Unit 3: Stoichiometry

44 MCQs. Correct option in bold. 1 mark each.

1. The atomic, formula or molecular mass of a substance expressed in grams is called one
A. mole B. kilogram C. gram D. litre

2. The SI unit used to express the amount of a substance is the
A. gram **B. mole** C. kelvin D. litre

3. One mole of water (H_2O) has a mass of
A. 10 g B. 16 g **C. 18 g** D. 2 g

4. One mole of oxygen molecules (O_2) has a mass of
A. 64 g B. 8 g C. 16 g **D. 32 g**

5. One mole of NaCl has a mass of
A. 58.5 g B. 85.5 g C. 23 g D. 35.5 g

6. In $2H_2 + O_2 \rightarrow 2H_2O$, 2 moles of hydrogen react with _____ mole(s) of oxygen.
A. 3 B. 2 C. 4 **D. 1**

7. In $2CH_3OH + 3O_2 \rightarrow 2CO_2 + 4H_2O$, the moles of oxygen used to burn 3.50 moles of methanol are
A. 2.33 B. 7.00 **C. 5.25** D. 3.50

8. In $2CH_3OH + 3O_2 \rightarrow 2CO_2 + 4H_2O$, burning 3.50 moles of methanol produces _____ moles of water.
A. 5.25 **B. 7.00** C. 1.75 D. 3.50

9. In $N_2 + 3H_2 \rightarrow 2NH_3$, the moles of hydrogen required to make 8.0 moles of NH_3 are
A. 12 B. 24 C. 8 D. 4

10. What mass of CO_2 is produced by the combustion of each mole of CH_4?
A. 16 g **B. 44 g** C. 32 g D. 88 g

11. The mass of aluminium in 204 g of Al_2O_3 is (Al = 27, O = 16)
A. 54 g B. 26 g **C. 108 g** D. 27 g

12. One mole of any gas at RTP occupies a volume of
A. 48 dm^3 B. 1 dm^3 C. 22.4 dm^3 **D. 24 dm^3**

13. The volume of 2.5 moles of chlorine gas at RTP is
A. 2.5 dm^3 B. 24 dm^3 **C. 60 dm^3** D. 9.6 dm^3

14. The number of moles of oxygen in 50.0 dm^3 of oxygen gas at RTP is about
A. 0.48 **B. 2.08** C. 50 D. 1.2

15. The volume occupied by 0.80 mole of N_2 at RTP is
A. 19.2 dm^3 B. 30 dm^3 C. 24 dm^3 D. 0.8 dm^3

16. A flask contains 500 cm^3 of SO_2 at RTP. The mass of SO_2 is about (S = 32, O = 16)
A. 2.4 g B. 64 g C. 32 g **D. 1.33 g**

17. The percentage of magnesium in MgO (Mg = 24, O = 16) is
A. 50 B. 40 **C. 60** D. 75

18. Which compound has the highest percentage by mass of nitrogen?
A. NH_3 in water solution only **B. N_2H_4**
C. NO D. NH_4OH

19. A limiting reactant is the reactant that
A. is completely consumed in a reaction B. is left over after the reaction
C. does not react D. is a catalyst

20. The reactant which is consumed earlier and gives the least quantity of product is the
A. reactant in excess B. stoichiometric amount
C. catalyst **D. limiting reactant**

21. 10 moles of H_2 and 7 moles of O_2 react to form water. The limiting reactant is
A. O_2 B. neither **C. H_2** D. H_2O

22. 200 g of Zn reacts with 200 g of H_2SO_4 (Zn = 63.5, H_2SO_4 = 98). The limiting reactant is
A. neither **B. H_2SO_4** C. Zn D. both

23. The mass of hydrogen produced when 2.04 mol of H_2SO_4 reacts completely with zinc is
A. 4.08 g B. 8.16 g C. 2.04 g D. 1.02 g

24. In $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$, 0.480 mol C_2H_4 reacts with 1.08 mol O_2. The limiting reactant is
A. C_2H_4 B. CO_2 C. H_2O **D. O_2**

25. 68.1 g of $CaCO_3$ (100 g/mol) is mixed with 51.6 g of HCl (36.5 g/mol) in $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$. The limiting reactant is
A. both **B. $CaCO_3$** C. neither D. HCl

26. The amount of product actually obtained in a reaction is called the
A. mass defect B. theoretical yield
C. percentage purity **D. actual yield**

27. The percentage yield is calculated as
A. (actual yield − theoretical yield) × 100 B. actual yield × theoretical yield
C. (actual yield / theoretical yield) × 100 D. (theoretical yield / actual yield) × 100

28. The actual yield of $CuSO_4$ is 1.85 g and the theoretical yield is 2.5 g. The percentage yield is
A. 74 % B. 135 % C. 26 % D. 50 %

29. The theoretical yield of Cu is 0.5072 g and the actual yield is 0.392 g. The percentage yield is about
A. 129 % B. 22.7 % **C. 77.3 %** D. 50 %

30. A compound has 40 % C, 6.7 % H and 53.3 % O. Its empirical formula is
A. C_2H_2O B. CHO C. CH_4O **D. CH_2O**

31. A compound with empirical formula CH_2O and molar mass 180 g/mol has the molecular formula
A. CH_2O **B. $C_6H_{12}O_6$** C. $C_2H_4O_2$ D. $C_3H_6O_3$

32. A sample weighs 6.3 g and contains 4.2 g of pure compound. The percentage purity is
A. 66.67 % B. 150 % C. 33.3 % D. 4.2 %

33. An impure sample of $CaCO_3$ weighs 70 g and 56 g is pure. The percentage purity is
A. 125 % B. 56 % **C. 80 %** D. 20 %

34. Molarity is the number of moles of solute per
A. kg of solvent **B. dm^3 of solution**
C. gram of solution D. cm^3 of solvent

35. 40 g of urea (60 g/mol) dissolved to make 500 cm^3 of solution has a molarity of about
A. 0.08 M B. 2.67 M C. 0.667 M **D. 1.334 M**

36. 0.05 mol of $KMnO_4$ in 600 cm^3 of solution has a molarity of about
A. 0.083 M B. 30 M C. 0.83 M D. 0.05 M

37. A solution contains 20 g of salt in 2 dm^3 of solution. Its strength is
A. 40 g/dm^3 **B. 10 g/dm^3** C. 22 g/dm^3 D. 2 g/dm^3

38. 10.0 g of NaCl in 500 cm^3 of solution has a strength of
A. 5 g/dm^3 B. 0.02 g/dm^3
C. 10 g/dm^3 **D. 20 g/dm^3**

39. The mass of NaCl (58.5 g/mol) needed to prepare 250 cm^3 of 0.5 M NaCl is about
A. 7.3 g B. 58.5 g C. 29.25 g D. 14.6 g

40. The dilution formula is
A. $M_1V_2 = M_2V_1$ B. $M_1/V_1 = M_2/V_2$
C. $M_1V_1 = M_2V_2$ D. $M_1 + V_1 = M_2 + V_2$

41. The volume of 4 M KNO_3 needed to prepare 500 cm^3 of 1 M KNO_3 is
A. 250 cm^3 **B. 125 cm^3** C. 500 cm^3 D. 2000 cm^3

42. In the titration of HCl with NaOH using phenolphthalein, the end point is when the
A. pink colour just disappears B. gas is released
C. solution turns red D. solution turns blue

43. In a titration, 25.0 cm^3 of 0.10 M NaOH neutralised 20.0 cm^3 of HCl. The molarity of HCl is
A. 0.25 M B. 0.08 M C. 0.10 M **D. 0.125 M**

44. 1.00 g of impure Na_2CO_3 needs 25.0 cm^3 of 0.1 M HCl ($Na_2CO_3 + 2HCl \rightarrow 2NaCl + CO_2 + H_2O$). The percentage purity is about
A. 100 % B. 26.5 % **C. 13.25 %** D. 50 %