Chemical stoichiometry

21. Equivalent weight of $KMnO_4$ acting as an oxidant in acidic medium is

(a) The same as its molecular weight

(b) Half of its molecular weight

(c) One-third of its molecular weight

(d) One-fifth of its molecular weight

22. 0.16 *g* of dibasic acid required 25 *ml* of decinormal *NaOH* solution for complete neutralisation. The molecular weight of the acid will be

(a) 32 (b) 64

(c) 128 (d) 256

23. To neutralise 20 *ml* of $M/10$ sodium hydroxide, the volume of $M/20$ hydrochloric acid required is

(a) 10 *ml* (b) 15 *ml*

(c) 20 *ml* (d) 40 *ml*

24. Hydrochloric acid solutions *A* and *B* have concentration of 0.5 *N* and 0.1 *N* respectively. The volume of solutions *A* and *B* required to make 2 *litres* of 0.2 *N* hydrochloric are

(a) 0.5 *l* of *A* + 1.5 *l* of *B*

(b) 1.5 *l* of *A* + 0.5 *l* of *B*

(c) 1.0 *l* of *A* + 1.0 *l* of *B*

(d) 0.75 *l* of *A* + 1.25 *l* of *B*

25. 5 *ml* of *N HCl*, 20 *ml* of $N/2H_2SO_4$ and 30 *ml* of $N/3HNO_3$ are mixed together and volume made to one *litre*. The normality of the resulting solution is

(a) $N/5$ (b) $N/10$

(c) $N/20$ (d) $N/40$

26. Under similar conditions of pressure and temperature, 40 *ml* of slightly moist hydrogen chloride gas is mixed with 20 *ml* of ammonia gas, the final volume of gas at the same temperature and pressure will be

(a) 100 *ml* (b) 20 *ml*

(c) 40 *ml* (d) 60 *ml*

27. $KMnO_4$ reacts with oxalic acid according to the equation, $2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$, here 20 *ml* of 0.1 *M* $KMnO_4$ is equivalent to

(a) 20 *ml* of 0.5 *M* $H_2C_2O_4$

(b) 50 *ml* of 0.1 *M* $H_2C_2O_4$

(c) 50 *ml* of 0.5 *M* $H_2C_2O_4$

(d) 20 *ml* of 0.1 *M* $H_2C_2O_4$

28. In order to prepare one *litre* normal solution of $KMnO_4$, how many *grams*

of $KMnO_4$ are required if the solution is used in acidic medium for oxidation

(a) 158 *g* (b) 31.6 *g*

(c) 790 *g* (d) 62 *g*

29. What is the concentration of nitrate ions if equal volumes of 0.1 *M* $AgNO_3$ and 0.1 *M NaCl* are mixed together

(a) 0.1 *N* (b) 0.2 *M*

(c) 0.05 *M* (d) 0.25 *M*

30. 30 *ml* of acid solution is neutralized by 15 *ml* of a 0.2 *N* base. The strength of acid solution is

(a) 0.1 *N* (b) 0.15 *N*

(c) 0.3 *N* (d) 0.4 *N*

31. A solution containing Na_2CO_3 and *NaOH* requires 300 *ml* of 0.1 *N HCl* using phenolpthalein as an indicator. Methyl orange is then added to the above titrated solution when a further 25 *ml* of 0.2 *N HCl* is required. The amount of *NaOH* present in solution is $(NaOH = 40, Na_2CO_3 = 106)$

(a) 0.6 *g* (b) 1.0 *g*

(c) 1.5 *g* (d) 2.0 *g*

32. In the preceeding question, the amount of Na_2CO_3 present in the solution is

(a) 2.650 *g* (b) 1.060 *g*

(c) 0.530 *g* (d) 0.265 *g*

33. How many *ml* of 1 (*M*) H_2SO_4 is required to neutralise 10 *ml* of 1 (*M*) *NaOH* solution

(a) 2.5 (b) 5.0

(c) 10.0 (d) 20.0

34. Which of the following cannot give iodometric titrations

(a) Fe^{3+} (b) Cu^{2+}

(c) Pb^{2+} (d) Ag^{+}

35. $KMnO_4$ reacts with ferrous ammonium sulphate according to the equation $MnO_4^- + 5Fe^{2+} + 8H^+ \rightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$, here 10 *ml* of 0.1 *M* $KMnO_4$ is equivalent to

(a) 20 *ml* of 0.1 *M* $FeSO_4$

(b) 30 *ml* of 0.1 *M* $FeSO_4$

(c) 40 *ml* of 0.1 *M* $FeSO_4$

(d) 50 *ml* of 0.1 *M* $FeSO_4$

36. $Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$ the equivalent weight of H_3PO_4 in the above reaction is

(a) 21 (b) 27

(c) 38 (d) 49

37. The mass of $BaCO_3$ produced when excess CO_2 is bubbled through a solution of 0.205 mol $Ba(OH)_2$ is

(a) 81 *g* (b) 40.5 *g*

(c) 20.25 *g* (d) 162 *g*

38. The amount of water that should be added to 500 *ml* of 0.5 *N* solution of $NaOH$to give a concentration of 10 *mg* per *ml* is

(a) 100 (b) 200

(c) 250 (d) 500

39. Number of moles of $KMnO_4$required to oxidize one mole of $Fe(C_2O_4)$ in acidic medium is

(a) 0.6 (b) 0.167

(c) 0.2 (d) 0.4

40. A hydrocarbon contains 86% carbon, 488ml of the hydrocarbon weight 1.68 *g* at STP. Then the hydrocarbon is an

(a) Alkane (b) Alkene

(c) Alkyne (d) Arene