (b) SiO₂
- (c) SiO₄
- (d) Si₂O₃

27. Which compound has same molecular and empirical formula?

09201157

- (a) C₆H₁₂O₆
- (b) C₆H₆
- (c) H₂O₂
- (d) H₂O

28. Atom is electrically:

09201158

- (a) Positive particle
- (b) Negative particle
- (c) Neutral particle
- (d) None of these

29. Which one is extremely reactive species?

(a) NaCl

(b) H₂

09201159

(c) N₂⁺

(d) CH₄

30. Fourth state of matter is:

09201160

- (a) Solid
- (b) Liquid
- (c) Gas
- (d) Plasma

31. Example of mono atomic molecule is:

(a) H₂

(b) O₂

09201161

(c) CO₂

(d) He

32. Which one is polyatomic molecule?

(a) CH₄

(b) He

09201162

(c) O₂

(d) N₂

33. 1gram formula of NaCl contains grams:

09201163

(a) 100g

(b) 32g

(c) 58.5g

(d) 49g

34. 1gram atom of carbon contains how many moles?

09201164

(a) 2 moles

(b) 12 moles

(c) 1 mole

(d) 6 moles

35. Value of Avogadro's number is:

09201165

(a) 6.02×10²³

(b) 1.32×10²³

(c) 6.6×10⁻²⁰

(d) 6.00×10²⁴

36. Empirical formula of glucose is:

09201166

(a) CH₂O

(b) CHO

(Board 2015)

(c) CHO₂

(d) C₂HO

37. How many atoms are present in one gram atomic mass of a substance?

09201167

(a) 6.20× 10²⁴

(b) 12.04× 10²³

(c) 6.02× 10²³

(d) 6.2 × 10⁻²³

38. 40g of H_3PO_4 contains number of moles:

- (a) 0.58g (b) 0.408g 09201168
(c) 4.8g (d) 5.8g

39. Which of the following specie is generated by sunlight?

09201169

- (a) Ion
(b) Free Radical
(c) Molecule (d) Atom

40. Which type of molecular ions are present in plasma?

09201170

- (a) Cationic (b) Anionic
(c) Both a & b (d) Neutral

41. Percentage of Argon in nature is:

- (a) 87%
(b) 47% 09201171
(c) 0.9%
(d) 21%

42. Formula mass of K_2SO_4 is:

09201172

- (a) 174amu
(b) 180amu
(c) 110amu
(d) 145amu

43. Empirical formula of acetic acid (CH_3COOH) is:

09201173

- (a) CHO
(b) CH_2O
(c) CH
(d) None of these

44. Mass of 3 moles of oxygen atoms is:

- (a) 48g
(b) 32g 09201174
(c) 64g
(d) 16g

45. How many molecules of water will be present in half mole of water? 09201175

- (a) 6.02×10^{23}
(b) 3.01×10^{23}
(c) 6.02×10^{24}
(d) 1.66×10^{-24}

46. A piece of matter in its pure form is

called:

09201176

- (a) Element
(b) Substance
(c) Mixture
(d) Matter

47. Which one of the following is an example of ionic compound?

09201177

- (a) H_2O
(b) CH_4
(c) NaCl
(d) HCl

48. Example of covalent compound is:

- (a) KNO_3
(b) NaCl 09201178
(c) KCl
(d) HCl

49. Example of heterogeneous mixture is:

- (a) Air 09201179
(b) Gasoline
(c) Ice cream
(d) Soil

50. Number of moles in 29.25g NaCl is:

(Board

2014)

09201180

- (a) 0.25
(b) 0.21
(c) 0.50
(d) 0.75

51. How many atoms of carbon are present in one molecule of glucose?

09201181

- (a) 11
(b) 12 (Board 2013)
(c) 6
(d) 22

52. Weight % age of chlorine present in oceans is:

(Board 2014) 09201182

- (a) 1.8
(b) 2.8
(c) 3.8
(d) 4.8

53. The mass of electron is: (Board 2014)

09201183

- (a) $9.106 \times 10^{-28} \text{ g}$ (b) $1.674 \times 10^{-24} \text{ g}$

- (c) $1.672 \times 10^{-24} \text{ g}$ (d) $1.66 \times 10^{-24} \text{ g}$
- 54. Percentage of carbon in human body is:**
(Board 2014) 09201184
(a) 18%
(b) 19%
(c) 20%
(d) 21%
- 55. The removal of electron from a neutral atom gives rise to:** (Board 2015) 09201185
(a) Molecular anion
(b) Molecular cation
(c) Anion
(d) Cation
- 56. Chemistry deals with the behaviour of gases, liquids and solids is:** 09201186
(a) Organic chemistry
(b) Inorganic Chemistry
(c) Physical Chemistry
(d) Biochemistry
- 57. Hydrocarbons and their derivatives are studied in:** 09201187
(a) Organic Chemistry
(b) Inorganic Chemistry
(c) Nuclear Chemistry
(d) Physical Chemistry
- 58. Extraction of metals from ores is called:** 09201188
(a) Calcination
(b) Metallurgy
(c) Carbonation
(d) Refining
- 59. Metabolic processes of carbohydrates and proteins are studied in:** 09201189
(a) Physical Chemistry
(b) Analytical Chemistry
(c) Biochemistry
(d) Organic Chemistry
- 60. The main concern of Nuclear chemistry is with the:** 09201190
(a) Atomic energy

- (b) Pollution
(c) Pharmaceutical Industry
(d) Fertilizers
- 61. The analysis which provides the identity of a substance is called:** 09201191
(a) Clinical analysis
(b) Quantitative analysis
(c) Qualitative analysis
(d) All of these
- 62. A piece of matter in impure form is termed as:** 09201192
(a) Mixture (b) Compound
(c) Substance (d) All of these
- 63. The properties that are associated with physical state of matter are called:** 09201193
(a) Chemical properties
(b) Physical properties
(c) Nuclear Properties
(d) None of these
- 64. The properties which depend upon the composition of the substance are called:** 09201194
(a) Physical properties
(b) Chemical properties
(c) Atomic Properties
(d) Nuclear Properties
- 65. In early ages, how many elements were known?** 09201195
(a) Six
(b) Seven
(c) Eight (d) Nine
- 66. How many elements have been discovered till now?** 09201196
(a) 118
(b) 100
(c) 92
(d) 63
- 67. Number of naturally occurring elements is:** (Board 2016) 09201197

- (a) 92
(b) 98
(c) 108
(d) 114
- 68. The most abundant gas present in atmosphere is:**
09201198
(a) Nitrogen
(b) Oxygen
(c) Argon
(d) Carbon dioxide
- 69. %age of oxygen in Earth's crust is:**
(a) 28%
(b) 47% 09201199
(c) 7.8%
(d) 78%
- 70. Silicon is present in Earth's crust by weight:**
09201200
(a) 86%
(b) 21%
(c) 28%
(d) 47%
- 71. Percentage of Aluminum in Earth's crust is:**
09201201
(a) 7.8%
(b) 0.9%
(c) 11%
(d) 1.8%
- 72. Oxygen is present in oceans:**
09201202
(a) 47%
(b) 86%
(c) 21%
(d) 65%
- 73. Natural occurrence of Hydrogen in oceans is:**
09201203
(a) 71%
(b) 78%
(c) 0.9%
(d) 11%
- 74. Percentage of Hydrogen in human body is:**
09201204
(a) 18%
(b) 10%

- (c) 65%
(d) 15%
- 75. Percentage of Nitrogen in atmosphere is:**
09201205 (Board 2017)
(a) 21%
(b) 50%
(c) 0.03% (d) 78%
- 76. Natural occurrence of oxygen in atmosphere is:**
09201206 (Board 2017)
(a) 21%
(b) 78%
(c) 35%
(d) 47%
- 77. Which is liquid metal?**
09201207
(a) Mercury (b) Bromine
(c) Sulphur (d) Iodine
- 78. Which is liquid non-metal?**
09201208
(a) Boron (b) Bromine
(c) Sodium (d) Mercury
- 79. The ratio by mass of hydrogen and oxygen in water is:**
09201209
(a) 8 : 1 (b) 3 : 8
(c) 1 : 2 (d) 1 : 8
- 80. Valency of Iron is:**
09201210
(a) 2
(b) 3
(c) 2 and 3 (d) 1 and 2
- 81. Formula of sulphate radical is:**
09201211
(a) SO_3^{2-} (b) SO_4^{2-}
(c) HSO_4^- (d) HSO_3^-
- 82. Which one of the following radicals is Thiosulphate?**
09201212



83. Which one of the following elements has valency 2?

09201213

- (a) Zn (b) Ba
 (c) Ca (d) All of these

84. Which is ammonium radical? 09201214



85. Percentage of water in a living body is:

(a) 65%

09201215

- (b) 80%
 (c) 65% to 80%
 (d) 40 % to 50%

86. The most abundant constituent of our body mass is:

09201216

- (a) Oxygen (b)
 Carbon
 (c) Hydrogen (d) Nitrogen

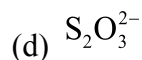
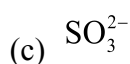
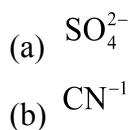
87. Percentage of oxygen in our body mass is:

09201217

- (a) 18%
 (b) 65%
 (c) 10%
 (d) 3%

88. Formula of sulphite radical is:

09201218



89. Valency of Phosphorus is:

09201219

- (a) 1 & 2
 (b) 2 & 3
 (c) 3 & 5

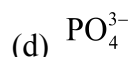
(d) 2 &

4

90. Which is phosphate radical?

09201220

- (a) N^{3-}
 (b) H_3O^+
 (c) P^{3-}



91. Which element shows 1 valency?

09201221

- (a) Hydrogen
 Silver
 (c) Potassium

(b)

(d) All

of these

92. Valency of copper is:

09201222

- (a) 1 & 2
 3
 (c) 2 & 4

(b) 2 &

(d) 3 &

5

93. In FeSO_4 , the valency of iron is: 09201223

- (a) 1
 (b) 2
 (c) 3
 (d) 4

94. Formula of common salt is:

09201224

- (a) NaOH
 CaO
 (c) CaCO_3

(b)



95. Which one of the following represents sand?

09201225

- (a) SiO_2
 (b) H_2O

- (c) NaCl
(d) CaCO_3

96. Sodium Hydroxide is also known as:

09201226

- (a) Washing Soda (b) Caustic Soda
(c) Soda Ash
(d) Quick lime

97. Washing Soda is represented by the formula:

09201227

- (a) NaOH
(b) CaO
(c) CaCO_3
(d) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

98. Limestone is another name of: 09201228

- (a) Sodium hydroxide
(b) Calcium Carbonate
(c) Sodium Carbonate
(d) Silicon dioxide

99. Formula of Caustic Soda is:

09201229

- (a) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ (b) $\text{C}_6\text{H}_{12}\text{O}_6$
(c) CaO
(d) NaOH

100. Symbol of Tungsten metal is: 09201230

- (a) Tl
(b) Ti
(c) W
(d) Au

101. Which is chemical formula of Quick lime?

09201231

- (a) CaCO_3
(b) CaO
(c) NaOH
(d) NaCl

102. Example of homogeneous mixture is:

09201232

- (a) Soil
(b) Rock
(c) Wood
(d) Gasoline

103. Which one of the following is a mixture?

09201233

- (a) Sugar
(b) Table Salt
(c) Blood
(d) Tin

104. Symbol of Barium element is:

09201234

- (a) Br
(b) B
(c) Bi
(d) Ba

105. Atomic number is represented by:

- (a) Z
(b) A 09201235
(c) P
(d) At

106. $^{238}_{92}\text{U}$ has number of neutrons:

- (a) 92
(b) 238 09201236
(c) 146
(d) 330

107. Mass number is represented by:

- (a) A
(b) Z 09201237
(c) M
(d) N_A

108. Mass of Proton in amu is:

09201238

- (a) 1.0073
(b) 1.0087
(c) 1.672×10^{-24}
(d) None of these

109. Percentage of Calcium in human body is:

09201239

- (a) 65%
(b) 3%
(c) 1.5%
(d) 18%

110. Mass of neutron is:

09201240

- (a) 1.0073 amu
(b) 1.0087 amu
(c) 5.486×10^{-4} amu
(d) 1.672×10^{-24} g

111. Empirical formula of hydrogen peroxide is:

09201241

- (a) HO
- (b) CHO
- (c) CH
- (d) CO

112. Empirical formula of Benzene is:

(Board 2016)

09201242

- (a) CH_2O
- (b) CH
- (c) CH_2
- (d) C_2H

113. Molecular mass of acetic acid is:

(a) 43 amu

09201243

- (b) 70 amu
- (c) 60 amu
- (d) 80 amu

114. Which one is monoatomic molecule?

- (a) CO
- (b) H_2
- (c) CO_2
- (d) Ne

09201244

115. Formula of ozone is:

09201245

- (a) O_2
- (b) O_3
- (c) S_8
- (d) CO_2

116. No. of formula units present in 58.5 g

of NaCl are:

09201246

- (a) $2 \times 6.02 \times 10^{23}$
- (b) 6.02×10^{23}
- (c) $3 \times 6.02 \times 10^{23}$
- (d) $58.5 \times 6.02 \times 10^{23}$

117. Number of hydrogen atoms present in 18g of water:

09201247

- (a) $2 \times N_A$
- (b) N_A
- (c) $3 \times N_A$
- (d) $\frac{1}{2} N_A$

118. Total number of ions present in one mole of sodium chloride is:

09201248

- (a) $\frac{1}{2} \times 6.02 \times 10^{23}$
- (b) 6.02×10^{23}
- (c) 1.204×10^{24}
- (d) None of these

119. The theory of dual nature of matter was formulated by:

09201249

- (a) Dalton
- (b) Avogadro
- (c) Goldstein
- (d) de-Broglie

120. Formula of sugar is:

09201250

- (a) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
- (b) $\text{C}_6\text{H}_{12}\text{O}_6$
- (c) NH_3
- (d) CH_3COOH

121. In $\text{Fe}_2(\text{SO}_4)_3$, the valency of iron is:

- (a) 4
- (b) 3
- (c) 2
- (d) 1

09201251

UNIT 02

STRUCTURE OF ATOMS

Long Answers Questions

Q1.(Ex. Q.1) How are cathode rays produced? What are its major characteristics?

09202001

Q2. (Ex. Q.2) How was it proved that electrons are fundamental particles of an atom?

09202002

Q3. (Ex. Q.3) Draw a labeled diagram to show the presence of protons in the discharge tube and explain how canal rays were produced.

09202003

Q4. How were neutrons discovered? Write their properties.

09202004

Q5. (Ex. Q.4) How did Rutherford discover that atom has a nucleus located at the centre of the atom?

09202005

Q6. What results were drawn by Rutherford from his experiment of α - particles scattering?

09202006

Q7. Write defects of Rutherford's Atomic Model.

09202007

Q8.(Ex. Q.6) How did Bohr prove that an atom must exist?

09202008

OR Write postulates of Bohr's Atomic Model.

Q9. Write differences between Rutherford's and Bohr's atomic theory.

(Board 2013,16,17,18) 09202009

Q10. Write a note on shells and sub-shells.

09202010

Q11. What do you mean by electronic configuration? What are basic requirements while writing electronic configuration of an element (atom)?

09202011

Q12. Draw electronic configuration of first 18 elements.

09202012

Q13.(Ex. Q.10) What is an isotope? Describe the isotopes of Hydrogen with diagram. 09202013

Q14. Explain Isotopes of carbon, chlorine and uranium.

09202014

Q15.(Ex. Q.9) Give the applications of Isotopes in the field of radiotherapy and medicine. 09202015

Q16. Write applications of radioisotopes in archaeology and structure determination. 09202016

Q17. Write applications of radioactive isotopes in power generation. (Board 2017) 09202017

Q18.(Ex. Q.8) Describe the electronic configurations of Na^+ , Mg^{2+} and Al^{3+} ion. Do they have the same number of electrons in the outermost shell?

09202018

Q19.(Ex. Q.5) One of the postulates of Bohr's atomic model is that angular momentum of a moving electron is quantized. Explain its meaning and calculate angular momentum of

third orbit (i.e $n=3$).

09202019

Book Examples

Example 2.1 Write the electronic configuration of an element having 11 electrons. 09202020

Example 2.2 Write down the electronic configuration of Cl^- ion. (Board 2015)
09202021

Example 2.3 An element has 5 electrons in M shell. Find out its atomic number.
09202022

Exercise Short Answers Questions

Q1. What is the nature of charge on cathode rays? (Board 2018)

09202023

Q2. Give five characteristics of cathode rays. (Board 2013, 14)

09202024

Q3. The atomic symbol of phosphorous ion is given as ${}_{15}^{31}\text{P}^{3-}$. (Board 2015)

09202025

(a) How many protons, electrons and neutrons are there in the ion?

Q4. Differentiate between shell and sub-shell with examples of each. (Board 2016)
09202026

Q5. An element has an atomic number 17. How many electrons are present in K, L and M shells of the atom? 09202027

Q6. Write down the electronic configuration of Al^{+3} . How many electrons are present in its outermost shell? 09202028

Q7. Magnesium has electronic configuration 2,8,2.

09202029

(a) How many electrons are in its outermost shell?

(b) In which subshell of the outermost shell, electrons are present?

(b) What is name of the ion?

(c) Draw electronic configuration of the ion.

(Board 2015)

(d) Name the noble gas which has the same electronic configuration as the Phosphorus

${}_{15}^{31}\text{P}^{3-}$ ion has.

(c) Why magnesium tends to lose electrons?

Q8. What will be the nature of charge on an atom when it loses an electron or when it gains an electron?

09202030

Q9. For what purpose is U-235 used?

(Board 2014,

2015,18) 09202031

Q10. A patient has goiter. How will it be detected? (Board 2017)

09202032

Q11. Give three properties of positive rays. (Board 2015,16)

09202033

Q12. What are the defects of Rutherford's atomic model?

(Board 2014, 15,17) 09202034

Q13. As long as electron remains in an orbit, it does not emit or absorb energy. When does it emit or absorb energy?

09202035

Additional Short Answers Questions

Q14. Describe plum pudding model. Who presented it?

(Board 2017)

09202036

Q15. What is Dalton's atomic theory?

09202037

Q16. Briefly describe the contribution of J.J. Thomson in the field of Science.

09202038

Q17. Briefly describe contribution of Sir William Crooks in field of Science.

09202039

Q18. Who discovered neutrons and how?

09202040

Q19. Write three properties of neutrons.

(Board

2017)

09202041

Q20. Write electronic configuration of Fluorine.

09202042

Q21. Write electronic configuration of Aluminium.

09202043

Q22. Define isotopes. (Board 2016)

09202044

Q23. Write names of two isotopes used for the treatment of skin cancer.

09202045

Q24. Write use of Co-60.

09202046

Q25. Define radioactive-isotope dating.

09202047

Q26. What is meant by radio carbon dating or carbon dating? (Board 2014, 15,16)

09202048

Q27. Write the contribution of Rutherford in Science.

09202049

Q28. Write contribution of Neil Bohr in Science.

09202050

Q29. What is meant by Quantum?

09202051

Q30. Write contribution of Max Planck.

09202052

Q31. Write down the electronic configuration of sodium 'Na'. (Board 2014)

09202053

Q32. State two uses of isotopes. (Board 2014)

09202054

Q33. Complete the following equation:

09202055

Q34. Write down the electronic configura-tion of 'S'. (Board 2014)

09202056

Q35. Write down the electronic configura-tion of Be and Ne. (Board

2014)

09202057

Q36. Write down general electronic configuration of carbon family. 09204058

Test yourself 2.1

Q37. Do you know any element having no neutrons in its atoms?

09202059

Q38. Who discovered an electron, a proton and a neutron? (Board 2017) 09202060

Q39. How does electron differ from a neutron?
(Board 2014) 09202061

Q40. Explain how anode rays are formed from the gas present in the discharge tube.
09202062

Test yourself 2.2

Q41. How was it proved that the whole mass of an atom is located at its centre?

09202063

Q42. How was it shown that atomic nuclei are positively charged?

09202064

Q43. Name the particles which determine the mass of an atom.

09202065

Q44. What is the classical theory of radiation? How does it differ from quantum theory?

Q45. How can you prove that angular momentum is quantized?

09202067

Test yourself 2.3

Q46. How many maximum number of electrons can be accommodated in a p-subshell?

09202068

Q47. How many subshells are there in second shell?

09202069

Q48. Why does an electron first fill 2p orbital and then 3s orbital?

09202070

Q49. If both K and L shells of an atom are completely filled what is the total number of electrons present in them?

09202071

Q50. How many electrons can be accommodated in M shell?

09202072

Q51. What is the electronic configuration of a hydrogen atom?

09202073

Q52. What is atomic number of phosphorus? Write down its electronic configuration. (Board 2014)

09202074

Q53. If an element has atomic number 13 and atomic mass 27; how many electrons are there in each atom of the element?

09202075

Q54. How many electrons will be in M shell of an atom having atomic number 15?

09202076

Q55. What is maximum capacity of a shell?

(Board 2017)

09202077

Test yourself 2.4

Q56. Why do the isotopes of an element have different atomic masses?

09202078

Q57. How many neutrons are present in C- 12 and C -13?

09202079

Q58. Which of the isotopes of hydrogen contains greater number of neutrons?

09202080

Q59. Give one example each of the use of radioactive isotope in medicine and radiotherapy.

(Board 2018) 09202081

Q60. How is the goiter in thyroid gland detected?

09202082

Q61. Define nuclear fission reaction.

09202083

Q62. When U-235 breaks up, it produces a large amount of energy. How is this energy used?

(Board 2018)

09202084

Q63. How many neutrons are produced in the fission reaction of U-235?

09202085

Q64. U-235 fission produces two atoms of which elements?

09202086

Exercise MCQ's

1. Which one of the following results in the discovery of proton?

09202087

- (a) Cathode rays (b) Canal rays
(c) X-rays
(d) Alpha rays

2. Which one of the following is the most penetrating?

09202088

- (a) Protons
(b) Electrons
(c) Neutrons
(d) Alpha particles

3. The concept of orbit was used by:

09202089

- (a) J.J. Thomson (b) Rutherford
(c) Bohr
(d) Planck

4. Which one of the following consists of three sub-shells? (Board 2017)

09202090

- (a) O shell
(b) N shell
(c) L shell
(d) M shell

5. Which radioisotope is used for the diagnosis of tumor in the body? 09202091

- (a) Cobalt-60
(b) Iodine-131
(c) Strontium-90
(d) Phosphorous-30

6. When U-235 breaks up, it produces:

- (a) Electrons (b) Neutrons 09202092

- (c) Protons (d) Nothing

7. The p sub-shell has: (Board 2016)

09202093

- (a) One orbital (b) Two orbitals
(c) Three orbitals (d) Four orbitals

8. Deuterium is used to make:

09202094

- (a) Light water (b) Heavy water
(c) Soft water
(d) Hard water

9. The isotope C-12 is present in abundance of:

09202095

- (a) 96.9%
(b) 98.9%
(c) 99.7%
(d) None of these

10. Who discovered the proton?

09202096

(Board 2018,14)

- (a) Goldstein
(b) J.J. Thomson
(c) Neil Bohr
(d) Rutherford

Additional MCQs

11. The name atom was derived from the

Latin word 'Atomos' meaning: 09202097

- (a) Divisible
- (b) Indivisible
- (c) Reactive
- (d) Stable

12. John Dalton put forward his atomic theory in the beginning of:

09202098

- (a) 16th century
- (b) 17th century
- (c) 18th century
- (d) 19th century

13. In 1897, who discovered electrons in atom?

09202099

- (a) Goldstein
- (b) Dalton
- (c) J.J. Thomson
- (d) William Crooks

14. Plum pudding theory was put forward by:

09202100

- (a) Thomson
- (b) Goldstein
- (c) Crooks
- (d) Soddy

15. Uranium has number of isotopes:

(Board 2016)

09202101

- (a) 1
- (b) 3
- (c) 4
- (d) 5

16. Canal rays were discovered by: 09202102

- (a) Goldstein
- (b) Thomson
- (c) Dalton
- (d) Crooks

17. How many times heavier mass of a proton than an electron?

09202103

- (a) 1480
- (b) 1804
- (c) 1840
- (d) 1408

18. ${}^9_4\text{Be} + {}^4_2\text{He} \longrightarrow {}^{12}_6\text{C} + \text{_____}$

09202104

- (a) ${}^1_0\text{P}$
- (b) ${}^{-1}_0\text{e}$
- (c) ${}^1_0\text{n}$
- (d) ${}^4_2\text{He}$

19. Who predicted in 1920 that some neutral particles having mass equal to that of proton are present in an atom?

09202105

- (a) Bohr
- (b) Rutherford
- (c) Chadwick
- (d) Goldstein

20. Rutherford used a gold foil in his experiment, which had a thickness of:

09202106

- (a) 0.002cm
- (b) 0.00004cm
- (c) 0.0001cm
- (d) 0.001cm

21. In 1912 Neil Bohr joined for post doctoral research with:

09202107

- (a) Rutherford
- (b) Chadwick
- (c) Newton
- (d) Goldstein

22. Who performed first experiment to split atom?

09202108

- (a) Soddy
- (b) Rutherford
- (c) Bohr
- (d) Newton

23. The value of Planck's constant is:

(a) $6.63 \times 10^{-34} \text{ Js}$

09202109

- (b) $6.62 \times 10^{-24} \text{ Js}$
- (c) $6.62 \times 10^{-19} \text{ Js}$
- (d) $6.62 \times 10^{-12} \text{ Js}$

24. Quantum means:

09202110

- (a) Variable energy
- (b) Fixed energy
- (c) High energy
- (d) Minimum energy

25. According to Rutherford's atomic theory, atom should produce:

09202111

- (a) Line spectrum
- (b) Continuous spectrum
- (c) Both a & b
- (d) None of these

26. Who described the concept of line spectrum in his atomic model?

09202112

- (a) Rutherford
- (b) Bohr
- (c) Goldstein
- (d) Chadwick

27. The number of electrons that a shell can accommodate is given by formula:

(a) n^2

(b) $2n$ 09202113

(c) $2n^2$

(d) $3n^2$

28. How many sub shells are there in first energy level or K shell?

09202114

- (a) 01
- (b) 02
- (c) 03
- (d) 04

29. How many electrons can be accommodated in L-shell?

09202115

- (a) 2
- (b) 8
- (c) 18
- (d) 32

30. How many electrons can be accommodated in N-shell?

09202116

- (a) 02
- (b) 08
- (c) 18
- (d) 32

31. How many electrons can be accommodated in p-orbital? (Board 2018)

09202117

(a) 02

(b) 06

(c) 10

(d) 14

32. Electronic configuration of Boron is:

(a) $1s^2, 2s^1$

(b) $1s^2, 2s^2$ 09202118

(c) $1s^2, 2s^2, 2p^1$

(d) $1s^2,$

$2p^1$

33. Symbol for Deuterium is:

09202119

(a) ${}^1_1\text{H}$

(b) ${}^2_1\text{H}$

(c) ${}^3_1\text{H}$

(d) ${}^1_0\text{H}$

34. ^{13}C and ^{14}C are both present in nature:

(a) 0.1 %

(b) 0.9 % 09202120

(c) 1.1 %

(d) 1.5 %

35. The percentage of pure ${}^{238}_{92}\text{U}$ is found in nature:

09202121

(a) 97 %

(b) 98 %

(c) 99 %

(d) 100 %

36. Which isotope is used for diagnosis of goiter?

09202122

(a) Iodine-131

(b)

Cobalt-60

(c) P-32

(d) Sr-90

37. Number of electrons in outermost shell of chlorine is: (Board 2014)

09202123

(a) 3

(b) 4

(c) 7

(d) 8

38. How many electrons can be accommodated by K shell? (Board 2014)

09202124

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

39. The nucleus of an atom is composed of:

(Board 2014)

09202125

- (a) Electrons
- (b) Electrons and protons
- (c) Electrons and neutrons
- (d) Protons and neutrons

40. How many electrons can be accommodated by M-shell?

(Board 2014)

09202126

- (a) 8
- (b) 18
- (c) 32
- (d) 40

41. Who proposed quantum theory?

(Board 2013) 09202127

- (a) Neil Bohr
- (b) Dalton
- (c) Thomson
- (d) Max Planck

42. After gaining one electron, chlorine atom attains the electronic configuration of which noble gas?

(Board

2015)

09202128

- (a) Helium
- (b) Neon
- (c) Argon
- (d) Krypton

43. Who discovered cathode rays? 09202129

- (a) John Dalton
- (b) Goldstein
- (c) Neil Bohr
- (d) Sir William Crooks

44. Democritus was a/an _____ philosopher.

09202130

- (a) Latin (b)
- Greek
- (c) English (d)
- American

45. J.J. Thomson was:

09202131

- (a) English chemist
- (b) Italian philosopher
- (c) British physicist
- (d) German scientist

46. J.J. Thomson was awarded the Noble prize in 1906 in the field of:

09202132

- (a) Maths (b)
- Physics
- (c) Chemistry (d) Quantum theory

47. William Crooks kept pressure inside the discharge tube at:

09202133

- (a) 10^{-4} atm (b)
- 10^{-7} atm
- (c) 10^{-10} atm (d)
- 10^4 atm

48. Who was the pioneer of vacuum tubes?

0920213134

- (a) Goldstein (b)
- William Crooks
- (c) Bohr (d)
- Rutherford

49. Goldstein observed canal rays in:

09202135

- (a) X-rays (b)
- Canal rays
- (c) α -rays (d)
- Cathode rays

50. German physicist Max Planck won the Noble in 1918:

09202136

- (a) Maths (b)
- Chemistry
- (c) Physics (d)
- Quantum theory

51. Max planck won Noble prize for his work on the:

09202137

- (a) Discharge tubes
- (b) Quantum theory
- (c) Classical theory
- (d) None of these

52. How many electrons can be accommodated in s subshell?

09202138

- (a) 2
(b) 6
(c) 10
(d) 14
- 53. Number of electrons that can be accommodated in f-subshell:**
09202139
(a) 2
(b) 6
(c) 10
(d) 14
- 54. Which subshells are present in L-shell?**
09202140
(a) s&p
(b) Only s-subshell
(c) Only p-subshell
(d) d-subshell
- 55. How many subshells are there in M-shell?**
09202141
(a) 2
(b) 3
(c) 4
(d) 5
- 56. N-shell contains number of subshells:**
(a) 1
(b) 2
(c) 3
(d) 4
09202142
- 57. M-shell has more energy than:** 09202143
(a) K-shell
(b) K and L-shell
(c) N shell
(d) All of the above
- 58. The “s” subshell has:**
09202144
(a) One orbital
(b) Two orbitals
(c) Three orbitals
(d) Four orbitals
09202145
- 59. The “d” subshell has:**
09202145
(a) One orbital
(b) Three orbitals
(c) Five orbitals
(d) Seven orbitals
- 60. The “f” subshell has:**
09202146

- (a) Three orbitals
(b) Four orbitals
(c) Five orbitals
(d) Seven orbitals
- 61. An element has 5 electrons in M-shell. Its atomic number is:**
09202147
(a) 5
(b) 10
(c) 15
(d) 20
- 62. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$ represents electronic configuration of:**
09202148
(a) Cl
(b) Na
(c) Cl^-
(d) Na^+
- 63. Electronic configuration of Neon is:**
(a) $1s^2, 2s^2, 2p^6$
(b) $1s^2, 2s^2,$
(c) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$
(d) $1s^2, 2s^2, 2p^6, 3s^2$
09202149
- 64. Chlorine has isotopes:**
09202150
(a) $^{35}_{17}Cl$
(b) $^{37}_{17}Cl$
(c) $^{17}_{35}Cl$
(d) both a & b
- 65. Which isotopes are used for the treatment of skin cancer?**
09202151
(a) P-32
(b) Sr-90
(c) Co-60
(d) Both a & b
- 66. Which isotope emits less penetrating beta radiation?**
09202152
(a) C-14
(b) P-32
(c) Iodine-131
(d) Co-60
- 67. Which isotope emits strongly penetrating gamma rays?**
09202153
(a) Sr-90
(b) C-12
(c) Co-60
(d) P-32

68. Which isotope is used for treatment of cancer affecting within the body? 09202154

- (a) Co-60
- (b) C-12
- (c) Sr-90
- (d) Iodine-131

69. Which isotope is used to monitor the bone growth?

09202155

- (a) Iodine-131
- (b) Cobalt-60
- (c) Phosphorus-32
- (d) Technetium

70. Carbon-14 is used for the:

09202156

- (a) Age determination of old objects
- (b) Growth of bones
- (c) Diagnosis of goiter
- (d) All of these

71. When U-235 breaks up, it produces:

(a) $^{139}_{56}\text{Ba}$

(b) $^{94}_{36}\text{Kr}$

09202157

(c) $^{35}_{17}\text{Cl}$

(d) Both a & b

72. d-subshell can accommodate maximum electrons:

09202158

- (a) 2
- (b) 6
- (c) 10
- (d) 14

73. Number of isotopes of hydrogen is: 09202159

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

UNIT 03

PERIODIC TABLE AND PERIODICITY OF PROPERTIES

Q1. Describe Dobereiner's triads with an example.

09203001

Q2. Describe Newlands octaves and also write down its drawbacks.

09203002

Q3.(Ex. Q.1) Explain the contributions of Mendeleev for the arrangement of elements in his Periodic Table.

09203003

Q4. Write a note on Modern Periodic Table.

09203004

Q5.(Ex. Q.7) Why and how elements are arranged in the Periodic Table?

09203005

Q6. Write down the significance of atomic number in the arrangement of Long Form of Periodic Table.

09203006

Q7.(Ex. Q.4) Discuss the important features of Modern Periodic Table. (Board 2014, 15)

09203007

Q8.(Ex. Q.6) Discuss in detail the periods in Periodic Table.

(Board 2017)

09203008

Q9. Discuss the groups present in Modern Periodic Table. (Board 2015)

09203009

Q10.(Ex. Q.5) What do you mean by blocks in the Periodic Table and why elements were placed in blocks?

09203010

Q11. Define Atomic size or Atomic Radius .Write down its units. Explain its trends in groups and periods.

09203011

Q12.(Ex. Q.2) Show why in a period the size of an atom decreases if one moves from left to right.

09203012

Q13. Define Shielding Effect. Explain its trends in Periodic Table. (Board 2015)

09203013

Q14. (Ex. Q.10) Justify the statement: Bigger size atoms have more shielding effect thus low ionization energy.

09203014

Q15.(Ex. Q.8) What is Ionization energy? Describe its trends in periodic table.

09203015

Q16.(Ex. Q.9) Define electron affinity. Why it increases in a period and decreases in a group?

Q17.(Ex. Q.3) Describe the trends of electronegativity in a period and in a group.

09203017

Exercise Short Answers Questions

Q1. Why are noble gases not reactive?
(Board 2014)

09203018

Q2. Why does Cesium (atomic no.55) require little energy to release its one electron present in the outermost shell?

09203019

Q3. How is periodicity of properties dependent upon the number of protons in an atom?

09203020

Q4. Why does shielding effect of electrons make cation formation easy?

09203021

Q5. What is the difference between Mendeleev's periodic law and modern

periodic law?

09203022

Q6. What do you mean by groups and periods in the Periodic Table?

09203023

Q7. Why and how elements are arranged in 4th period?

09203024

Q8. Why does the size of atom not decrease regularly in a period?

09203025

Q9. Give the trend of ionization energy in periodic table. (Board 2014)

09203026

Additional Short Answers Questions

Q10. Define periodic table.

09203027

Q11. Describe drawbacks of Newlands Octaves.

09203028

Q12. Who was Mendeleev?

09203029

Q13. Write down drawbacks of Mendeleev's periodic table.

09203030

Q14. Describe Modern periodic law.

09203031

Q15. Write down significance of atomic number.

09203032

Q16. What do you mean by group number and period number?

9203033

Q17. How many groups and periods are present in Modern periodic table?

09203034

Q18. How many blocks are present in Modern Periodic table?

09203035

Q19. How are elements arranged into four blocks?

09203036

Q20. Define normal or representative elements.

09203037

Q21. Define transition elements.

09203038

Q22. Who were Alchemists?

09203039

Q23. Define lanthanides. To which period do they belong?

09203040

Q24. Define actinides. To which period do they belong?

09203041

Q25. Write down the trends of atomic size in groups and periods in the periodic table.

(Board 2016)

09203042

Q26. Why does atomic radius of elements increase down the group? (Board 2014)

09203043

Q27. Why does ionization energy decrease from top to bottom in any group?

09203044

Q28. Give the trend of ionization energy in a period. (Board 2013,18)

09203045

Q29. Define electron affinity. Write down its unit. (Board 2014, 16)

09203046

Q30. What is the trend of electron affinity in groups and periods in the periodic table?

(Board 2018)

09203047

Q31. Why does electron affinity decrease in a group?

09203048

Q32. Why does electron affinity increase in a period?

09203049

Q33. Define electronegativity. Write the electronegativity of Nitrogen and oxygen.

(Board 2013,18)

09203050

Q34. What are the elements arranged in group 3 to 12 called? (Board 2015)

09203051

Q35. Write down the names of any four elements of group 17. (Board 2014)

09203052

Q36. Write the names or symbols of any four elements of Nobel Gases.

09203053

Test yourself 3.1

Q36. What was the contribution of Dobereiner towards classification of elements? (Board 2015)

09203054

Q37. How did Newlands arrange the elements?

09203055

Q38. Who introduced the name of periodic table?

09203056

Q39. Why was the improvement in Mendeleev's periodic table made?

09203057

Q40. State Mendeleev's periodic law.

(Board

2014, 2015, 2016)

09203058

Q41. Why and how are elements arranged in a period?

09203059

Test yourself 3.2

Q42. How do the properties of elements repeat after regular intervals?

09203060

Q43. In which pattern was modern periodic table arranged?

09203061

Q44. How many elements are there in first period and what are their names and symbols?

09203062

Q45. How many elements are placed in 4th period?

09203063

Q46. From which element does lanthanide series start?

09203064

Q47. From which period does actinide series start?

09203065

Q48. How many elements are present in 3rd period? Write their names and symbols.

09203066

Q49. How many periods are considered to be normal periods?

09203067

Q50. What do you mean by a group in a periodic table?

09203068

Q51. What is the reason of arranging elements in a group?

09203069

Q52. What do you mean by periodic function? (Board 2014,17)

09203070

Q53. Why are the elements called s or p-block elements? (Board 2017)

09203070

Q54. Write down the names of elements of group 1 with their symbols.

09203071

Q55. How many members are in Group 17, is there any liquid, what is its name?

09203072

Test yourself 3.3

Q56. Define atomic radius.

09203073

Q57. What are SI units of atomic radius?

(Board 2017)

09203074

Q58. Why does the size of atoms decrease in a period?

09203075

Q59. Define ionization energy. (Board 2014)

09203076

Q60. Why is the 2nd Ionization energy of an element higher than first one?

09203077

Q61. What is the trend of ionization energy in a group?

09203078

Q62. Why is the ionization energy of sodium less than that of magnesium?

(Board 2013)

09203079

Q63. Why is it difficult to remove an electron from halogens?

09203080

Q64. What is shielding effect?

09203081

Q65. How does shielding effect decrease the forces of electrostatic attractions between nucleus and outermost electrons?

09203082

Q66. Why does the bigger size atoms have more shielding effect?

09203083

Q67. Why is the trend of electron affinity and electronegativity same in a period?

09203084

Q68. Which element has the highest electronegativity?

09203085

Multiple Choice Questions

Exercise MCQs

1. The atomic radii of the elements in periodic table:

09203086

(a) Increase from left to right in a period
(b) Increase from top to bottom in a group

(c) Do not change from left to right in a period

(d) Decrease from top to bottom in a group

2. The amount of energy given out when an electron is added to an atom is called:

09203087

(a) Lattice energy

(b) Ionization energy

(c) Electronegativity

(d) Electron affinity

3. Mendeleev's Periodic Table was based upon the:

09203088

(a) Electronic configuration

(b) Atomic mass

(c) Atomic number

(d) Completion of a subshell

4. Long form of Periodic Table is constructed on the basis of:

09203089

(a) Mendeleev Postulate

- (b) Atomic number
- (c) Atomic mass
- (d) Mass number

5. 4th and 5th period of the long form of Periodic Table are called:

09203090

- (a) Short periods
- (b) Normal periods
- (c) Long periods
- (d) Very long periods

6. Which one of the following halogens has lowest electronegativity?

(Board 2015,17)

09203091

- (a) Fluorine
- (b) Chlorine
- (c) Bromine
- (d) Iodine

7. Along the period, which one of the following decreases:

09203092

- (a) Atomic radius
- (b) Ionization energy
- (c) Electron affinity
- (d) Electronegativity

8. Transition elements are:

(Board 2017)

09203093

- (a) All gases
- (b) All metals
- (c) All non-metals
- (d) All metalloids

9. Mark the incorrect statement about ionization energy:

09203094

- (a) It is measured in kJmol^{-1}
- (b) It is absorption of energy
- (c) It decreases in a period
- (d) It decreases in a group

10. Point out the incorrect statement about electron affinity:

09203095

- (a) It is measured in kJmol^{-1}
- (b) It involves release of energy
- (c) It decreases in a period
- (d) It decreases in a group

Additional MCQs

11. Moseley arranged the elements in his periodic table on the basis of:

(Board 2018)

09203096

- (a) Atomic number
- (b) Atomic masses
- (c) Atomic volume
- (d) None of these

12. In modern periodic table the elements in a group do not have continuously increasing:

09203097

- (a) Atomic number
- (b) Atomic masses

- (c) Atomic volume
- (d) None of the above

13. How many groups are present in the modern periodic table?(Board 2014)

- (a) 8
- (b) 10 09203098
- (c) 15
- (d) 18

14. How many periods are present in the modern periodic table?

09203099

- (a) 7
- (b) 8
- (c) 10

(d) 12
15. How many elements are present in 1st period?

09203100

- (a) 1
- (b) 2
- (c) 8
- (d) 18

16. How many elements are present in each 2nd & 3rd period? (Board

2018)09203101

- (a) 2
- (b) 8
- (c) 18
- (d) 32

17. How many elements are present in each 4th & 5th period?

09203102

- (a) 2
- (b) 8
- (c) 18
- (d) 32

18. How many elements are present in 6th period? (Board

2016) 09203103

- (a) 2
- (b) 8
- (c) 18
- (d) 32

19. How many elements are present in 7th period?

09203104

- (a) 2
- (b) 8
- (c) 18
- (d) 32 *(incomplete)

20. Elements of a period show properties:

- (a) Same (b) Different 09203105
- (c) Both a & b (d) None of these

21. The elements of a group show properties:

09203106

- (a) Same (b) Different
- (c) Both a & b (d) None of these

22. How many blocks are present in modern periodic table? (Board 2014) 09203107

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

23. Elements are classified into four blocks depending upon:

09203108

- (a) Shell
- (b) Sub-shell
- (c) Atomic mass
- (d) Atomic number

24. The elements of group 1 and 2 are placed in which block: (Board 2013) 09203109

- (a) s
- (b) p
- (c) d
- (d) f

25. Elements of groups 13 to 18 have their valence electrons in subshell:

09203110

- (a) s
- (b) p
- (c) d
- (d) f

26. Who were trying to convert inferior metals to superior metals?

09203111

- (a) Alchemists (b) Scientists
- (c) Doctors
- (d) None of these

27. Which of the following elements is present in 1st period?

09203112

- (a) Hydrogen
- (b) Helium
- (c) Both a & b (d) None of these

28. Second and third periods are called:

- (a) Normal periods

09203113

- (b) 1st transition series
- (c) 2nd transition series
- (d) 3rd transition series

29. Which element is present in 2nd period?

09203114

- (a) Lithium
- (b) Beryllium
- (c) Boron
- (d) All of these

30. Elements with atomic No.58 to 71 are called:

09203115

- (a) Lanthanides (b)
- Actinides
- (c) Both a & b (d)
- None of these

31. Lanthanides belong to period:

09203116

- (a) 4th
- (b) 5th
- (c) 6th
- (d) 7th

32. Elements with atomic No.90 to 103 are called:

09203117

- (a) Lanthanides (b)
- Actinides
- (c) Both a & b (d)
- None of these

33. Actinides belong to period:

09203118

- (a) 4th
- (b) 5th
- (c) 6th
- (d) 7th

34. Lanthanide series starts after the element:

09203119

- (a) Lanthanum (b)
- Actinium
- (c) Osmium
- (d) None of these

35. Atomic number of lanthanum is:

09203120

- (a) 57
- (b) 58
- (c) 59
- (d) 60

36. Actinide series starts after the element:

09203121

- (a) Lanthanum (b)
- Actinium
- (c) Osmium

(d) Silver

37. Atomic number of actinium is:

09203122

- (a) 57
- (b) 60
- (c) 80
- (d) 89

38. Group number tells about the:

09203123

- (a) Number of valence electrons
- (b) Number of shells
- (c) Both a & b
- (d) None of the above

39. Period number tells about the:

09203124

- (a) No. of valence electrons
- (b) No. of electronic shells
- (c) Both a & b
- (d) None of the above

40. Which period of the modern periodic table is considered as incomplete period?

(Board

2013)

09203125

- (a) 4th
- (b) 5th
- (c) 6th
- (d) 7th

41. Which of the following elements is present in group I?

09203126

- (a) Hydrogen (b)
- Lithium
- (c) Sodium (d) All
- of these

42. Elements of Group 1 are called:

09203127

- (a) Alkali metals
- (b) Alkaline earth metals
- (c) Transition metals
- (d) Halogens

43. How many electrons are present in the valence shell of group 1 elements?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

09203128

44. The group 1 and 2 and 13 to 17 contain the elements:

09203129

- (a) Normal elements
- (b) Transition elements
- (c) Inner transition elements
- (d) Outer transition elements

45. 17th group elements are known as: 09203130

- (a) Alkali metals
- (b) Alkaline earth metals
- (c) Halogens
- (d) Noble gases

46. 17th group elements contain electrons in their outer most shell:

09203131

- (a) 4
- (b) 5
- (c) 6
- (d) 7

47. The elements of group 3 to 12 are called:

09203132

- (a) Normal elements
- (b) Transition elements
- (c) Halogens
- (d) Noble gases

48. Normal elements belong to: 09203133

- (a) s-block
- (b) p-block
- (c) both a & b
- (d) d & f block

49. All transition elements belong to:

- (a) s & p block
- (b) d-block
- (c) f-block
- (d) d & f block

50. Unit of atomic size is:

09203135

- (a) nm
- (b) pm
- (c) kJmol⁻¹
- (d) Both a & b

51. The distance between the Nuclei of two carbon atoms in its elemental form is:

(Board 2014) 09203136

- (a) 150 pm
- (b) 152 pm
- (c) 154 pm

- (d) 156 pm

52. When we move from left to right in a period, atomic number:

09203137

- (a) Increases
- (b) Decreases
- (c) First increases then decreases
- (d) None of the above

53. When we move from left to right in a period, atomic size:

09203138

- (a) Increases
- (b) Decreases
- (c) First increases then decreases
- (d) None of the above

54. When we move from top to bottom in a group, atomic size:

09203139

- (a) Increases
- (b) Decreases
- (c) First decreases then increases
- (d) None of the above

55. Atomic size of lithium is:

09203140

- (a) 150 pm
- (b) 151 pm
- (c) 152 pm
- (d) 154 pm

56. Atomic size of Neon is:

09203141

- (a) 60 pm
- (b) 65 pm
- (c) 68 pm
- (d) 69 pm

57. With the increase of atomic number, the number of electrons in an atom also:

- (a) Increases

09203142

- (b) Decreases
- (c) First increases then decreases
- (d) None of the above

58. When we move from top to bottom in a group, shielding effect:

09203143

- (a) Increases
- (b) Decreases
- (c) No effect

(d) None of these

59. When we move from left to right in a period, shielding effect:

09203144

- (a) Increases
- (b) Decreases
- (c) Remains same
- (d) None of these

60. The minimum amount of energy which is required to remove an electron from the gaseous state of an atom is called:

(a) Ionization energy

09203145

- (b) Electron affinity
- (c) Electronegativity
- (d) Potential energy

61. The unit of ionization energy is:

- (a) nm and pm
- (b) kJmol^{-1}
- (c) Newton
- (d) Pascal

62. When we move top to bottom in a group, ionization energy:

09203147

- (a) Increases
- (b) Decreases
- (c) No effect
- (d) None of these

63. When we move from left to right in a period, ionization energy:

09203148

- (a) Increases
- (b) Decreases
- (c) No effect
- (d) None of these

64. The first ionization energy of sodium atom is:

09203149

- (a) $+496 \text{ kJmol}^{-1}$
- (b) $-495.8 \text{ kJmol}^{-1}$
- (c) $-490.6 \text{ kJmol}^{-1}$
- (d) $-495.7 \text{ kJmol}^{-1}$

65. The amount of energy released when an electron is added in the outermost shell of an isolated gaseous atom is called:

09203150

(a) Ionization energy

- (b) Electron affinity
- (c) Electronegativity
- (d) Potential energy

66. Unit of electron affinity is:

09203151

- (a) pm
- (b) kJmol
- (c) kJmol^{-1}
- (d) Newton

67. Electron affinity of fluorine in kJmol^{-1} is:

09203152

- (a) 328
- (b) -328
- (c) -330
- (d) -340

68. The ability of an atom to attract the shared pair of electrons towards itself in a molecule is called:

09203153

- (a) Ionization energy
- (b) Electron affinity
- (c) Electronegativity
- (d) Shielding effect

69. Which one of the following halogens has highest electronegativity?

09203154

(Board 2014,18)

- (a) Iodine
- (b) Chlorine
- (c) Fluorine
- (d) Bromine

70. The vertical columns present in the periodic table are called:

(Board 2014)

09203155

- (a) Groups
- (b) Periods
- (c) Both a & b
- (d) None of these

71. The horizontal lines present in the periodic table are called:

09203156

- (a) Groups
- (b) Periods
- (c) Both a & b
- (d) None of these

72. Who arranged the elements in the groups of three?

09203157

- (a) Dobereiner (b) Newland
(c) Mendeleev (d) Moseley

73. Who determined the correct atomic masses of elements in 1860?

09203158

- (a) Dobereiner (b) Cannizzaro
(c) Newland (d) All of these

74. How many elements were present in Mendeleev's periodic table?

09203159

- (a) 50
(b) 55
(c) 60
(d) 63

75. Electronegativity of oxygen is: (Board 2014)

- (a) 3.1
(b) 3.3
(c) 3.2
(d) 3.4

09203160

76. Number of elements in each normal period are: (Board 2015)

09203161

- (a) 18
(b) 10
(c) 8
(d) 32

77. The electronegativity of carbon is:

(Board 2014) 09203162

- (a) 2.0
(b) 1.0
(c) 2.6
(d) 4.0

78. Who discovered atomic number:

(Board 2017)

09203163

- (a) Dalton
(b) Moseley
(c) Rutherford
(d) Bohr

79. The shortest period of periodic table is:

2017)

(Board 09203164

- (a) First
(b) Second
(c) Third
(d) Fourth

80. The base of modern periodic table is:

(Board 2018)

09203165

- (a) Mass number
(b) Avogadro's number
(c) Atomic number
(d) Quantum number

Q1.(Ex. Q.10) What is a chemical bond and why do atoms form a chemical bond?

09204001

Q2.(Ex. Q.11) What is octet rule? Why do atoms always struggle to attain the nearest noble gas electronic configuration?

09204002

Q3. (Ex. Q.1) What is ionic bond? Discuss the formation of ionic bond between sodium and chlorine atom. (Board 2016)

09204003

Q4.(Ex. Q.5) Explain the types of covalent bonds with at least one example of each type.

09204004

Q5.(Ex. Q.3) What type of covalent bonds are formed between hydrogen, oxygen and nitrogen? Explain their bonding with dot and cross model.

- 09204005
- Q6.(Ex. Q.6) How is a coordinate covalent bond formed? Explain with examples.**
09204006
- Q7. Differentiate between polar and non-polar covalent bond.**
09204007
- Q8. (Ex. Q.2) How can you justify that bond strength in polar covalent compounds is comparable to that of ionic compounds?**
09204008
- Q9. (Ex. Q.4)How a covalent bond develops ionic character in it? Explain.**
09204009
- Q10.(Ex. Q.7)What is Metallic Bond? Explain Metallic bonding with the help of diagram.**
- Q11. (Ex. Q.9) What are intermolecular forces? Compare these forces with chemical bond forces with reference to HCl molecule. (Board 2013)**
09204011
- Q12. Write a note on Dipole-Dipole Interaction.**
09204012
- Q13. (Ex. Q.8)Define hydrogen bonding. Explain how these forces affect the physical properties of compounds.**
09204013
- Q14. Differentiate between ionic and covalent compounds.**
09204014
- Q15. What are polar and Non-Polar covalent compounds? Discuss their properties.** 09204015
- Q16. What are ionic compounds? Write down general properties of ionic compounds.** 09204016
- Q17. What are covalent compounds? Write down the general properties of covalent compounds.**
(Board 2014,18) 09204017
- Q18. What are coordinate covalent compounds? Discuss their general properties.**
09204018
- Q19. What are common properties of metals?**
09204019

Exercise Short Answers Questions

- | | |
|--|---|
| <p>Q1. Why do atoms react?
(Board 2017,18) 09204020</p> <p>Q2. Why is the bond between an electropositive and an electronegative atom ionic in nature?
09204021</p> <p>Q3. Ionic compounds are solids. Justify.
(Board 2016,18) 09204022</p> <p>Q4. More electronegative elements can form bonds between themselves. Justify.
09204023</p> <p>Q5. Metals are good conductor of electricity. Why?
(Board</p> | <p>2017) 09204024</p> <p>Q6. Ionic compounds conduct electricity in solution or molten form. Why? 09204025</p> <p>Q7. What type of covalent bond is formed in nitrogen molecule? (Board 2014,17) 09204026</p> <p>Q8. Differentiate between lone pair and bond pair of electrons. (Board 2015) 09204027</p> <p>Q9. Describe at least two necessary conditions for the formation of a covalent bond.
09204028</p> |
|--|---|

Q10. Why HCl has dipole-dipole forces of attraction?

09204029

Q11. What is a triple covalent bond? Explain with an example. (Board 2014)

09204030

Q12. What is difference between polar and non-polar covalent bonds? Explain with one example of each. (Board 2016)

09204031

Q13. Why does a covalent bond become polar? (Board 2015,17)

09204032

Q14. What is the relationship between electronegativity and polarity?

09204033

Q15. Why does ice float on water?

(Board 2016,17,18)

09204034

Q16. Give the characteristic properties of ionic compounds.

09204035

Q17. What characteristic properties do the covalent compounds have? (Board 16)

09204036

Additional Short Answers Questions

Q18. Why are noble gases non-reactive in nature?

(Board 2017)

09204037

Q19. How can an atom complete its octet?

09204038

Q20. When are atoms considered to be unstable?

09204039

Q21. What is meant by a chemical bond?

09204040

Q22. What is meant by duplet rule?

(Board 2013)

09204041

Q23. What is meant by octet rule?

(Board 2014)

09204042

Q24. What would be the effect, when two approaching atoms come closer to each other?

09204043

Q25. What is the effect of attractive and repulsive forces in the formation of a chemical bond?

09204044
Q26. What is meant by bonding electrons?

09204045

Q27. Name different types of chemical bonds.

09204046

Q28. Define ionic bond with an example.

(Board 2016)

09204047

Q29. What is meant by covalent bond?

09204048

Q30. What is meant by single covalent bond? Give examples. (Board 2018)

09204049

Q31. What is meant by double covalent bond? Give examples. (Board 2014)

09204050

Q32. Describe Lewis structure diagram.

09204051

Q33. Define coordinate covalent bond.

(Board 2018)

09204052

Q34. How is coordinate covalent bond formed in NH_4^+ ?

09204053

Q35. Draw Lewis dot and cross structure of ammonia molecule.

09204054

Q36. Draw Lewis dot and cross structure of nitrogen molecule.

09204055

Q37. How is coordinate covalent bond formed between NH_3 and BF_3 ?

09204056

Q38. Draw Lewis dot and cross structure of methane.

09204057

Q39. Draw Lewis dot and cross structure of ethene.

09204058

Q40. Draw Lewis dot and cross structure of ethyne.

09204059

Q41. What is meant by non-polar covalent bond? Give examples. (Board 2014-16)

09204060

Q42. What is meant by polar covalent bond? Give examples. (Board 2014)

09204061

Q43. What is meant by electronegative atom?

09204062

Q44. Give the formation of polar covalent bond in HCl molecule.

09204063

Q45. What is the effect of electronegativity in the formation of an ionic bond?

09204064

Q46. How do electronegativity values help us to predict the formation of a chemical bond?

09204065

Q47. What is meant by metallic bond?

(Board 2013,17)

09204066

Q48. What is meant by Van der Waals forces?

09204067

Q49. Draw a schematic diagram of copper wire showing metallic bonding.

09204068

Q50. What is meant by hydrogen bonding?

(Board 2014, 16,17)

09204069

Q51. Draw a structure of water molecules showing hydrogen bonding.

(Board

2017) 09204070

Q52. What are ionic compounds? Give examples.

09204071

Q53. When are covalent compounds considered to be good conductors of electricity?

09204072

Q54. Why do coordinate covalent compounds not form ions in water?

09204073

Q55. Polymers or resins used in synthetic adhesives belong to which category?

09204074

Q61. Differentiate between polar and non-polar compounds.

09204080

Q56. Give composition of epoxy.

09204075

Q57. Give uses of adhesives.

09204076

Q58. What are the applications of epoxy adhesives?

09204077

Q59. What properties are shown by the presence of different types of chemical bonds between atoms of metals?

09204078

Q60. How is metallic bond formed?

09204079

Q62. What type of attractive forces exist in ionic compounds?

09204081

Q62a. Differentiate between donor and acceptor atom.

(Board 2018)

09204080(a)

Test yourself 4.1

Q63. Why does sodium form a chemical bond with chlorine? (Board 2014)

09204082

Q64. Why does sodium lose an electron and attains (+1) charge?

09204083

Q65. How do atoms follow octet rule?

(Board 2014)

09204084

Q66. Which electrons are involved in chemical bonding?

09204085

Q67. Why does group 1 elements prefer to combine with group 17 elements?

09204086

Q68. Why can chlorine accept only one electron?

(Board 2014)

09204087

Test yourself 4.2

Q69. Give the electronic configuration of carbon atom.

09204088

Q70. What type of elements have tendency of sharing of electrons?

09204089

Q71. If repulsive forces dominate to attractive forces, will a covalent bond form?

09204090

Q72. Considering the electronic configuration of nitrogen atom, how many electrons are involved in bond formation and what type of covalent bond is formed?

09204091

Q73. Point out the type of covalent bonds in the following molecules:

09204092

CH₄, C₂H₄, H₂, N₂ and O₂

Q74. What is lone pair? How many lone pair of electrons are present on nitrogen in ammonia?

(Board 2013)

09204093

Q75. Why is the BF₃ electron deficient?

09204094

Q76. What type of electron pairs make a molecule good donor?

09204095

Q77. What is the difference between bonded and lone pair of electron and how many bonded pair of electrons are present in NH₃ molecule?

09204096

Q78. What do you mean by delta sign and why does it develops?

09204097

Q79. Why does oxygen molecule not form a polar covalent bond?

09204098

Q80. Why water molecules carries polar covalent bonds?

09204099

Test yourself 4.3

Q81. What type of elements form metallic bonds?

09204100

Q82. Why is the hold of nucleus over the

outermost electrons in metals remain weak?

09204101

Q83. Why do the electrons move freely in metals?

09204102

Q84. Which types of electrons are responsible for holding the atoms together in metals?

09204103

Q85. Why does a dipole develop in a molecule?

09204104

Q86. What do you mean by induced

Q89. Define intermolecular forces: show these forces among HCl molecule.

09204108

dipole?

09204105

Q87. Why are dipole forces of attraction not found in halogen molecules?

09204106

Q88. What types of attractive forces exist between HCl molecules?

09204107

Test yourself 4.4

Q90. Why do the ionic compounds have high melting and boiling points?

09204109

Q91. What do you mean by malleability?

09204110

Q92. Why are ionic compounds easily soluble in water?

09204111

Q93. What type of bond exists in sodium chloride?

09204112

Q94. Why do the covalent compounds of bigger size molecules have high melting points?

09204113

Q95.(a) What is the electronegativity difference between the following pairs of elements (atoms). Predict the nature of the bond between them.

09204114

(a) H and Cl

(b) H and Na

(c) Na and I (d) K and Cl

(b) Comparing the electronegativity differences, arrange these compounds in increasing ionic strength.

09204115

Exercise MCQs

1. Atoms react with each other because:

09204116

- (a) They are attracted to each other
- (b) They are short of electrons
- (c) They want to attain stability
- (d) They want to disperse

2. An atom having six electrons in its valence shell will achieve noble gas electronic configuration by:

09204117

- (a) Gaining one electron
- (b) Losing all electrons

(c) Gaining two electrons

(d) Losing two electrons

3. Considering the electronic configuration of atoms which atom with the given atomic number will be the most stable one?

09204118

- (a) 6
- (b) 8
- (c) 10
- (d) 12

4. Octet rule is:

09204119

- (a) Description of eight electrons
- (b) Picture of electronic configuration
- (c) Pattern of electronic configuration
- (d) Attaining of eight electrons

5. Transfer of electrons between elements result in:

09204120

- (a) Metallic bonding
- (b) Ionic bonding
- (c) Covalent bonding
- (d) Coordinate covalent bonding

6. When an electronegative element combines with electropositive element, the type of bonding is:

09204121

- (a) Covalent
- (b) Ionic
- (c) Polar covalent
- (d) Coordinate covalent

7. A bond formed between two non-metals is expected to be: (Board 2018)

- (a) Covalent

09204122

- (b) Ionic
- (c) Coordinate covalent
- (d) Metallic

8. A bond pair in covalent molecules usually has:

09204123

- (a) One electron
- (b) Two electrons
- (c) Three electrons
- (d) Four electrons

9. Which of the following compounds is non-directional in its bonding? 09204124

- (a) CH₄
- (b) KBr
- (c) CO₂
- (d) H₂O

10. Ice floats on water because:

(Board 2018)

09204125

- (a) Ice is denser than water
- (b) Ice is crystalline in nature
- (c) Water is denser than ice
- (d) Water molecules move randomly

11. Covalent bond involves the:

(Board 2016)

09204126

- (a) Donation of electrons
- (b) Acceptance of electrons
- (c) Sharing of electrons
- (d) Repulsion of electrons

12. How many covalent bonds does C₂H₂ molecule have? (Board 2014)

09204127

- (a) Two
- (b) Three
- (c) Four
- (d) Five

13. Triple covalent bond involves how many electrons?(Board 2015,16,17) 09204128

- (a) Eight
- (b) Six
- (c) Four
- (d) Only three

14. Which pair of the molecules has same type of covalent bonds?

09204129

- (a) O₂ and HCl
- (b) O₂ and N₂
- (c) O₂ and C₂H₄
- (d) O₂ and C₂H₂

15. Identify the compound which is not soluble in water:

09204130

- (a) C₆H₆
- (b) NaCl
- (c) KBr
- (d) MgCl₂

16. Which one of the following is an electron deficient molecule?

(Board 2014,16)

09204131

- (a) NH₃
- (b) BF₃
- (c) N₂
- (d) O₂

17. Identify which pair has polar covalent bonds:

09204132

- (a) O₂ and Cl₂
- (b) H₂O and N₂
- (c) H₂O and C₂H₂
- (d) H₂O and HCl

18. Which one of the following is the weakest force among the atoms? 09204133

- (a) Ionic forces
- (b) Metallic forces
- (c) Intermolecular forces

(d) Covalent forces

Additional MCQs

19. A bond formed due to complete transfer of electrons from one atom to another is called:

09204134

- (a) Covalent bond
- (b) Hydrogen bond
- (c) Ionic bond
- (d) Metallic bond

20. The electronic configuration of sodium atom is:

09204135

- (a) $1s^2 2s^2 2p^6$
- (b) $1s^2 2s^2 2p^5$
- (c) $1s^2 2s^2 2p^6 3s^2$
- (d) $1s^2 2s^2 2p^6 3s^1$

21. How many electrons are there in the valence shell of sodium atom? 09204136

- (a) One
- (b) Two
- (c) Three
- (d) Four

22. The electropositive elements have the tendency to:

09204137

- (a) Gain electrons
- (b) Lose electrons
- (c) Share electrons
- (d) All of these

23. How many valence shell electrons are there in Na^+ ion?

09204138

- (a) 8
- (b) 9
- (c) 10
- (d) 11

24. During the formation of ionic bond, heat is:

09204139

- (a) Absorbed
- (b) Released
- (c) Remains same
- (d) Both a or b

25. Which type of attractive forces are present in ionic compounds?

09204140

- (a) Covalent bonds
- (b) Coordinate covalent bonds
- (c) Metallic bonds
- (d) Electrostatic forces of attraction

26. Covalent bond is most commonly found between the elements of group:

09204141

- (a) 13 to 17
- (b) 1 to 13
- (c) 16 to 18
- (d) 15 to 18

27. A bond formed by the mutual sharing of an electron pair is called:

09204142

- (a) Ionic bond
- (b) Covalent bond
- (c) Coordinate covalent bond
- (d) Metallic bond

28. A covalent bond formed by the mutual sharing of two pairs of electrons between bonded atoms is called: 09204143

- (a) Single covalent bond
- (b) Double covalent bond
- (c) Triple covalent bond
- (d) Polar covalent bond

29. Which molecule contains a single covalent bond?

09204144

- (a) CH_4
- (b) C_2H_4
- (c) C_2H_2
- (d) O_2

30. Nitrogen molecule contains:

09204145

- (a) Polar covalent bond
- (b) Single covalent bond
- (c) Double covalent bond
- (d) Triple covalent bond

31. How many electrons are involved in the

(Board 2015)

formation of single covalent bond?

- (a) One
- (b) Two 09204146
- (c) Three
- (d) Four

32. Dative covalent bond is also known as:

- (a) Coordinate covalent bond

09204147

- (b) Covalent bond
- (c) Ionic bond
- (d) Metallic bond

33. How many lone pairs are present on nitrogen in ammonia molecule? 09204148

- (a) One
- (b) Two
- (c) Three
- (d) Four

34. Which type of bond is present between NH_3 and BF_3 ?

09204149

- (a) Covalent bond
- (b) Coordinate covalent bond
- (c) Ionic bond
- (d) Metallic bond

35. A covalent bond formed by two similar atoms is known as: (Board 2014)

09204150

- (a) Polar covalent bond
- (b) Non-polar covalent bond
- (c) Metallic bond
- (d) Double covalent bond

36. Which of the following is an example of polar covalent compound? (Board 2016)

- (a) HCl
- (b) Cl_2 09204151
- (c) O_2
- (d) H_2

37. The difference between electronegativities of hydrogen and chlorine: 09204152

- (a) 1.0
- (b) 2.0
- (c) 3.0
- (d) 0.9

38. The electronegativity of hydrogen atom is:

09204153

- (a) 2.0
- (b) 2.2

- (c) 3.0

- (d) 2.1

39. Which sign indicates partial positive and partial negative charge?

09204154

- (a) δ

- (b) π

- (c) σ

- (d) None of these

40. The nature of a chemical bond can be predicted by using:

09204155

- (a) Electron affinity values
- (b) Electronegativity values
- (c) Ionization energy values
- (d) All of the above

41. A covalent bond is formed by the elements having :

09204156

- (a) Low electronegative values
- (b) High electronegative values
- (c) Comparable electronegative values
- (d) High electron affinity values

42. If the difference of electronegativities between two elements is more than 1.7, the bond will be :

09204157

- (a) Ionic bond
- (b) Single Covalent bond
- (c) Double Covalent bond
- (d) Metallic bond

43. If the difference of electronegativities between two elements is less than 1.7, the bond will be :

09204158

- (a) Ionic bond
- (b) Covalent bond
- (c) Metallic bond
- (d) All of these

44. In metals, the hold of nucleus over the valence shell electrons is weak due to:

- (a) Large sized atoms

09204159

- (b) High ionization energies
- (c) High electron affinities
- (d) All of the above

45. Metals have the tendency to lose electrons due to:

09204160

- (a) High ionization energy
- (b) Low electron affinity
- (c) Low ionization energy
- (d) None of the above

46. The mobile electrons are responsible for holding the atoms of metals together, forming a:

09204161

- (a) Ionic bond
- (b) Covalent bond
- (c) Hydrogen bond
- (d) Metallic bond

47. The energy required to break the intermolecular forces between one mole of liquid hydrogen chloride molecule to convert it into gas is:

09204162

- (a) 22 kJ
- (b) 32 kJ
- (c) 132 kJ
- (d) 17 kJ

48. The energy required to break the chemical bond between hydrogen and chlorine atoms in 1 mole of hydrogen chloride is:

09204163

- (a) 320 kJ
- (b) 430 kJ
- (c) 365 kJ
- (d) 410 kJ

49. Intermolecular forces are collectively known as:

09204164

- (a) Vander Waals forces
- (b) Electrostatic forces
- (c) Adhesive forces
- (d) Dipole-dipole forces

50. Hydrogen bonding is always found in:

09204165

- (a) Non-polar molecules
- (b) Polar molecules
- (c) homoatomic molecules
- (d) All of the above

51. The force of attraction between water molecules is:

09204166

- (a) Ionic bonding
- (b) Covalent bonding
- (c) Hydrogen bonding
- (d) Coordinate covalent bonding

52. The boiling point of water is:

09204167

- (a) 0 °C
- (b) 35 °C
- (c) 100 °C
- (d) 25 °C

53. The boiling point of alcohol is:

09204168

- (a) 44 °C
- (b) 19 °C
- (c) 53 °C
- (d) 78 °C

54. Water has high boiling points as compared to alcohol due to:

09204169

- (a) Hydrogen bonding
- (b) High vapour pressure
- (c) Low density
- (d) High surface tension

55. The density of ice at 0°C is:

09204170

- (a) 0.917 g/cm³
- (b) 1.24 g/cm³
- (c) 1.7 g/cm³
- (d) 2.17 g/cm³

56. The density of water at 0°C is:

09204171

- (a) 2.0 g/cm³
- (b) 1.00 g/cm³
- (c) 0.70 g/cm³
- (d) 1.17 g/cm³

57. The compounds formed by opposite charges are known as :

09204172

- (a) Non-polar Covalent compounds
- (b) Ionic compounds
- (c) Metallic solids
- (d) None of the above

58. Ionic compounds are good conductors of electricity in:

09204173

- (a) Solid state
- (b) Molten state
- (c) Solution
- (d) Both b and c

59. Ionic compounds have:

09204174

- (a) High melting and boiling points
- (b) High melting and low boiling points
- (c) Low melting and high boiling points
- (d) Low melting and boiling points

60. The melting point of NaCl is:

09204175

(Board 2014)

- (a) 318 °C
- (b) 1000 °C
- (c) 510 °C
- (d) 800 °C

61. The boiling point of NaCl is:

(Board

2018)

09204176

- (a) 2000 °C
- (b) 1413 °C
- (c) 1215 °C
- (d) 1510 °C

62. Which of the following is an example of a covalent compound?

09204177

- (a) $C_6H_{12}O_6$
- (b) CH_4
- (c) H_2SO_4
- (d) All of these

63. At room temperature, higher molecular mass covalent compounds are:

09204178

- (a) Solids
- (b) Liquids
- (c) Gases
- (d) All of these

64. Non-polar compounds are insoluble in:

09204179

- (a) Water
- (b) Benzene
- (c) Ether
- (d) Alcohol

65. The electronegativity value of fluorine is:

09204180

- (a) 1.0
- (b) 2.0
- (c) 3.0
- (d) 4.0

66. The electronegativity value of atoms is given by which scale?

09204181

- (a) pH
- (b) Pauling
- (c) pOH
- (d) None of these

67. Which of the following do not show ions in water?

09204182

- (a) Polar Covalent compounds
- (b) Ionic compounds
- (c) Coordinate covalent compounds
- (d) All of the above

68. Malleability is the property by virtue of which a metal can be drawn into:

- (a) Sheets
- (b) Wires
- (c) Rods
- (d) Plates

69. Metals usually have: (Board 2015)

09204184

- (a) High ionization energy
- (b) Low ionization energy
- (c) High electron affinity
- (d) High electronegativity

70. Metals are good conductors of heat and electricity in solid and liquid state due to:

09204185

- (a) Mobile electrons
- (b) Lone pair electrons
- (c) Bond pair electrons
- (d) All of the above

71. Which type of adhesives is less expensive to produce?

09204186

- (a) Synthetic
- (b) Natural
- (c) Both (a) and (b)
- (d) None of the above

72. Epoxy adhesives can be made:

09204187

- (a) Flexible or rigid
- (b) Transparent or opaque
- (c) Coloured
- (d) All of the above

73. Epoxy adhesives are:

09204188

- (a) Good heat resistant
- (b) Good chemical resistant
- (c) Both (a) and (b)
- (d) None of the above

74. **Epoxy adhesives are also known as:**

- (a) Medical adhesives

09204189

- (b) Engineering adhesives
- (c) Surgical adhesives
- (d) All of the above

75. **The forces responsible for binding the atoms together in a molecule are called:**

09204190

- (a) Hydrogen bond
- (b) Ionic bond
- (c) Chemical bond
- (d) Covalent bond

76. **Atoms achieve stability by attaining electronic configuration of:**

09204191

- (a) Alkali metals
- (b) Inert gases
- (c) Alkaline earth metals
- (d) Coinage metals

77. **Attaining two electrons in the valence shell is called:**

09204192

- (a) Duplet rule
- (b) Triplet rule
- (c) Octet rule
- (d) All of these

78. **All the noble gases have their valence electrons:**

09204193

- (a) Partially filled
- (b) Completely filled
- (c) Incomplete
- (d) None of the above

79. **Noble gases are non-reactive, because they do not:**

09204194

- (a) Gain electrons
- (b) Lose electrons
- (c) Share electrons
- (d) All of these

80. **Every atom has a natural tendency to accommodate electrons in its valence shell:**

09204195

- (a) 2 or 6
- (b) 2 or 4
- (c) 2 or 8
- (d) 2 or 10

81. **The position of an atom in the periodic table indicates its:**

09204196

- (a) Period number
- (b) Group number
- (c) Number of neutrons
- (d) Number of electrons

82. **How many valence shell electrons are there in group 1 elements?**

09204197

- (a) One
- (b) Two
- (c) Three
- (d) Four

83. **Mode of reaction of an element depends upon its:**

09204198

- (a) Number of valence shell electrons
- (b) Number of shells
- (c) Number of neutrons
- (d) Atomic size

84. **Hydrogen and Helium follow:**

09204199

- (a) Octet rule
- (b) Duplet rule
- (c) Triplet rule
- (d) None of these

85. **The formation of ionic bond between two ions is due to:**

09204200

- (a) Hydrogen bonding
- (b) Metallic forces
- (c) Electrostatic forces
- (d) All of the above

86. **Which force becomes operative, when two atoms come closer to each other?**

- (a) Attractive forces

09204201

- (b) Repulsive forces
- (c) Both (a) and (b)
- (d) None of the above

87. **The formation of a chemical bond is a result of dominant net:**

09204202

- (a) Attractive forces

(Board 2015)

- (b) Repulsive forces
(c) Both (a) and (b)
(d) None of the above

88. A molecule is formed, when energy of a system:

09204203

- (a) Remains same (b) Decreases
(c) Increases (d)

Shows variability

89. The valence electrons, which are involved in chemical bonding, are termed as:

09204204

- (a) Lone pair electrons
(b) Bonding electrons
(c) High energy electrons
(d) Low energy electrons

90. Which group of the periodic table has the tendency to gain electrons? 09204205

- (a) Group 1
(b) Group 18
(c) Group 2
(d) Group 17

91. The electronegative elements have:

- (a) High electron affinities

09204206

- (b) Low electron affinities
(c) Large atomic sizes
(d) High melting points

92. Which of the following is a building block of matter?

09204207

- (a) Atom (b)
Molecule
(c) Element (d)
Compound

93. Number of bond pair electrons in nitrogen molecule is: (Board 2014) 09204208

- (a) 2
(b) 4
(c) 6
(d) 8

94. The atom which donates electron pair in Dative covalent bond is called:

09204209

(Board 2014)

- (a) Acceptor (b)

Donor

- (c) Electronegative (d) Ionic bond

95. Types of chemical bonds are: 09204210
(Board 2014)

- (a) 1
(b) 2
(c) 3
(d) 4

96. Which type of force is present in hydrogen bonding? (Board 2015) 09204211

- (a) Intermolecular force

(b) Ionic force
(c) Covalent force

- (d) Metallic force

97. Which one has non-polar covalent bond? (Board 2013, 14)

09204212

- (a) HF
(b) H₂O
(c) N₂
(d) HCl

98. Which compound has hydrogen bonding?

(Board 2013) 09204213

- (a) CH₄
(b) Cl₂
(c) H₂
(d) H₂O

99. Which pair has single covalent bond?

- (a) CH₄ and C₂H₄ (Board 2013)
09204214
(b) CH₄ and CH₃Cl
(c) CH₄ and C₂H₂

- (d) CH₄ and CO₂

100. Methane is an example of: 09204215

(Board 2018)

- (a) Single covalent bond
(b) Double covalent bond
(c) Triple covalent bond
(d) Dative covalent bond

UNIT 05

PHYSICAL STATES OF MATTER

Q1. Explain the typical properties of gases.

09205001

Q2.(Ex. Q.1) Define Boyle's law and verify it with an example.

(Board 2014,16,17)

09205002

Q3. In which units is blood pressure measured?

09205003

Q4.(Ex. Q.2) Define and explain Charles Law of gases.

(Board 2014,17,18)

09205004

Q5. Explain Absolute Temperature Scale.

09205005

Q6. Explain the role of intermolecular forces in physical states of matter.

09205006

Q7. Define and explain Evaporation Process.

09205007

Q8. Explain the factors affecting evaporation.

09205008

Q9. (Ex. Q.3) What is vapour pressure and is how it affected by intermolecular forces?

09205009

Q10. Describe the factors affecting vapour pressure.

(Board 2013)

09205010

Q11.(Ex. Q.4) Define Boiling Point and also explain, how it is affected by different factors.

Q12. Explain Freezing point. / What is meant by freezing point of a liquid?

09205012

Q13.(Ex. Q.5) Describe the phenomenon of diffusion in liquids along with factors which influence it.

09205013

Q14. Explain the density of liquids.

09205014

Q15. Explain typical properties of solid state.

09205015

Q16.(Ex. Q.6) Differentiate between crystalline and amorphous solids. (Board 2014, 15) 09205016

Q17. Define Allotropy and explain it with examples.

(Board 2018)

09205017

Q18. Explain the curing with salt to preserve meat.

09205018

Q19. Explain change of instrumentation as the science progresses.

09205019

Book Examples

Example 5.1

09205020

A gas with volume 350 cm^3 has a

pressure of 650 mm of Hg. If its pressure is reduced to 325 mm of Hg, calculate what will be its new volume?

Example 5.2

09205021

785 cm³ of a gas was enclosed in a container under a pressure of 600 mm Hg. If volume is reduced to 350 cm³, what will be the pressure?

Example 5.3

09205022

A sample of oxygen gas has a

volume of 250 cm³ at -30 °C. If gas is allowed to expand up to 700 cm³ at constant pressure, find out its final temperature.

Example 5.4

09205023 A

sample of hydrogen gas occupies a volume 160 cm³ at 30°C. If its temperature is raised to 100°C, calculate what will be its volume if the pressure remains constant.

Exercise Numericals

1) Convert the following units:

09205024

- a. 850 mm Hg to atm
- b. 205000 Pa to atm.
- c. 560 torr to cm Hg
- d. 1.25 atm to Pa

2) Convert the following units:

09205025

- a. 750°C to K
- b. 150°C to K
- c. 100 K to °C
- d. 172 K to °C

3) A gas at pressure 912 mm of Hg has volume 450cm³. What will be its volume at 0.4 atm? (Board 2015)

09205026

4) A gas occupies a volume of 800 cm³ at 1atm, when it is allowed to expand up to 1200 cm³ what will be its pressure in mm of Hg.

09205027

5) It is desired to increase the volume of a fixed amount of gas from 87.5 to 118 cm³ while holding the pressure constant. What would be the final temperature if the

initial temperature is 23 °C?

09205028

6) A sample of gas is cooled at constant pressure from 30°C to 10°C. Comment:

a. Will the volume of the gas decrease to one third of its original volume?

b. If not, then by what ratio will the volume decrease?

09205029

7) A balloon that contains 1.6 dm³ of air at standard temperature (0°C or 273.15K) and pressure (1 atm) is taken under water to a depth at which its pressure increases to 3.0 atm. Suppose that temperature remains unchanged, what would be the new volume of the balloon. Does it contract or expand?

8) A sample of neon gas occupies 75.0 cm³ at very low pressure of 0.4 atm. Assuming temperature remains constant what would be the volume at 1.0 atm. pressure? 09205031

9) A gas occupies a volume of 35.0 dm³ at 17°C. If the gas temperature rises to 34°C

at constant pressure, would you expect the volume to double? If not calculate the new volume.

09205032

10) The largest moon of Saturn is Titan. It has atmospheric pressure of 1.6×10^5 Pa. What is the atmospheric

pressure in atm? Is it higher than earth's atmospheric pressure?

09205033

Exercise Short Answers Questions

Q1. What is diffusion? Explain with an example. (Board 2014, 2015,16,17,18)09205034

Q2. Define standard atmospheric pressure. What are its units? How is it related to Pascal? (Board 2016)

09205035

Q3. Why are the densities of gases lower than that of liquids?

09205036

Q4. What do you mean by evaporation?

How is it affected by surface area?

(Board 2014) 09205037

Q5. Define the term allotropy with examples. (Board 2015)

09205038

Q6. In which form does sulphur exist at 100°C ?

(Board 2017,18) 09205039

Q7. What is the relationship between evaporation and boiling point of a liquid?

09205040

Additional Short Answers Questions

Q8. Define Matter.

09205041

Q9. Write down the names of different states of matter.

09205042

Q10. Describe gaseous state of matter.

09205043

Q11. Define Effusion. On what factor does it depend?

(Board 2017) 09205044

Q12. Define Pressure. Write down its SI unit.

(Board 2014)

09205045

Q13. Write down the names of instruments with the help of which we measure the pressure.

09205046

Q14. Describe the mobility of gas molecules. (Board 2017)

09205047

Q15. Define Boyle's law. (Board 2014)

09205048

Q16. Define Charles's law. Also write its mathematical representation.

09205049

Q17. What is normal body temperature?

09205050

Q18. What is meant by liquid?

09205051

Q19. What are the factors affecting evaporation?

09205052

Q20. Explain evaporation causes cooling.

(Board 2013, 15,18)

09205053

Q21. Define vapour pressure.

09205054

Q22. Enlist the factors on which vapour pressure depends.

09205055

Q23. Define boiling point. (Board 2013, 15)

09205056

Q24. Enlist the factors on which boiling point depends.

09205057

Q25. Define freezing point.

09205058

Q26. On which factors does diffusion of liquid depend?

09205059

Q27. Describe density of liquid.

09205060

Q28. What is meant by solid?

09205061

Q29. Define melting point. Describe melting and boiling point of solids.

09205062

Q30. Explain the rigidity of solid.

09205063

Q31. Explain density of solid.

09205064

Q32. Define amorphous solids. Give examples.

(Board 2016,17)

09205065

Q33. Define crystalline solids. Give examples.

(Board 2016)

09205066

Q34. Define transition temperature. Give examples.

(Board 2016)

09205067

Q.35. Write reasons for allotropy.

09205068

Test yourself 5.1

Q36. Why is the rate of diffusion of gases rapid than that of liquids?

09205069

Q37. Why are the gases compressible?

09205070

Q38. What do you mean by Pascal? How many Pascals are equal to 1atm?

09205071

Q39. Why the density of a gas increases on cooling?

(Board 2016)

09205072

Q40. Why is the density of gas measured in gdm^{-3} , while that of a liquid is expressed in gcm^{-3} ?

09205073

Q41. Convert the following:

09205074

a) 70 cm Hg to atm

b) 3.5 atm to torr

c) 1.5 atm to Pa

Test yourself 5.2

Q42. Is the Boyle's law applicable to liquids?

09205075

Q43. Is the Boyle's law valid at very high temperature?

09205076

Q44. What will happen if the pressure on a sample of gas is raised three times and its temperature is kept constant?

09205077

Test yourself 5.3

Q45. Which variables are kept constant in Charles's Law?

09205078

Q46. Why does volume of gas decrease with increase of pressure?

09205079

Q47. What is absolute zero?

09205080

Q48. Does Kelvin scale show a negative temperature?

09205081

Q49. When a gas is allowed to expand, what will be its effect on its temperature?

09205082

Q50. Can you cool a gas by increasing its volume?

09205083

Test yourself 5.4

Q51. Why does evaporation increase with the increase of temperature?

09205084

Q52. What do you mean by condensation?

(Board 2014)

09205085

Q53. Why is vapour pressure higher at high temperature? (Board 2014)

09205086

Q54. Why is the boiling point of water higher than that of alcohol?

09205087

Q55. What do you mean by dynamic equilibrium?

09205088

Q56. Why are the rates of diffusion in liquids slower than that of gases?

09205089

Q57. Why does rate of diffusion increase with increase of temperature?

09205090

Q58. Why are liquids mobile?

09205091

Test yourself 5.5

Q59. Which form of sulphur exists at room temperature?

09205092

Q60. Why is white tin available at room temperature?

09205093

Q61. Why is the melting point of a solid considered its 'identification' characteristics?

09205094

Q62. Why do amorphous solids not have sharp melting points while crystalline solids do have?

09205095

Q63. Which is lighter one: aluminum or gold?

09205096

Q64. Write the molecular formula of a sulphur molecule.

09205097

Q65. Which allotropic form of carbon is stable at room temperature (25°C)?

09205098

Q66. State whether allotropy is shown by elements or compounds or both.

09205099

Exercise MCQs

1. How many times liquids are denser than gases?

09205100

- (a) 100 times
- (b) 1000 times
- (c) 10,000 times
- 100,000 times

(d)

2. Gases are the lightest form of matter and their densities are expressed in terms of:

09205101

- (a) mg cm^{-3}
- (b) g cm^{-3}
- (c) g dm^{-3}

(d) kg dm^{-3}

3. At freezing point which one of the following coexists in dynamic equilibrium:

09205102

- (a) Gas and solid (b) Liquid and gas
(c) Liquid and solid (d) All of these

4. Solid particles possess which one of the following motions?

09205103

- (a) Rotational motions
(b) Vibrational motions
(c) Translational motions
(d) Both translational and vibrational motions

5. Which one of the following is not amorphous?

(Board 2013,16,17)

09205104

- (a) Rubber
(b) Plastic
(c) Glass
(d) Glucose

6. One atmospheric pressure is equal to how many Pascals:(Board 2014,18)09205105

- (a) 101325
(b) 10325
(c) 106075
(d) 10523

7. In the evaporation process, liquid molecules which leave the surface of the liquid have:

09205106

- (a) Very low energy
(b) Moderate energy

(c) Very high energy

(d) None of the above

8. Which one of the following gas diffuses fastest?

(Board 2017)

09205107

- (a) Hydrogen
(b) Helium
(c) Fluorine
(d) Chlorine

9. Which one of the following does not affect the boiling point?

09205108

- (a) Intermolecular forces
(b) External pressure
(c) Nature of liquid
(d) Initial temperature of liquid

10. Density of a gas increases, when its:

(a) Temperature is increased

09205109

- (b) Pressure is increased
(c) Volume is kept constant
(d) None of the above

11. The vapour pressure of a liquid increases with the:

09205110

- (a) Increase of pressure
(b) Increase of temperature
(c) Increase of intermolecular forces
(d) Increase of polarity of molecules

Additional MCQs

12. How many states of matter exist?

- (a) One
(b) Two
(c) Three
(d) Four

09205111

13. In which state matter does not have definite shape and volume?

09205112

- (a) Solid
(b) Liquid
(c) Gas
(d) All of these

14. Pressure is a significant property of:

- (a) Solid
(b) Liquid
(c) Gas
(d) None of these

09205113

15. Rate of diffusion depends upon the:

(a) Shape of the gas molecules

09205114

- (b) Size of the gas molecules
(c) Molecular mass of the gas
(d) All of the above

16. How many times does hydrogen gas

diffuse faster than oxygen gas?
09205115

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

17. A tyre gets punctured is the example of:

(Board 2015) 09205116

- (a) Diffusion
- (b) Effusion
- (c) Pressure
- (d) Volume

18. The S.I unit of pressure is:

09205117

- (a) Nm^2
- (b) Nm^{-2} (Board 2013)
- (c) Nm^3
- (d) Nm^{-3}

19. Which one is used to measure atmospheric pressure?

09205118

- (a) Barometer
- (b) Manometer
- (c) Thermometer
- (d) Galvanometer

20. Which one is used to measure pressure in the laboratory?

09205119

- (a) Barometer
- (b) Manometer
- (c) Thermometer (d)
- Galvanometer

21. 1atm pressure is equal to:

09205120

- (a) 760torr
- (b) 780torr
- (c) 790torr
- (d) 800torr

22. Density of solids is expressed in:

09205121

- (a) g dm^{-3}
- (b) g cm^{-3}
- (c) kg
- (d) g dm^3

23. Density of oxygen gas at 20 °C: 09205122

- (a) 1.2 gdm^{-3}
- (b) 1.3 gdm^{-3}
- (c) 1.4 gdm^{-3}

(d) 1.6 gdm^{-3}

24. Density of oxygen gas at 0°C:

09205123

- (a) 1.1 gdm^{-3}
- (b) 1.2 gdm^{-3}
- (c) 1.4 gdm^{-3}
- (d) 1.5 gdm^{-3}

25. When the pressure of gas is increased from 1atm to 2atm, the volume of the gas reduces from 2dm³ to:

09205124

- (a) 1 dm^3
- (b) 0.5 dm^3
- (c) 3 dm^3
- (d) 4 dm^3

26. When the pressure of gas is increased from 2atm to 4atm, the volume of the gas reduces from 1dm³ to:

09205125

- (a) 0.75 dm^3
- (b) 0.5 dm^3
- (c) 0.33 dm^3
- (d) 0.25 dm^3

27. When the pressure of gas is increased from 2atm to 6atm, the volume of the gas reduces from 1dm³ to:

09205126

- (a) 0.75 dm^3
- (b) 2 dm^3
- (c) 0.5 dm^3
- (d) 0.33 dm^3

28. When the pressure of gas is increased from 2atm to 8atm, the volume of the gas reduces from 1dm³ to:

09205127

- (a) 0.75 dm^3
- (b) 0.5 dm^3
- (c) 0.33 dm^3
- (d) 0.25 dm^3

29. In hypertension, blood pressure is greater than:

09205129

- (a) $\frac{120}{80}$

- (b) $\frac{140}{90}$

- 80
(c) $\frac{90}{90}$
90
(d) 140

30. Body temperature is measured in:

- (a) Celsius scale
09205129
(b) Fahrenheit scale
(c) Kelvin scale
(d) Both (a) & (b)

31. Evaporation is the process:

09205130

- (a) Exothermic (b) Endothermic
(c) Both (a) & (b) (d) None of these

32. On which factor does evaporation depends?

09205131

- (a) Temperature
(b) Surface area
(c) Intermolecular forces
(d) All of the above

33. Vapour pressure of liquid depends upon the factors:

09205132

- (a) Nature of liquid
(b) Size of molecules
(c) Temperature
(d) All of the above

34. At 0°C the vapour pressure of diethyl ether is:

09205133

- (a) 100 mmHg
(b) 200 mmHg
(c) 300 mmHg
(d) 400 mmHg

35. At 0°C the vapour pressure of ethyl alcohol is:

09205134

- (a) 20 mmHg
(b) 22 mmHg
(c) 25 mmHg
(d) 30 mmHg

36. On what factors does the boiling point depend upon?

09205135

- (a) Nature of liquid

- (b) Intermolecular forces
(c) External pressure
(d) All of the above

37. Density of liquid is expressed in: 09205136

- (a) gdm^3
(b) gdm^{-3}
(c) gcm^3
(d) gcm^{-3}

38. Which state of matter has fixed shape and volume?

09205137

- (a) Solid
(b) Liquid
(c) Gas
(d) All of these

39. Density of aluminum is:

09205138

- (a) 2 gcm^{-3}
(b) 2.60 gcm^{-3}
(c) 2.70 gcm^{-3}
(d) 2.80 gcm^{-3}

40. Density of iron is:

09205139

- (a) 7 gcm^{-3}
(b) 7.86 gcm^{-3}
(c) 7.90 gcm^{-3}
(d) 7.92 gcm^{-3}

41. Density of gold is:

09205140

- (a) 9 gcm^{-3}
(b) 9.2 gcm^{-3}
(c) 19.3 gcm^{-3}
(d) 9.4 gcm^{-3}

42. Example of amorphous solid is: 09205141

- (a) Plastic
(b) Glass
(c) Rubber
(d) All of these

43. Which one is crystalline solid? 09205142

- (a) Diamond (b) Sodium chloride
(c) Plastic (d) Both
(a) and (b)

44. Allotropes of oxygen are:

09205143

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

45. The temperature at which two allotropic forms co-exist is called:

(a) Absolute temperature

09205144

(b) Transition temperature

(c) Normal temperature

(d) Standard temperature

46. Transition temperature of phosphorous is:

09205145

(a) 200°C

(b) 220°C

(c) 250°C

(d) 260°C

47. Transition temperature of tin is:

09205146

(a) 15°C

(b) 13.2°C

(c) 20°C

(d) 22°C

48. Blood pressure of a healthy / normal person is:

(Board 2014)

09205147

(a) $\frac{120}{80} mmHg$

(b)

$\frac{140}{90} mmHg$

(c) $\frac{110}{100} mmHg$

(d)

$\frac{150}{70} mmHg$

49. In Charles law, “K” is equal to:

(Board 2015)

09205148

(a) $\frac{T}{V}$

(b) TV

(c) $\frac{V}{T}$

(d) $\frac{V}{P}$

50. The simplest form of matter is:

(Board 2014)

09205149

(a) Gas

(b) Liquid

(c) Solid

(d)

Both ‘b’ and ‘c’

51. Normal body temperature of humans is:

(Board 2014)

09205150

(a) $37^{\circ}C$

(b)

$38^{\circ}C$

(c) $39^{\circ}C$

(d)

$40^{\circ}C$

UNIT 06

SOLUTIONS



Q1. Define the following:

09206001

- | | |
|--------------------------|----------------------|
| i. Solution | ii. Aqueous solution |
| iii. Universal Solvent | |
| iv. Solute | v. Solvent |
| vi. Unsaturated Solution | |

Q2.(Ex. Q.1) What is saturated solution and how is it prepared? (Board 2015)

09206002

Q3. Define supersaturated solution and how is it prepared?

09206003

Q4.(Ex. Q.2) Differentiate between dilute and concentrated solutions with a common example.

Q5. Write down the types of solutions with examples.

09206005

Q6. What is meant by concentration of solution? Describe concentration units.

09206006

Q7.(Ex. Q.4) What is Molarity and give its formula to prepare molar solution.

09206007

Q8.(Ex. Q.3) Explain, how dilute solutions are prepared from concentrated solutions?

(Board 2016)

09206008

Q9.(Ex. Q.6) What is solubility? Describe its general principle. (Board 2016,17)

09206009

Q10. (Ex. Q.5) Explain solute – solvent interaction for the preparation of solution.

09206010

Q11.(Ex. Q.7) Discuss the effect of temperature on solubility. (Board 2013, 14, 15,16)

09206011

Q12.(Ex. Q.8) Give five characteristics of colloids.

(Board 2017)

09206012

Q13.(Ex. Q.9) Give at least five characteristics of suspensions.

(Board 2018)

09206013

Q14. Define true solution, suspension and colloid with examples.

09206014

Q15. Give comparison of the characteristics of Solution, Colloid and Suspension.

09206015

Q16. Write the relationship of solutions to different products in the community.

09206016

Book Examples

Example 6.1

09206017

If we add 5cm^3 of acetone in water to prepare 90cm^3 of aqueous solution. Calculate the concentration (v/v) of this solution.

Example 6.2

09206018

Calculate the molarity of a solution which is prepared by dissolving 28.4g of Na_2SO_4 in 400cm^3 of solution.

Example 6.3

09206019

How much NaOH is required to prepare its 500 cm^3 of 0.4 M solution?

Example 6.4

09206020

10cm^3 of 0.01 molar KMnO_4 solution has been diluted to 100cm^3 . Find out the molarity of this solution.

Q1. A solution contains 50g of sugar dissolved in 450g of water. What is the concentration of this solution?

09206021

Q2. If 60cm^3 of alcohol is dissolved in 940cm^3 of water. What is the concentration of this solution?

09206022

Q.3. How much salt will be required to prepare following solutions (atomic masses:
09206023

$\text{K} = 39$, $\text{Na} = 23$, $\text{S} = 32$, $\text{O} = 16$, $\text{H} = 1$)

(a) 250cm^3 of KOH solution of 0.5M

(b) 600cm^3 of NaNO_3 solution of 0.25M

(c) 800cm^3 of Na_2SO_4 solution of 1.0M

Q4. When we dissolve 20g of NaCl in 400cm^3 of solution, what will be its molarity?
09206024

Q5. We desire to prepare 100cm^3 0.4 M solution of MgCl_2 . How much MgCl_2 is needed?

Ans.

09206025

Q.6. 12M H_2SO_4 solution is available in the laboratory. We need only 500cm^3 of 0.1M solution, how will it be prepared?

09206026

Exercise Short Answers Questions

Q1. Why does suspension and solutions not show Tyndall effect while colloids do?

09206027

Q2. What is the reason for the difference between solutions, colloids and suspensions?

(Board 2014) 09206028

Q3. Why does the suspension not form a homogeneous mixture?

09206029

Q4. How will you test whether given solution is colloidal solution or not?

09206030

Q5. Classify the following into true solution and colloidal solution.

Blood, starch solution, Glucose solution, toothpaste, copper sulphate solution, silver nitrate solution.

(Board

2018)

09206031

Q6. Why do we stir paints thoroughly before using?

(Board 2018)

09206032

Q7. Which of the following will scatter light and why?

Sugar solution, Soap solution, Milk of Magnesia

09206033

Q8. What do you mean, like dissolves like? Explain with examples.

09206034

Q9. How does nature of attractive forces of solute-solute and solvent-solvent affect the solubility?

09206035

Q10. How can you explain the solute-solvent interaction to prepare NaCl solution?

09206036

Q11. Justify with example that solubility of a salt increases with increase in temperature.

(Board 2013) 09206037

Q12. What do you mean by volume/volume %?

(Board 2017,18)

09206038

Additional Short Answers Questions

Q13. Define solution.

09206039

Q14. What are physical states of solutions?

09206040

Q15. How is a solution and a pure liquid distinguished?

(Board 2015)

09206041

Q16. Brass and bronze cannot be separated by physical means, yet it is considered a mixture. Why?

09206042

Q17. What is aqueous solution?

09206043

Q18. What is the difference between solute and solvent?

(Board 2013, 14,

15,16)

09206044

Q19. Define a saturated solution and give example.

(Board 2014)

09206045

Q20. Define unsaturated solution.

(Board 2014, 2015,18)

09206046

Q21. Define supersaturated solution.

09206047

Q22. What is concentration of a solution?

09206048

Q23. Define percentage mass / mass (%m/m). (Board 2014,16)

09206049

Q24. What is percentage – mass / volume (%m/v)? (Board 2014) 09206050

Q26. Define Molarity. Write its formula. (Board 2013, 2014,17) 09206052

Q27. Define solubility. (Board 2014) 09206053

Q28. Define colloid. (Board 2015) 09206054

Q29. Define suspension. (Board 2017) 09206055

Q30. Why does solubility of Li_2SO_4 and $\text{Ce}_2(\text{SO}_4)_3$ decrease with the increase of temperature? 09206056

Q31. Write down example of a solution in which solute is liquid and solvent is gas.

(Board 2015) 09206057

Q25. What is percentage volume by mass (%v/m)?

(Board 2014)

09206051

Q32. What is the difference between true solution and a colloidal solution? (Board 2014)
Ans.

09206058

Q33. How one molar solution is prepared?

(Board 2015,16) 09206059

Q34. What is alloy? Give an example.

(Board 2014) 09206060

Test yourself 6.1

Q35. Why is a solution considered mixture?

09206061

Q36. Distinguish between the following pairs as compound or solution.

09206062

a. Water and salt solution

b. Vinegar and benzene

c. Carbonated water and acetone

Q37. What is the major difference between a solution and a mixture? 09206063

Q38. Why are the alloys considered solutions?

09206064

Q39. Dead sea is so rich with salt that it forms crystals when temperature lowers in the winter. Can you comment why is it named as dead sea?

09206065

Test yourself 6.2

Q40. Does the percentage calculation require the chemical formula of the solute?

09206066

Q41. Why is the formula of solute necessary for calculation of the molarity of the solution?

09206067

Q42. You are asked to prepare 15 percent (m/m) solution of common salt. How much

amount of water will be required to prepare this solution?

09206068

Q43. How much water should be mixed with 18cm^3 of alcohol so as to obtain 18% (v/v) alcohol solution?

09206069

Q44. Calculate the concentration % (m/m) of a solution which contains 2.5g of

salt dissolved in 50g of water.

09206070

Q45. Which one of the following solutions is more concentrated: one molar

or three molar?

09206071

Test yourself 6.3

Q46. What will happen if the solute-solute forces are stronger than those of solute-solvent forces?

09206072

Q47. When solute-solute forces are weaker than those of solute-solvent forces, will solution form?

09206073

Q48. Why is iodine soluble in CCl_4 and not in water?

(Board 2018)

09206074

Q49. Why does test tube become cold when KNO_3 is dissolved in water?

09206075

Test yourself 6.4

Q50. What is the difference between colloid and suspension? (Board 2016)

09206076

Q51. Can colloids be separated by filtration, if not why?

09206077

Q52. Why are the colloids quite stable?

09206078

Q53. Why does the colloid show Tyndall effect?

(Board 2013)

09206079

Q54. What is Tyndall effect and on what factors does it depend? (Board 2014)

09206080

Q55. Identify as colloids or suspensions from the following:

(Board 2018)

09206081

Paints, milk, milk of magnesia, soap solution

Q56. How can you justify that milk is a colloid?

09206082

Exercise MCQs

1. Mist is an example of solution:

(Board

2017,18)

09206083

(a) Liquid in gas liquid

(b) Gas in

(c) Solid in gas

(d) Gas in solid

2. Which one of the following is a 'liquid in solid' solution?

(Board 2015)

09206084

(a) Sugar in water

(b) Butter

(c) Opal

(d) Fog

3. Concentration is ratio of:

09206085

(a) Solvent to solute

(b) Solute to solution

(c) Solvent to solution

(d) Both (a) & (b)

4. Which one of the following solutions contains more water?

(Board 2017)

09206086

(a) 2 M

(b) 1M

(c) 0.5M

(d)

0.25M

5. A 5 percent (w/w) sugar solution means that:

09206087

(a) 5g of sugar is dissolved in 90g of water

(b) 5g of sugar is dissolved in 100g of water

(c) 5g of sugar is dissolved in 105g of water

(d) 5g of sugar is dissolved in 95g of water

6. If the solute-solute forces are strong enough than those of solute-solvent forces. The solute:

09206088

(a) Dissolves readily

(b) Does not dissolve

- (c) Dissolves slowly
(d) Dissolves and precipitates.
- 7. Which one of the following will show negligible effect of temperature on its solubility?** (Board 2014) 09206089
- (a) KCl
(b) KNO_3
(c) NaNO_3 (d) NaCl
- 8. Which one of the following is heterogeneous mixture?** 09206090
- (a) Milk
(b) Ink
(c) Milk of magnesia
(d) Sugar solution
- 9. Tyndall effect is shown by** (Board 2016)
- (a) Sugar solution (b) Paints 09206091
(c) Jelly
(d) Chalk solution
- 10. Tyndall effect is due to:** 09206092
- (a) Blockage of beam of light
(b) Non-scattering of beam of light

- (c) Scattering of beam of light
(d) Passing through beam of light
- 11. If 10 cm^3 of alcohol is dissolved in 100 g of water, it is called:** (Board 2017) 09206093
- (a) % w/w
(b) % w/v
(c) % v/w
(d) %v/v
- 12. When a saturated solution is diluted it turns into:** 09206094
- (a) Supersaturated solution
(b) Saturated solution
(c) A concentrated solution
(d) Unsaturated solution
- 13. Molarity is the number of moles of solute dissolved in:** 09206095
- (a) 1 kg of solution
(b) 100 g of solvent
(c) 1 dm^3 of solvent
(d) 1 dm^3 of solution

Additional MCQs

- 14. 10% m/v sugar solution contains 10g of sugar in solution:** 09206096
- (a) 90g
(b) 100g
(c) 100 cm^3 (d) 90 cm^3
- 15. 10% v/m alcohol solution contains 10 cm^3 of alcohol in solution:** 09206097
- (a) 100 cm^3 (b) 100g
(c) 90 cm^3 (d) 90g
- 16. One molar solution contains one mole of solute in volume of:** 09206098
- (a) 100 cm^3 (b) 1 cm^3
(c) 1 dm^3 (d) 10 cm^3
- 17. Ionic solids and polar covalent compounds are soluble in:** 09206099
- (a) Benzene (b) Ether
(c) Water (d) Petrol
- 18. Which one of the following solvents is polar?** 09206100
- (a) Benzene (b) Water
(c) Ether (d) Petrol
- 19. Grease, paints, naphthalene are soluble in:** 09206101
- (a) Water
(b) Ether
(c) Carbon tetrachloride

- (d) Both b and c
- 20. The compound soluble in water is/are:**
(Board 09206102)
2018)
(a) KCl
(b) Na_2CO_3
(c) CuSO_4 (d) All of these
- 21. Solubility of which salt increases with the increase of temperature:**
09206103
(a) KNO_3 (b) NaNO_3
(c) KCl
(d) All of these
- 22. The solubility of which salt decreases with the increase of temperature?**
09206104
(a) KNO_3 (b) NaNO_3
(c) Li_2SO_4 (d) KCl
- 23. Which of the following shows Tyndall effect?**
09206105
(a) Albumin (b) Milk
(c) Paints (d) Both a and b
- 24. Which one is example of colloid?** 09206106
(a) Jelly
(b) Paints
(c) Milk of magnesia (d) None of these
- 25. Which one is a suspension?**
09206107
(a) Blood (b) Toothpaste
(c) Ink
(d) Chalk in water
- 26. Size of particles in true solution is:**
(a) 10^{-2}cm (b) 10^{-8}cm 09206108
(c) 10^{-5}cm (d) 10^{-12}cm
- 27. Butter is example of solution:**
09206109
(a) Gas-gas (b) Liquid-solid
(c) Solid-solid (d) None of these

- 28. Sea water is a source of naturally occurring elements:**
09206110
(a) 18
(b) 92
(c) 118
(d) 95
- 29. Brass is a solid solution of Zn and:**
(a) C
(b) Sn 09206111
(c) Fe
(d) Cu
- 30. Brass and Bronze are considered as:**
(a) Compounds (b) Mixtures
09206112
(c) Elements (d) All of these
- 31. In soft drinks, CO_2 is:**
09206113
(a) Solvent (b) Solute
(c) Solution (d) None of these
- 32. Which salt is used to prepare supersaturated solution?**
09206114
(a) Na_2SO_4 (b) NaCl
(c) $\text{Na}_2\text{S}_2\text{O}_3$ (d) NaHSO_4
- 33. Air is an example of solution:**
(Board 2016)
09206115
(a) Gas in liquid (b) Liquid in liquid
(c) Gas in gas (d) Solid in gas
- 34. Hydrogen absorbed in palladium is an example of solution:**
09206116
(a) Solid in gas (b) Solid in liquid
(c) Gas in gas (d) Gas in solid
- 35. Example of liquid-gas solution is:**
(a) Mist 09206117
(b) Fog
(c) Liquid Air pollutants
(d) All of these
- 36. Smoke in air is example of solution:**

- 09206118
- (a) Gas in gas (b)
- Solid in liquid
- (c) Solid in gas (d) All of these
- 37. Example of solid in solid solution is:**
- (a) Brass (b)
- Bronze 09206119
- (c) Opals (d) All
- of these

38. Example of liquid in liquid is: (Board 2014)

(a) Alcohol in water

09206120

(b) Butter in water

(c) Fog

(d) Mist

39. Which one can easily dissolve in carbon tetrachloride? (Board 2013)

09206121

(a) Sodium Chloride

(b) AgNO_3

(c) Magnesium oxide

(d) Iodine

40. Metal alloys are: (Board 2014, 15) 09206122

(a) Solution of solid in gas

(b) Solution of solid in liquid

(c) Solution of solid in solid

(d) Solution of gas in solid

41. Which one of the following solutions has less water? (Board 2014)

09206123

(a) 0.25M (b)

0.50M

(c) 0.60M (d)

2.0M

42. Which one of the following is suspension?

(Board

2018) 09206124

(a) Milk of magnesia

(b) Sugar Solution

(c) Ink

(d) Milk

43. The example of solution of a solid solute in a solid solvent.

(Board

2018)

(a) Fog (b)

Brass 09206125

(c) Cheese (d)

Air

UNIT 07

ELECTROCHEMISTRY

Long Answers Questions

Q1. Explain oxidation and reduction on basis of addition and removal of hydrogen / oxygen.

09207001

Q2. Explain Oxidation and Reduction in Terms of loss or Gain of Electrons.

09207002

Q3.(Ex. Q.1) Describe the rules for assigning oxidation state. (Board 2013,18)

09207003

Q4. Explain oxidizing and reducing agents with suitable examples. (Board 2015)

09207004

Q5. (Ex. Q.3)How can a non-spontaneous reaction be carried out in an electrolytic cell? Discuss in detail.

09207005

Q6. (Ex. Q.4) Discuss the electrolysis of water. (Board 2014,16,18)

09207006

Q7.(Ex. Q.5)Discuss the construction and working of a cell in which electricity is produced.09207007

OR What is meant by Galvanic cell? Write construction and working of Daniel's cell.

Q8. Give a comparison between Electrolytic and Galvanic cell. (Board 2015)

09207008

Q9. How is sodium metal extracted from fused sodium chloride in Down's Cell?

09207009

Q10.(Ex. Q.6) How can we prepare NaOH on commercial scale? Discuss its chemistry along with diagram.

09207010

Q11.(Ex. Q.7)Discuss the redox reaction taking place in the rusting of iron in detail.

09207011

Q12. What are the methods for the prevention of corrosion?

09207012

Q13.(Ex. Q.8)Discuss, why galvanizing is considered better than that of tin plating?

09207013

Q14.(Ex. Q.9)What is electroplating? Write down procedure of electroplating.

09207014

Q15. Explain electroplating of silver.

(Board 2014)

09207015

Q16. (Ex. Q.10) What is the principle of electroplating? How is electroplating of Chromium (Cr) carried out?

(Board 2015)

09207016

Q17. Describe electrolytic refining of copper.

(Board 2013,17) 09207017

Q18. (Ex. Q.2) Find out the oxidation number of the underlined elements in the following compounds.

(Board 2018)

09207018

- | | | |
|---|------------------------------------|------------------------------------|
| a) Na_2SO_4
(Board 2014) | c) KMnO_4
(Board 2014) | b) AgNO_3
(Board 2014) |
| d) $\text{K}_2\text{Cr}_2\text{O}_7$ | | e) HNO_2 |

Example 7.1

09207019

Find oxidation number of nitrogen in HNO_3 when the oxidation numbers of H = + 1 and O = - 2

(Board 2014, 15)

Example 7.2

09207020

Calculate the oxidation number of sulphur in H_2SO_4 , when O.N. of H = +1 and O.N. of O = - 2.

Example 7.3

(Board 2017)

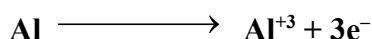
09207021

Find out the Oxidation number of Chlorine in KClO_3 . As O.N of K = + 1 and O. N. of O = - 2.

(Board 2013, 14)

Exercise Short Answers Questions

- Q1. Define oxidation in terms of electrons. Give an example. (Board 2014,17)
09207022
- Q2. Define reduction in terms of loss or gain of oxygen or hydrogen. Give an example.
- Q3. What is difference between valency and oxidation state? (Board 2013, 14)
09207024
- Q4. Differentiate between Oxidizing and reducing agents. (Board 2014)
09207025
- Q5. Differentiate between strong and weak electrolytes.
09207026
- Q6. How is electroplating of tin on steel carried out? (Board 2014)
09207027
- Q7. Why is steel plated with nickel before the electroplating of chromium?
09207028
- Q8. How can you explain, that following reaction is oxidation in terms of increase of oxidation number?
09207029



- Q9. How can you prove with an example that conversion of anion to an

atom is an oxidation process?

09207030

- Q10. Why does the anode carry negative charge in galvanic cell but positive charge in electrolytic cell? Justify with comments.

09207031

- Q11. Where do the electrons flow from Zn electrode in Daniel's Cell?

09207032

- Q12. Why do electrodes get their names 'anode' and 'cathode' in galvanic cell?

09207033

Q13. What happens at the cathode in a galvanic cell?

09207034

Q14. Which solution is used as an electrolyte in Nelson's Cell?

09207035

Q15. Name the by-products produced in Nelson's Cell.

09207036

Q16. Why is galvanizing done?(Board 2014)

09207037

Q17. Why is an iron grill painted frequently? (Board 2014)

09207038

Q18. Why is O₂ necessary for rusting?

(Board 2014)

09207039

Q19. In electroplating of chromium, which salt is used as an electrolyte? (Board 2014)

09207040

Q20. Write the redox reaction taking place during the electroplating of chromium.

09207041

Q21. In electroplating of silver, from where Ag⁺ ions come and where they deposit?

09207042

Q22. What is the nature of electrode used in electroplating of chromium?

09207043

Additional Short Answers Questions

Q23. What is meant by electrochemistry?

09207044

Q24. Define oxidation. (Board 2014)

09207045

Q25. Define reduction. (Board 2014)

09207046

Q26. What is meant by Redox?

(Board 2015,16,17,18)

09207047

Q27. What is meant by oxidizing agent? Give examples.

09207048

Q28. What is meant by reducing agent? Give examples. (Board 2018)

09207049

Q29. What are spontaneous reactions?

09207050

Q30. What are non-Spontaneous reactions?

(Board 2017)

09207051

Q31. What is meant by Oxidation State?

(Board 2015,18) 09207052

Q32. Define valency.

09207053

Q44. Differentiate between Cathode and Anode.

09207065

Q33. What is meant by electrochemical cell?

09207054

Q34. What are electrolytes?

09207055

Q35. What are strong electrolytes?

09207056

Q36. What are weak electrolytes? Give examples. (Board 2013, 14,

15)

09207057

Q37. What are non-Electrolytes?

(Board

2015,16,17,18)

09207058

Q38. What is meant by electrolytic cell?

(Board 2014)

09207059

Q39. Define cation.

09207060

Q40. Define anion. (Board 2014)

09207061

Q41. Differentiate between Oxidation and Reduction. 09207062

Q42. What is meant by galvanic cell?

09207063

Q43. What is half cell?

09207064

(Board 2015,16)

Q45. What is meant by salt bridge?

09207066

Q46. Define corrosion. (Board 2016)

09207067

Q47. Differentiate between cation and anion.

Q48. What is meant by rust?

09207069

Q49. Define alloy. (Board 2014)

09207070

Q51. Justify that the reaction between Zn and HCl is Redox reaction. (Board 2018)

09207072

Q52. Justify that the reaction between H_2S and Cl_2 is Redox reaction.

09207073

Q53. Justify that the reaction between Na and Cl_2 is Redox reaction.

09207074

Q54. Write oxidation numbers of oxygen in its binary compounds.

09207075

Q55. Name different types of electro-chemical cells. (Board 2015)

09207076

Q56. How are the oxidation number and valency assigned?

09207077

Q57. Write construction of an electrolytic cell.

09207079

09207078

Q58. Write construction of Down's cell.

Q59. Differentiate between spontaneous and non-spontaneous reactions.

09207080

Q60. Give overall reaction for the preparation of sodium hydroxide.

09207081

Q61. Why does the process of rusting only occur on iron and not on the surface of aluminium?

09207082

Q62. What is meant by stainless steel?

09207083

Q63. How does galvanizing process take place?

09207084

Q64. What is the principle of electroplating?

09207085

09207068

Q50. Justify that the reaction between ZnO and C is Redox reaction.

09207071

Q65. Differentiate between Electrolytes and Non-electrolytes.

09207086

Q66. Differentiate between Electrolytic and Galvanic cell.

09207087

Q67. Write applications of galvanic cell.

09207088

Q68. Define reduction in terms of electrons? Give an example.

09207089

Q69. What is the oxidation number of an element in its free state?

09207090

Q70. What is the oxidation number of elements of group 1, group 2 and group 13?

09207091

Q71. Give an example to show that in neutral molecules, the algebraic sum of the oxidation number of all the elements is zero.

09207092

Q72. What is electrolysis?

09207093

Q73. How does an electrolytic cell work?

09207094

Q74. Why few drops of an acid are added in water during its electrolysis?

09207095

Q75. Write the reactions taking place during electrolysis of the molten Sodium Chloride.

09207096

Q76. Which ions are present in an aqueous solution of sodium chloride?

09207097

Q77. Which by-products are produced during the manufacture of NaOH from brine?

09207098

Q78. What is brine?

09207099

Q79. Which is the best method to prevent corrosion and which metals are used for this?

09207100

Q80. What is the purpose of electroplating?

09207101

Q81. Why anode is made of carbon (graphite) during the electrolysis of sodium chloride?

09207102

Q82. What is the important condition for rusting?

09207103

Q83. Why steel is usually plated first with nickel or copper and then by chromium?

09207104

Q84. Why non metals are oxidizing agents while metals are reducing agents?

09207105

Q85. Why electricity cannot pass through solid NaCl?

09207106

Test yourself 7.1

Q86. How can you justify that a reaction between magnesium and oxygen is a Redox reaction, while the reaction shows only addition of oxygen (oxidation).

09207107

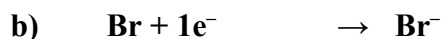


Q88. Oxidation and reduction proceed simultaneously. Explain, with an example.

09207109

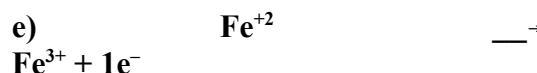
Q89. Identify which of the following is oxidation or reduction reaction.

09207110



Q87. A reaction between carbon and oxygen involved only addition of oxygen (oxidation), but it is called a Redox reaction. Comment on this.

09207108

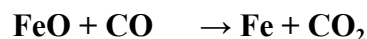


Q90. An element M reacts with another element X to form MX_2 . In terms of loss or gain of electrons, identify the element which is oxidized and which is reduced.

09207111

Q91. How can you justify that the following reaction is not only an oxidation reaction but also a complete Redox reaction?

09207112



Q92. Explain the term oxidation on the basis of electronic concept with an example.

09207113

Test yourself 7.2

Q93. Find out the oxidation numbers of the following elements marked in bold in the formulae. $\text{Ba}_3(\text{PO}_4)_2$, CaSO_4 , $\text{Cu}(\text{NO}_3)_2$, $\text{Al}_2(\text{SO}_4)_3$.

09207114

Q94. In a compound MX_3 , find out the oxidation number of M and X.

09207115

Q95. In H_2S , SO_2 and H_2SO_4 the sulphur atom has different oxidation number. Find out the oxidation number of sulphur in each compound.

09207116

Q96. Why is the oxidation number of oxygen in OF_2 +2?

09207117

Q97. An element X, has oxidation state 0.

What will be its oxidation state when it gains three electrons?

09207118

Q98. An element in oxidation state +7 gains electrons to be reduced to oxidation state +2. How many electrons did it accept?

09207119

Q99. If the oxidation state of an element changes from +5 to -3. Has it been reduced or oxidized? How many electrons are involved in this process?

09207120

Test yourself 7.3

Q100. In the following reaction, how can you justify that H_2S is oxidized and SO_2 is reduced.

09207121



Q101. The reaction between MnO_2 and HCl is a Redox reaction written as balanced chemical equation.

09207122



Find out.

a) The substance oxidized

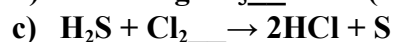
b) The substance reduced

c) The substance which acts as oxidizing agent

d) The substance which acts as reducing agent

Q102. The following reactions are Redox reactions. Find out the element which has been reduced and the element which has been oxidized.

09207123



Q103. Why is the following reaction not a redox reaction. Explain with reasons.

09207124



Test yourself 7.4

Q104. Why are the strong electrolytes termed as good conductors?

09207125

Q105. Does non-electrolyte form ions in solution?

09207126

Q106. What is the difference between a strong electrolyte and a weak electrolyte?

09207127

Q107. Identify a strong or weak electrolyte among the following compounds:

09207128

CuSO_4 , H_2CO_3 , Ca(OH)_2 , HCl , AgNO_3

Q108. Which force drives the non-spontaneous reaction to take place?

09207129

Q109. Which type of chemical reaction takes place in electrolytic cell?

09207130

Q110. What type of reaction takes place at anode in electrolytic cell?

09207131

Q111. Why is the positively charged electrode called anode in electrolytic cell? 09207132

Q112. In the electrolysis of water, towards which terminal H^+ ions move? 09207133

Q113. In the electrolysis of water, where is the oxygen produced?

09207134

Q114. Towards which electrode of the electrolytic cell moves the cations and what do they do there?

09207135

Q115. How are the half cells of a galvanic cell connected? What is the function of salt bridge? (Board 2015) 09207136

Test yourself 7.5

Q116. Anode of Down's Cell is made of a non-metal, what is its name? What is the function of this anode?

09207137

Q117. Where is the sodium metal collected in Down's Cell?

09207138

Q118. What is the name of the by-product produced in the Down's Cell? 09207139

Q119. Are anodes of Down's cell and Nelson's cell made of same element? If yes,

what is its name?

09207140

Q120. What is the shape of cathode in Nelson's cell? Why is it perforated?

09207141

Q121. Which ions are discharged at cathode in Nelson's cell and what is produced at cathode?

09207142

Test yourself 7.6

Q122. What is the difference between corrosion and rusting?

09207143

Q123. What happens to iron in the rusting process?

09207144

Q124. Rusting completes in how many redox reactions?

09207145

Q125. Explain the role of O_2 in rusting.

09207146

Q126. State the best method for protection of metal from corrosion.

09207147

Q127. What do you mean by galvanizing?

09207148

Q128. What is the advantage of galvanizing?

09207149

Q129. Why is tin plated iron rusted rapidly when tin layer is broken?

09207150

Q130. Name the metal which is used for galvanizing iron.

09207151

Test yourself 7.7

Q131. Define electroplating. (Board 2013, 15)

09207152

Q132. How is electroplating of zinc carried out?

09207153

Q133. Which material is used to make cathode in electroplating?

09207154

Q134. Why is the anode made up of a metal to be deposited during electrolysis?

09207155

Exercise MCQs

1. Spontaneous chemical reactions take place in: (Board 2014,16,18)

09207156

(a) Electrolytic cell (b)

Galvanic cell

(c) Nelson's cell (d)

Down's cell

2. Formation of water from hydrogen and oxygen is:

09207157

(a) Redox reaction

(b) Acid-base reaction

(c) Neutralization

(d) Decomposition

3. Which one of the following is not an electrolytic cell?

09207158

(a) Down's cell (b)

Galvanic cell

(c) Nelson's cell (d) Both a and c

4. The oxidation number of chromium in $K_2Cr_2O_7$ is: (Board 2017)

09207159

(a) +2

(b) +6

(c) +7

(d) +14

5. Which of the following is not an electrolyte? (Board 2018) 09207160

(a) Sugar solution

(b) Sulphuric acid solution

(c) Lime solution

(d) Sodium chloride solution

6. The most common example of corrosion is: (Board 2018) 09207161

(a) Chemical decay

- (b) Rusting of iron
- (c) Rusting of aluminium
- (d) Rusting of tin

7. Nelson's cell is used to prepare caustic soda along with gases. Which of the following gas is produced at cathode?

- (a) Cl_2
- (b) H_2 09207162
- (c) O_3
- (d) O_2

8. During the formation of water from hydrogen and oxygen, which of the following does not occur?

- (a) Hydrogen has oxidized
- (b) Oxygen has reduced
- (c) Oxygen gains electrons
- (d) Hydrogen behaves as oxidizing agent

9. The formula of rust is:

(Board 2015,18) 09207164

- (a) $\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$ (b)
- Fe_2O_3

- (c) $\text{Fe}(\text{OH})_3 \cdot n\text{H}_2\text{O}$ (d) $\text{Fe}(\text{OH})_3$

10. In the redox reaction between Zn and HCl, the oxidizing agent is:

(Board 2017) 09207165

- (a) Zn
- (b) H^+
- (c) Cl^-
- (d) H_2

Additional MCQs

11. Chemical reactions in which the oxidation state of one or more substances changes are called: 09207166

- (a) Catenation (b)
- Reduction (d)
- (c) Redox (d)

Oxidation

12. Which of the following is a good Electrolyte?

- (a) NaCl (b)
- H_2SO_4 (d) All
- (c) NaOH (d) All

of these

13. Which of the following is a weak electrolyte? (Board 2015,16)

- (a) NaCl (b)
- CH_3COOH (b)
- (c) KCl (b)
- (d) NaOH (b)

14. Which of the following electrolytes produces less ions in water? (Board 2014)

- (a) $\text{Ca}(\text{OH})_2$ (b)
- NaCl (b)
- (c) NaOH (d)
- H_2SO_4 (d)

15. The substances which do not ionize in solution and do not allow to pass current through them are called:

- (a) Strong electrolytes
- (b) Weak electrolytes
- (c) Non-electrolytes
- (d) Electrolytes

16. Example of electrolytic cell is:

- (a) Down's cell (b) Nelson's cell
- (c) Daniel cell (d) Both a and b

17. Which of the following is a non-electrolyte?

- (a) Benzene
- (b) Sodium chloride
- (c) Sulphuric acid
- (d) Sodium hydroxide

18. Oxidation always takes place at: 09207173

- (a) Anode
- (b) Cathode
- (c) Both of these
- (d) None of these

19. Which gas is evolved during the electrolysis of fused sodium chloride?

- (a) Hydrogen
 (b) Chlorine 09207174
 (c) Oxygen (d) All of these

20. Pure water is a: (Board 2015)

09207175

- (a) Non-electrolyte
 (b) Strong electrolyte
 (c) Weak electrolyte
 (d) All of the above

21. During electrolysis of sodium chloride in aqueous state, which gas is evolved from the cathode electrode? 09207176

- (a) Hydrogen
 (b) Chlorine
 (c) Oxygen
 (d) All of these

22. Who invented first electrolytic cell?

- (a) Berzelius (b) A. Volta 09207177
 (c) J. Dalton (d) Newton

23. In which cell electrical energy is converted into chemical energy?

- (a) Galvanic cell 09207178
 (b) Voltaic cell
 (c) Electrolytic cell
 (d) All of the above

24. Which is produced as a result of Redox reaction?

09207179

- (a) Electric current
 (b) Chemical current
 (c) Both (a) and (b)
 (d) None of the above

25. In galvanic cell, cathode electrode carries:

09207180

- (a) Positive charge
 (b) Negative charge
 (c) No charge
 (d) Neutral charge

26. Which cell is used in the manufacturing of sodium metal from fused NaCl?

- (a) Down's cell

09207181

- (b) Nelson's cell
 (c) Both (a) and (b)
 (d) None of the above

27. Which one acts as anode in Down's cell?

(Board 2014) 09207182

- (a) Iron
 (b) Carbon
 (c) Silver
 (d) Steel

28. Cl₂ gas is formed, when Cl⁻ ions are:

- (a) Reduced

09207183

- (b) Oxidized
 (c) Removed
 (d) Reacted with metals

29. In Nelson's cell, cathode is made up of:

- (a) Iron
 (b) Zinc 09207184
 (c) Graphite

- (d) Steel

30. Which ion is not formed during electrolysis of aqueous sodium chloride?

- (a) Na⁺
 (b) H⁺
 (c) K⁺
 (d) OH⁻

09207185

31. Which cell is used to prepare caustic soda?

(Board 2013) 09207186

- (a) Nelson's cell (b) Down's cell
 (c) Galvanic cell (d) Voltaic cell

32. A. Volta was:

09207187

- (a) Italian Physicist
 (b) Russian Physicist
 (c) British Physicist
 (d) German Physicist

33. Corrosion of iron is called:

09207188

- (a) Rusting (b) Smelting
 (c) Roasting (d) All of these

34. Which medium accelerates the process of rusting?

09207189

- (a) Acidic (b) Basic

- (c) Buffer (d) Neutral
35. A region of stain or dent on iron surface when rusting takes place acts as: 09207190 (a) Cathodic region (b) Anodic region (c) Both of the above (d) None of the above
36. Rusting occurs on: 09207191 (a) Iron (b) Steel (c) Aluminium (d) Both (a) and (b)
37. Stainless steel contains: 09207192 (a) Nickel (b) Iron (d) Chromium (d) All of these
38. Which of the following is not a corrosion resistant metal? 09207193 (a) Fe (b) Zn (c) Sn (d) Cr
39. In order to give longer life, the containers of iron are coated by: 09207194 (a) Tin (b) Chromium (c) Carbon (d) Both a and b
40. A process of coating a thin layer of Zn on iron is called: 09207195 (a) Catenation (b) Rusting (c) Smelting (d) Galvanizing
41. The electrolytic cell is made up of: (a) Cement (b) Glass 09207196 (c) Wood (d) All of the above
42. Which of the following is a common example of silver plating? 09207197 (a) Wares (b) Cutlery (c) Jewellery (d) All of these
43. Which metal has a great tendency

to corrosion?

09207198

- (a) Potassium (b) Sodium (c) Aluminium (d) All of these
44. In early nineteenth century photographers produce crude images using papers covered with: 092072199 (a) Chromium sulphate (b) Nickel sulphate (c) Silver nitrate (d) Potassium nitrate
45. Chemical formula of sodium hypo-sulphite is: 09207200 (a) Na_2SO_4 (b) $\text{Na}_2\text{S}_2\text{O}_3$ (c) Na_2SO_3 (d) NaSO_4
46. Sodium hyposulphite dissolves: 09207201 (a) Mercuric iodide (b) Silver iodide (c) Potassium iodide (d) Sodium iodide
47. Which is not a property of fine silver? (a) It is soft 09207202 (b) It is not malleable (c) It is easily damaged (d) All of the above
48. The percentage of any metal in the non-silver portion of sterling is: 09207203 (a) 2.7 (b) 4.5 (c) 7.5 (d) 8.4
49. The percentage of silver in sterling silver is: 09207204 (a) 22.1 (b) 44.7 (c) 99.2 (d) 92.5
50. Sterling silver is an alloy of silver and: (a) Iron (b) Copper 09207205 (c) Chromium (d) Aluminium
51. The branch of chemistry which

deals with the relationship between electricity and chemical reactions:

- (a) Electrochemistry
- (b) Thermochemistry
- (c) Analytical chemistry
- (d) Industrial chemistry

52. Oxidation involves:

09207207

- (a) Removal of oxygen
- (b) Addition of oxygen
- (c) Gain of electrons
- (d) Addition of hydrogen

53. In HCl, oxidation number of H is:

(Board 2014) 09207208

- (a) -1
- (b) +1
- (c) +2
- (d) -2

54. The oxidation number of all elements in free state is:

09207209

- (a) One
- (b) Two
- (c) Three
- (d) Zero

55. The oxidation number of Group-I elements is:

09207210

- (a) +1
- (b) +2
- (c) +3
- (d) +4

56. The oxidation number of hydrogen in metal hydrides is:

09207211

- (a) +1
- (b) -1
- (c) +2
- (d) -2

57. The oxidation number of oxygen in OF₂ is: (Board 2016)

09207212

- (a) -1
- (b) -2
- (c) +1
- (d) +2

58. In neutral molecules, the algebraic sum of the oxidation numbers of

all the elements is:

09207213

- (a) One
- (b) Two
- (c) Three
- (d) Zero

59. The oxidation number of sulphur in H₂SO₄ is: (Board 2014)

09207214

- (a) +1
- (b) +4
- (c) +6
- (d) +8

60. Oxidizing agent is a substance which:

09207215

- (a) Reduces itself and oxidizes other
- (b) Reduces itself and also reduces other
- (c) Oxidizes itself and reduces other
- (d) Oxidizes itself and also oxidizes other

61. Addition of oxygen during chemical reaction is called: (Board 2015)

09207216

- (a) Reduction
- (b) Oxidation
- (c) Evaporation
- (d) Conduction

62. Water is the oxidation number of oxygen in water? (Board 2013)

09207217

- (a) +1
- (b) -1
- (c) +2
- (d) -2

63. The oxidation number of oxygen in peroxides is: (Board 2014)

09207218

- (a) zero
- (b) -1
- (c) -2
- (d) +2

64. Types of electrochemical cells are:

(Board 2014) 09207219

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

65. Electrolysis of fused sodium chloride produces:

09207220

- a) sodium
- b) chlorine

- c) hydrogen
- d) both a & b

66. For the manufacture of sodium hydroxide, the electrolyte used is: 09207221

- a) fused NaCl
- b) aqueous NaCl
- c) both a & b
- d) None of these

67. Chlorine atom needs how many electrons to complete its octet?

09207222

- a) 1
- b) 2
- c) 3
- d) 7

68. Oxidation number of oxygen in peroxides is:

09207223

- a) + 1
- b) - 1
- c) + 2
- d) - 2

69. In ions, the algebraic sum of oxidation number equals the ___ on the ion. 09207224

- a) charge
- b) atoms
- c) symbols
- d) none of these

70. The concentration of hydrogen ions (H⁺) in pure water is:

09207225

- a) 10^7 mol dm^{-3}
- b) $10^{-7} \text{ mol dm}^{-3}$
- c) $10^{14} \text{ mol dm}^{-3}$
- d) $10^{-14} \text{ mol dm}^{-3}$

71. Electrolytes are classified into how many groups depending upon their extent of ionization in solution? 09207226

- a) 1
- b) 2
- c) 3
- d) 4

72. In electrolytic cell, the electrode connected to positive terminal of the

battery is called:

09207227

- a) cathode
- b) anode
- c) terminal
- d) none of these

73. The shape of iron cathode in Nelson cell is:

09207229

- a) V shape
- b) U shape
- c) Circular
- d) Rod like

74. In Nelson cell the iron cathode is internally lined with _____ diaphragm.

09207229

- a) Clay
- b) Asbestos
- c) Kaolin
- d) China Clay

75. Very successful technique against rusting of iron is:

09207230

- a) greasing
- b) tin coating
- c) alloying
- d) painting

76. Electrolyte used in silver plating is:

- a) ammonium nitrate

09207231

- b) silver nitrate
- c) silver chloride
- d) silver oxide

77. In the process of electroplating, the object to be electroplated is washed with solution of.

09207232

- a) sulphuric acid
- b) caustic soda
- c) lime water
- d) acetic acid

78. In electrolytic refining of copper, Impure copper acts as:

09207233

- a) anode
- b) cathode
- c) electrolyte
- d) solvent

79. In rusting process, Iron is:

09207234

- a) reduced
- b) oxidized
- c) removed
- d) catalyst

80. Reduction takes place at:

09207235

- a) anode
- b) cathode
- c) both a & b

81. Which electrolyte is used in electrolytic refining of copper?

09207236

- a) Copper sulphate
- b) Calcium sulphate
- c) Copper chloride
- d) Copper nitrate

82. Tin is usually electroplated on:

09207237

- a) Copper
- b) Silver
- c) Zinc
- d) Steel

83. Which electrolyte is used in electroplating of zinc?

09207238

- a) zinc Chloride
- b) zinc Sulphate
- c) copper Sulphate
- d) none of these

84. Metallic coating can take place by:

a) physical method

09207239

- b) electrolytic method
- c) both a & b

d) none of these

85. Down's cell is actually a:

09207240

- a) rectangle furnace
- b) square furnace

c) circular furnace

d) beaker

86. Removal of oxygen from a compound is:

09207241

- a) Oxidation
- b) Reduction
- c) Redox reaction
- d) None of these

87. $2\text{H}^+_{(\text{aq})} + 2\text{e}^- \longrightarrow \text{H}_{2(\text{g})}$ is a reaction :

09207242

- a) Oxidation
- b) Reduction
- c) Redox
- d) All of these

88. $\text{Zn}_{(\text{s})} \longrightarrow \text{Zn}^{+2}_{(\text{aq})} + 2\text{e}^-$ is a reaction :

- a) Oxidation
- b) Reduction
- c) redox
- d) All of these

89.

$2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$ is a reaction :

- a) oxidation
- b) reduction
- c) redox
- d) None of these

90. Which one of the following is an oxidizing agent?

09207245

- a) Sodium
- b) Magnesium
- c) Aluminium
- d)

Oxygen

91. Which one of the following are good reducing agents?

09207246

- a) metals
- b) non metals
- c) metalloids
- d) Noble gases

92. In Daniel cell zinc metal is dipped in:

09207247

- solution a) 1M Copper sulphate
 solution b) 1M Zinc sulphate
 solution c) 2M Zinc sulphate
 solution d) 2M Copper sulphate
 solution

93. During electrolysis of fused NaCl, which ions are reduced at cathode:

09207248

- a) Cl^- ions
 b) Na^+ ions
 c) H^+ ions
 d) OH^- ions

94. Which of the following on the surface of iron provide the sites for rusting to

occur.

09207249

- a) Stains
 b) Dents
 c) Oil
 d) Both a & b

95. The oxidation number of Cl in

KClO_3 is: (Board

2017)

09207250

- a) +4
 b) +5
 c) +6
 d) +7



CHEMICAL REACTIVITY

- Q1. Define metals. How they are categorized? Write down chemical properties of metals.**
Q2. Write down physical properties of metals.

09208002

Q3.(Ex. Q.11) Write a comprehensive note on the electropositive character of metals. 09208003

Q4. (Ex. Q.12) Compare the ionization energies of alkali and alkaline earth metals. OR
(What is the relationship between electropositivity and ionization energy?)

09208004

Q5. Write a note on reactivities of Alkali and Alkaline earth metals.

09208005

Q6. Write a comparison of physical properties of alkali metals and alkaline earth metals.

Q7. (Ex. Q.1) Compare the chemical properties of Alkali and Alkaline earth metals.

09208007

Q8.(Ex. Q.5) Give the reaction of sodium with H_2O , O_2 , Cl_2 and H_2 .

(Board 2014)

09208008

Q9.(Ex. Q.10) Give the chemical properties of magnesium and its uses.

09208009

Q10.(Ex. Q.3) Why are cations smaller and anions are bigger in size than their respective neutral atoms?

09208010

Q11.(Ex. Q.4) Discuss why hardness and softness of a metal depends upon its metallic bonding. 09208011

Q12.(Ex. Q.6)What are the physical properties of calcium metal? Give its uses.

09208012

Q13. Explain transition metals and Inertness of Noble Metals.

09208013

Q14. Write a note on properties and uses of silver.

09208014

Q15. Write a note on properties and uses of gold.

(Board 2017)

09208015

Q16. Write a note on properties and uses of platinum.

09208016

Q17.(Ex. Q.2)Discuss the inert character of silver and gold.

09208017

Q18. (Ex. Q.9) How can you compare the softness and hardness of metals?

09208018

Q19. What are non-metals? Explain electronegative characteristics of non-metals.

09208019

Q20. Explain the physical properties of non-metals.

(Board 2014)

09208020

Q21.(Ex. Q.8) Compare the physical properties of metals and non-metals.

(Board 2013)

09208021

Q22.(Ex. Q.7)Write down the important chemical properties of non-metals.

09208022

Q23. What is meant by halogens? Compare the reactivity of halogens in detail.

09208023

Q24. Explain halogens as oxidizing agents.

09208024

Q25. How halogens react with hydrogen and water?

(Board 2016,17)

09208025

Q26. Give reactions of halogens with methane and sodium hydroxide.

(Board 2018)

09208026

Q27. Explain the significance of non-metals.

(Board 2017)

09208027

Exercise Short Answers Questions

Q1. Why does reactivity of metals increase down the group?

09208028

Q2. State the physical properties of metals.

(Board 2014,18)

09208029

Q3. Why does nitrogen form compounds with alkaline earth metals directly?

09208030

Q4. Why is the second ionization energy of magnesium higher than the first one?

09208031

Q5. How does oxygen react with group II-A metals?

09208032

Q6.What is the relationship between electropositivity and ionization energy?

09208033

Q7. Why does electropositivity decrease from left to right in a period?

09208034

Q8. How does electropositivity depend upon the size and nuclear charge of an atom?

09208035

Q9. Why are ionization energies of alkaline earth metals higher than alkali metals?

09208036

Q10. Why are silver and gold less reactive?

09208037

Q11. Can pure gold be used for making ornaments? If not why?

09208038

Q12. Why is copper used for making electrical wires?

(Board 2017) 09208039

Q13. What is the trend of variation in densities of alkali metals?

09208040

Q14. Which metal is used for metal work?

Additional Short Answers Questions

Q19. Define a metal. How can metals be categorized?

(Board 2015)

09208046

Q20. Write down any two chemical properties of metals.

09208047

Q21. Write down the trends of electropositive character in periodic table.

09208048

Q22. What are non-metals?

09208049

Q23. On what factors does non-metallic character depend?

09208050

Q24. What is the trend of non-metallic character in periodic table?

09208051

Q25. Write down two physical properties of non-metals.

(Board 2018)

09208052

Q26. Write down two chemical properties of non-metals.

(Board

2014)

09208053

Q27. What are halogens?

09208054

Q28. Write down the physical states of halogens.

09208055

09208041

Q15. Why is magnesium harder than sodium?

(Board 2018)

09208042

Q16. Why calcium is more electropositive than magnesium?

09208043

Q17. Why is ionization energy of Na(sodium) less than Mg(magnesium)?

09208044

Q18. Why is the ionization energy of Na(sodium) more than K(potassium)?

09208045

Q29. Write down the names of very reactive metals.

09208056

Q30. Write down the names of moderately reactive metals.

09208057

Q31. Write down the names of least 'Reactive' or 'Noble metals'.

09208058

Q32. Write down the uses of Sodium.

09208059

Q33. Write down the uses of Calcium.

09208060

Q34. Write down the uses of Magnesium.

(Board 2014)

09208061

Q35. Write the name of a heaviest metal.

(Board 2018)

09208062

Q36. Which one is the most reactive and most useable metal?

09208063

Q37. What is the composition of white gold?

09208064

Q38. Discuss the purity of 22 carats gold.

09208065
Q39. What is electropositivity? Explain

Test yourself 8.1

Q40. What type of elements are metals?

09208067
Q41. Name the metal which exists in liquid form.

09208068
Q42. What is the nature of metallic oxides?

09208069
Q43. Which group of metals is highly reactive?

09208070
Q44. Why is Sodium metal more reactive than magnesium metal?

09208071
Q45. Name the metal which can be cut with knife.

09208072
Q46. Name the best ductile and malleable metal.

with an example. (Board 2014)
09208066

09208073
Q47. Name the metal which is the poorest conductor of heat.

09208074
Q48. What do you mean by malleable and ductile?

09208075
Q49. Why are alkali metals more reactive than alkaline earth metals?

09208076
Q50. What do you mean by metallic character? (Board 2015)

09208077
Q51. Why does metallic character decrease along a period and increase in a group?

09208078

Test yourself 8.2

Q52. Give the applications of silver.

09208079
Q53. Why is silver not used in pure form?

09208080
Q54. What do you mean by 24 carat Gold?

(Board 2017) 09208081
Q55. Why is gold used to make jewellery?

Q57. What is the difference between steel and stainless steel?

09208084

Q58. How is platinum used as a catalyst in automobiles and what are advantages of this use?

09208085

Test yourself 8.3

Q59. Why is valency of chlorine 1?
09208086

(Board 2018)
09208082
Q56. Why is platinum used for making jewellery? (Board 2015)
09208083

Q60. Which factor controls the non-metallic character of the elements?

09208087

Q61. Why is fluorine more non-metallic than chlorine?

09208088

Q62. Iodine exists in solid state; can it be beaten with hammer to form sheets?

09208089

Q63. Can liquids and gases be brittle?

09208090

Q64. Why is the oxygen called non-metal?

09208091

Q65. Name two non-metals which are both brittle and non-ductile.

09208092

Q70. How can we distinguish a metal from a non-metal by simple physical method?

09208097

Q71. How can we distinguish a substance is metal or non-metal with the help of an acid?

09208098

Q72. Why is HF a weak acid?

(Board

2013, 2014)

09208099

Q66. Name the most abundant non-metal in the earth's crust.

09208093

Q67. Give the non-metallic trend of halogens.

09208094

Q68. Why do the non-metals accept electrons readily?

09208095

Q69. Why do non-metals not react with dilute acids while metals do react?

09208096

Exercise MCQs

1. Metals can form ions carrying charges:

09208100

- (a) Uni-positive (b) Di-positive
(c) Tri-positive (d) All of these

2. Which one of the following metals burn with a brick red flame?

09208101

- (a) Sodium (b)

Magnesium

(c) Iron

(d) Calcium

3. Sodium is extremely reactive metal, but it does not react with:

09208102

- (a) Hydrogen (b)

Nitrogen

(c) Sulphur (d)

Phosphorus

4. Which one of the following is the lightest metal?

(Board 2014, 15)

09208103

(a) Calcium

(b) Magnesium

(c) Lithium

(d) Sodium

5. Pure alkali metals can be cut simply by knife but iron cannot because of alkali metals have:

09208104

(a) Strong metallic bonding

(b) Weak metallic bonding

(c) Non-metallic bonding

(d) Moderate metallic bonding

6. Which of the following is less malleable?

(Board 2014)

09208105

(a) Sodium

(b) Iron

(c) Gold

(d)

Silver

7. Metals lose their electrons easily because:

09208106

- (a) They are electronegative
- (b) They have electron affinity
- (c) They are electropositive
- (d) Good conductors of heat

8. Which one of the following is brittle?

09208107

- (a) Sodium
- (b) Aluminum
- (c) Selenium
- (d) Magnesium

9. Which one of the following non-metal is lustrous?

09208108

- (a) Sulphur
- (b) Phosphorus
- (c) Iodine
- (d) Carbon

10. Non-metals are generally soft, but which one of the following is extremely hard?

09208109

- (a) Graphite
- (b) Phosphorus
- (c) Iodine
- (d) Diamond

11. Which one of the following will not react with dilute HCl?

(Board 2016,17)

09208110

- (a) Sodium
- (b) Potassium
- (c) Calcium
- (d) Carbon

Additional MCQs

12. Metals are the elements which have:

- (a) Electropositive character
- (b) Electronegative character
- (c) Both a & b
- (d) None of the above

09208111

13. Which one is the most reactive metal?

09208112

- (a) Potassium
- (b) Sodium
- (c) Gold
- (d) All of these

14. Identify least reactive metal/s among the following:

09208113

- (a) Copper
- (b) Mercury
- (c) Silver
- (d) All of these

15. Which metal exists in liquid form at room temperature?

(Board 2013)

09208114

- (a) Sodium
- (b) Potassium
- (c) Mercury
- (d) None of these

16. Which are good conductor of heat and electricity?

09208115

- (a) Metals
- (b) Non-metals
- (c) Metalloids
- (d) All of these

17. All metals bear:

09208116

- (a) Positive charge
- (b) Negative charge
- (c) Both a & b
- (d) None of these

18. Metals possess:

09208117

- (a) Ionic bond
- (b) Covalent bond
- (c) Co-ordinate Covalent bond
- (d) Metallic bond

19. Sodium metal has electrons:

09208118

- (a) 10
- (b) 12
- (c) 11
- (d) 14

20. Which group of elements has low ionization energies?

09208119

- (a) Alkali Metals
- (b) Alkaline earth metals
- (c) Halogens
- (d) Noble gases

21. Density of Sodium metal is:

09208120

- (a) 0.98 gcm^{-3}
- (b) 1.74 gcm^{-3}
- (c) 1.55 gcm^{-3}
- (d) 1.60 gcm^{-3}

22. Density of Magnesium is:

09208121

- (a) 0.98 gcm^{-3}
- (b) 1.74 gcm^{-3}
- (c) 1.55 gcm^{-3}
- (d) 1.60 gcm^{-3}

23. Density of Calcium is:

09208122

- (a) 0.98 gcm^{-3}
- (b) 1.74 gcm^{-3}
- (c) 1.55 gcm^{-3}
- (d) 1.60 gcm^{-3}

24. Melting point of Sodium is:

09208123

(Board 13, 15)

- (a) 97°C
- (b) 650°C
- (c) 851°C
- (d) 801°C

25. Melting point of Calcium is:

09208124

- (a) 97°C
- (b) 650°C
- (c) 839°C
- (d) 801°C

26. Boiling point of Sodium is:

09208125

- (a) 883°C
- (b) 1105°C

- (c) 1494°C
- (d) 1500°C

27. Boiling point of Magnesium is:

09208126

- (a) 880°C
- (b) 1105°C
- (c) 1090°C
- (d) 1500°C

28. Boiling point of Calcium is:

09208127

- (a) 880°C
- (b) 1484°C
- (c) 1494°C
- (d) 1500°C

29. What is the colour of sodium metal's flame?

(Board 2013)

09208128

- (a) Golden yellow
- (b) Brilliant white
- (c) Brick red
- (d) Purple

30. The flame colour of Magnesium is:

09208129

- (a) Golden yellow
- (b) Brilliant white
- (c) Brick red
- (d) Purple

31. The flame colour of Calcium is:

09208130

- (a) Golden yellow
- (b) Brilliant white
- (c) Brick Red
- (d) Purple

32. The elements in which d-orbital is in the process of filling constitute a group of metals called:

09208131

- (a) Alkali Metals
- (b) Alkaline Earth Metals
- (c) Transition Metals
- (d) Noble gases

33. Which metal belongs to group-11?

09208132

- (a) Copper
- (b) Silver
- (c) Gold
- (d) All of these

34. Compounds of which element are widely used in photographic films and dental preparations?

09208133

- (a) Silver
- (b) Gold

(c) Platinum (d)
Copper

35. Which of the following is a yellow metal?

09208134
(a) Gold (b)
Silver
(c) Platinum (d)
Copper

36. 22 carat gold means that 22 part pure gold is alloyed with 2 parts of:

09208135
(a) Silver (b)
Copper
(c) Platinum (d) Both
a & b

37. Platinum alloyed with which metal is used as catalyst in automobiles as catalytic convertor?

09208136
(a) Palladium
(b) Rhodium
(c) Gold
(d) Both a & b

38. Non-metals form:

09208137
(a) Positive ion (b) Negative
ion
(c) Neutral atom (d) None of
these

39. Non-metallic oxides are:

09208138
(a) Basic in nature (b) Acidic in
nature
(c) Amphoteric (d) All of these

40. Metal oxides are:

09208139
(a) Basic in nature (b) Acidic in
nature
(c) Neutral (d)
None of these

41. Non-Metals are _____ of heat and electricity:

09208140
(a) Good Conductor
(b) Bad Conductor
(c) Moderate Conductor
(d) None of the above

42. The melting and boiling points of non metals are:

09208141
(a) High (b) Low
(c) Moderate (d)
None of these

43. Which element has high electronegativity value?

09208142
(a) Fluorine (b)
Oxygen
(c) Chlorine (d)
Nitrogen

44. Group 17 elements are called:

09208143
(a) Alkali Metals
(b) Alkaline Earth Metals
(c) Halogens
(d) Noble gases

45. Which is strongest oxidizing agent?

(a) Fluorine (b)
Chlorine 09208144
(c) Bromine (d)
Iodine

46. The order of stability of Hydrides is:

(a) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$
09208145
(b) $\text{HF} > \text{HBr} > \text{HCl} > \text{HI}$
(c) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
(d) $\text{HCl} > \text{HI} > \text{HF} > \text{HBr}$

47. Which is a weak acid?

09208146
(a) HF
(b) HCl
(c) HBr
(d) HI

48. How many elements are present in human body? (Board 2014)

09208147
(a) 25
(b) 26
(c) 27
(d) 28

49. %age of carbon in human body is:

(a) 65
(b) 18 09208148
(c) 10
(d) 3

50. %age of hydrogen in human body is:

- (a) 65
- (b) 18
- (c) 10
- (d) 3

09208149

51. %age of nitrogen in human body is:

- (a) 65
- (b) 18
- (c) 10
- (d) 3

09208150

52. Which halogen member exists in a liquid state at room temperature?

09208151

- (a) Fluorine
- (b) Chlorine
- (c) Bromine
- (d) Iodine

53. Which non-metal is good conductor of electricity?

09208152

- (a) Iodine
- (b) Graphite
- (c) Sulphur
- (d) Phosphorus

54. Which one of the following is a metal?

(Board 2014)

09208153

- (a) Hydrogen
- (b) Carbon
- (c) Nitrogen
- (d) Magnesium

55. The heaviest metal is: (Board 2018)

09208154

- (a) Iron
- (b) Platinum
- (b) Osmium
- (d) Lead