Unit - 1: Basic Concepts of Chemistry and Chemical Calculations

1. Choose and write the correct answer:

1. Consider the following statements.

   (1) matter possesses mass   (2) 22 carat gold is a mixture

   (3) dry ice is a compound

   Which of the statement(s) given above is/are correct?

   (a) 1 & 3   (b) only 1   (c) 1 & 2   (d) 1, 2 & 3

2. Match list - I with list - II and identify the correct code.

List - I	List - II
A. Bronze	1. Element
B. Table salt	2. Homogeneous mixture
C. Gold	3. Alloy
D. Petrol	4. Compound

	A	B	C	D
a)	1	4	2	3
b)	3	4	1	2
c)	2	3	4	1
d)	4	2	3	1

3. Solid state of matter is converted into gas by
   a) sublimation   b) deposition c) freezing   d) condensation

4. Identify the incorrect statement about a compound.
   a) A molecule cannot be separated into its constituent elements
      by physical methods of separation.
   b) A molecule of a compound has atoms of different elements.
   c) A compound retains the physical properties of its constituent
      elements.
   d) The ratio of atoms of different elements in a compound is
      fixed.

5. The characteristic feature of orderly arrangement of molecules
   belongs to
   a) solids   b) liquid   c) gases   d) none of these

6. Which among the following statement(s) describe an element?

   (1) It is pure substance which could be split into two or more
       simpler substance.

   (2) It is a pure substance which could not be split into simpler
       substance.

   (3) Its composition is not uniform.

   (4) All the above

   a) only 4   b) only 2   c) 2 & 3   d) 1 and 3

7. Atoms are too small with diameter of 10^{-10}m and weigh
   approximately

   a) 10^{-27}kg   b) 10^{-27}g   c) 10^{-31}kg   d) 10^{-31}g

8. 1amu or 1u =

a) 1.6605×10^{-25}kg   b) 1.6605×10^{-26}kg

c) 1.6605×10^{-27}kg   d) 1.6605×10^{-28}kg

9. Statement I : Equivalent mass of Mg is determined by oxide
method

Statement II : Molecular mass is calculated using vapour density.

a) Both the statements are individually true.

b) Both the statements are true and statement II is the correct
explanation of statement I.

c) Statement I is true and statement II is false.

d) Statement I is false and statement II is true.

10. Unit of Avogadro's number is

    a) mole   b) g   c) mol^{-1} d) no unit

11. $Fe^{2+} \rightarrow Fe^{3+} + e^{-}$ is a _____ reaction.

    a) redox   b) reduction c) oxidation d) decomposition

12. Assertion: An element has a fractional atomic mass.

    Reason: An element exist as isotope.

a) <u>Both assertion and reason are correct and reason is the correct explanation for assertion.</u>

b) Both assertion and reason are correct but reason is not the correct explanation for assertion.

c) Assertion is true but reason is false.

d) Both assertion and reason are false.

13. The empirical formula and molecular mass of a compound are CH_2O and 180g respectively. What will be the molecular formula of the compound?

a) $C_9H_{19}O$ b) CH_2O c) <u>$C_6H_{12}O_6$</u>   d) $C_2H_4O_2$

14. One 'u' stands for the mass of

a) an atom of carbon - 12   b) <u>$^1/_{12}$ th of the carbon - 12</u>

c) $^1/_{12}$ th of the hydrogen atom

d) one atom of any of the element

15. In the reaction $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$, NH_3 is acidic in nature. The reason for its acidity is _____

a) <u>acceptance of one H⁺ from water</u>   b) release of one OH^- ion

c) due to nitrogen atom   d) all the above

16. The volume occupied by any gas at STP is _____

a) <u>22.4 litres</u>   b) 2.24 litres   c) 224 litres   d) 0.224 litres

17. If a beaker holds 576g of water, what will be the gram molecules of water in that beaker?

a) 23 gram molecule   b) 23%   c) 32% d) <u>32 gram molecule</u>

18. Assertion: Oxalic acid is a dibasic acid.

Reason: It contains two basic radicals.

a) Both assertion and reason are correct and reason is the correct explanation for assertion.

b) Both assertion and reason are correct but reason is not the correct explanation for assertion.

c) <u>Assertion is true but reason is false.</u>

d) Both assertion and reason are false.

19. How many moles of magnesium phosphate $Mg_3(PO_4)_2$ will contain 0.25 moles of oxygen atoms?

a) 0.02   b) <u>3.125×10^{-2}</u>   c) 1.25×10^{-2} d) 2.5×10^{-2}

20. Match list I with list II and select the correct answer using the code given below

List I	List II
A. n	1. 6.02×10^{23} Ne atoms.
B. Vapour density	2. 0.01 moles of solute in one L of solution
C. 22.4L at STP	
D. Centimolar solution	3. Molecular mass × 2
	4. molecular mass/ empricial formula mass

	A	B	C	D
(a)	2	3	4	1
(b)	4	3	1	2
(c)	3	1	4	2
(d)	2	1	4	3

21. A compound has an empirical formula C_2H_4O. If the value of n=2 the molecular formula of the compound is _____

a) C_2H_4O b) CH_2O c) CH_2 d) <u>$C_4H_8O_2$</u>

22. Equal volume of N_2 and H_2 react to form NH_3 under suitable condition then the limiting reagent is

a) H_2 b) <u>N_2</u>   c) NH_3 d) no reactant is a limiting agent

23. Limiting agent in a chemical reaction is that reactant which

a) left some amount unreacted after the completion of reaction.

b) <u>reacts completely in the reaction.</u>

c) does not react in the reaction.

d) All of these

24. Match the list -I with list - II and select the correct answer code.

List - I	List - II
A. Molecular fomula	1. Completely consumed
B. Stoichiometric equation	2. Left unreacted
C. Limiting reagent	3. n x empricial formula
D. Excess reagent	4. Balanced equation

	A	B	C	D
a)	3	4	2	1
b)	3	4	1	2
c)	4	3	2	1
d)	4	3	1	2

25. Assertion: When 4 moles of H_2 reacts with 2 moles of O_2, then 4 moles of water is formed.

Reason: O_2 will act as limiting reagent.

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) <u>Both assertion and reason are true but reason is not the correct explanation of assertion</u>.

c) Only assertion is true but reason is false

d) Both assertion and reason are false.

26. The oxidation state of a element in its uncombined state is ___

a) <u>zero</u>   b) +1   c) -1   d) none

27. The oxidation number of hydrogen in LiH is _____

a) +1   b) <u>-1</u>   c) +2   d) -2

28. Consider the following statements.

(1) Oxidation number of He = zero

(2) Increase in oxidation number results in reduction.

(3) The substance undergoing increase in oxidation number is reducing agent.

Which among the statements(s) is / are correct?

a) only 1   b) 2 and 3   c) <u>1 and 3</u>   d) only 2

29. Among the three metals zinc, copper and silver, the electron releasing tendency decreases in the following order.

a) zinc>silver>copper   b<u>) zinc>copper>silver</u>

c) silver>copper>zinc   d) copper>silver>zinc

30. Assertion: Fluorine has an oxidation state of -1 in all its compounds.

Reason: Fluorine is the most electronegative element in the periodic table.

a) <u>Both assertion and reason are correct and reason is the correct explanation for assertion.</u>

b) Both assertion and reason are correct but reason is not the correct explanation for assertion

c) Assertion is true but reason is false.

d) Both assertion and reason are false.

31. Rusting of iron articles is an example of ____ reaction.

a) combustion   b) decomposition   c) <u>redox</u>   d) hydrolysis

32. Match list - I with list - II and select the correct answer code.

List - I	List - II
A. $Cr_2O_7^{2-}$	1. +5
B. MnO_4^-	2. +6
C. VO_3^-	3.+3
D. FeF_6^{3-}	4.+7

	A	B	C	D
a)	3	1	4	2
b)	4	3	2	1
c)	2	4	1	3
d)	3	2	1	4

33. (A) : Among halogens fluorine is the best oxidant.

(R): Fluorine is the most electronegative atom.

a) <u>Both A and R are true and R explains A.</u>

b) Both A and R are true but R does not explain A

c) A is true but R is false

d) Both A and R are false

34. Maximum oxidation state is present in the central metal atom of which compound?

a) <u>CrO_2cl_2</u>   b) MnO_2 c) $[Fe(CN)_6]^{3-}$ d) MnO

35. Identify the correct statement with reference to the given reaction.

$P4+3OH^-+3H_2O \rightarrow PH_3+3H_2PO_2^-$

(1) Phosphorous is undergoing reduction only

(2) Phosphorous is undergoing oxidation only

(3) Phosphorous is undergoing both oxidation and reduction

(4) Hydrogen is undergoing neither oxidation non reduction.

a) only 3   b) <u>both 3 and 4</u>   c) only 1 d) none of these

36. Two containers A and B of equal volume contain 8g of each O2 and SO2 at 273K and 1 atm. Then

a) no. of moles of B is less than that in A

b) no. of molecules of A and B are same

c) no. of molecules of B is three times greater than A.

d) The ratio between the number of molecules in A to B is 2:1.

37. Which one of the following is the standard for atomic mass?

a) $_1H^1$ b) $_6C^{12}$ c) $_6C^{14}$ d) $_8O^{16}$

38. 6.023×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of the solution is

a) 0.02M   b) 0.1M   c) 0.01M   d) 0.001M

39. Equivalent mass of $KMnO_4$ when it is converted to $MnSO_4$ is equal to molar mass divided by

a) 6   b) 4   c) 5   d) 2

40. Match column I with column II and choose the correct code.

List - I	List - II
A. Ions having positive charge	1. anion
B. Ions having negative charge	2. -1
C. Oxidation no of fluorine in NaF	3. 0
D. The sum of oxidation no of all atom in a neutral molecule.	4. Cation

	A	B	C	D
a)	3	4	2	1
b)	1	2	3	4
c)	2	3	4	1
d)	4	1	2	3

41. In redox reaction which is true?

a) no. of electrons lost is more than no of electrons gained

b) no. of electrons lost is less than no of electrons gained

c) no. of electrons lost is equal to no of electrons gained

d) no. transfer and gain of electrons

42. Molecular mass =

a) Vapour density × 2   b) Vapour density/2

c) Vapour density +2   d) Vapour density

43. 5.6L of a gas at STP are found to have mass of 11g. The molecular mass of the gas is _____

a) 36   b) 48   c) 40   d) 44

44. Oxidation state of hydrogen in metal hydrides is

a) +1   b) -1   c) 0   d) both a & b

45. 10 g of hydrogen and 64g of oxygen were filled in a steel vessel and exploded. The amount of water produced in this reaction will be

a) 3 moles   b) 4 moles   c) 1 mole   d) 2 moles

46. How many equivalents of sodium sulphate is formed when sulphuric acid is completely neutralised by a base NaOH?

a) 0.2   b) 2   c) 0.1   d) 1

47. The number of molecules in 16g methane is

a) 3.023×10^{23} b) 6.023×10^{23}

c) $16/6.023 \times 10^{23}$ d) $6.023/3 \times 10^{23}$

48. The solid state of matter is converted into gas by _____.

a) sublimation   b) deposition   c) freezing   d) condensation

49. What is the ratio of empirical formula mass to molecular formula mass of benzene?

a) 1:6   b) 6:1   c) 2:3   d) 3:2

50. When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of $Cl_2(g)$, each at 273K at 1atm the moles of HCl(g), formed is equal to _____.

a) 2 moles of HCl(g)   b) 0.5 moles of HCl(g)

c) 1.5 moles of HCl(g)   d) 1 mole of HCl(g)