Redox titration

1. The amount of $KMnO_4$ required to prepare 100 mL of a 0.1 N solution in an acidic medium is

(A) 3.16 g (B) 1.58 g (C) 0.316 g (D) 31.6 g

2. 0.185 g of an iron wire containing 99.8% iron is dissolved in an acid to form ferrous ions. The solution requires 29.3 mL of $K_2Cr_2O_7$ solution for complete reaction. The normality of the $K_2Cr_2O_7$ solution is

(A) 0.05 (B) 0.02 (C) 0.22 (D) 0.11

3. 25 mL of a solution of $KMnO_4$ containing 3.16 g potassium permanganate per litre of the solution oxidizes 20 mL of a solution of $FeSO_4$. in acidic medium. Calculate the weight of the crystalline $FeSO_4$ in 500 mL of the solution.

(A) 9.5 g (B) 7.5 g (C) 17.5 g (D) 1.7 g

4. 4 mL of concentrated H_2SO_4 having a density of 1.8 g / mL was diluted to one litre. 25.0 mL of this dilute solution needed 35.0 mL of an N/10 Na_2CO_3 solution for complete neutralization. The percentage purity of H_2SO_4 is

(A) 95.28% (B) 98.48% (C) 87.78% (D) 90.76%

5. As_2O_3 is oxidised to H_3AsO_4 by $KMnO_4$ in acidic medium. Volume of 0.02M $KMnO_4$ required for this purpose by 1mmol of As_2O_3 will be

(A) 10 mL (B) 20 mL (C) 40 mL (D) 80 mL

6. 25 ml of a solution of Fe^{2+} ions was titrated with a solution of the oxidizing agent $Cr_2O_7^{2-}$. 32.0 ml of 0.025M $K_2Cr_2O_7$ solution was required.What is the molarity of the Fe^{2+} solution.

(A) 0.189M (B) 0.92M (C) 0.192M (D) 0.190M

7. When ferrous oxalate is titrated against $K_2Cr_2O_7$, meq of Fe^{2+}, $C_2O_4^{2-}$ and $Cr_2O_7^{2-}$ in this redox reaction are x, y and z respectively. Then

(A) x = y (B) x + y = z (C) x + 2y = z (D) 2x + 6y = 6z

8. What mass of MnO_2 is reduced by 35 ml of 0.16 N oxalic acid in acid solution? The skeleton reaction is

$MnO_2 + H^+ + H_2C_2O_4 \rightarrow CO_2 + H_2O + Mn^{2+}$

(A) 8.7 g (B) 0.24 g (C) 0.84 g (D) 43.5 g

9. How many grams of I_2 are present in a solution which requires 40 ml of 0.11 N $Na_2S_2O_3$ to react with it?

$S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^-$

(A) 12.7 g (B) 0.558 g (C) 25.4 g (D) 11.4 g

10. What volume of 2N $K_2Cr_2O_7$ solution is required to oxidise 0.81 g of H_2S in acid medium?

$Cr_2O_7^{2-} + H_2S \rightarrow Cr^{+3} + S$

(A) 47.8 ml (B) 23.8 ml (C) 40 ml (D) 72 ml

11. What volume of 0.1 N oxalic acid solution can be oxidized by 250 gram of an 8 percent $KMnO_4$ solution?

(A) 6.3 L (B) 12.6 L (C) 25.2 L (D) 0.63 L

12. How many gram of $KMnO_4$ are contained in 4 litres of 0.05 N solution. The $KMnO_4$ is to be used as an oxidant in acid medium?

(A) 1.58 g (B) 15.8 g (C) 6.32 g (D) 31.6 g

13. The eq. wt. of $Fe_2(SO_4)_3$, the salt to be used as an oxidant in an acid solution is

(A) (mol. wt)/1 (B) (mol. wt./2) (C) (mol. wt.)/3 (D) (mol.wt.)/5

14. In basic medium CrO_4^{2-} oxidises $S_2O_3^{2-}$ to form $Cr(OH)_4^-$ & SO_4^{2-}. How many ml of 0.25 M Na_2CrO_4 are required to react with 40 ml of 0.3 M $Na_2S_2O_3$.

(A) 16 ml (B) 32 ml (C) 128 ml (D) 42 ml

15. What is the molarity of H_2O_2 solution whose 100 ml produce the 0.5 mole of I_2 when reacted with excess KI solution.

(A) 0.5 M (B) 1 M (C) 2.5 M (D) 5 M

16. 2 mole, equimolar mixture of $Na_2C_2O_4$ and $H_2C_2O_4$ required V_1L of 0.1 M $KMnO_4$ in acidic medium for complete oxidation. The same amount of the mixture required V_2L of 0.2 M NaOH for neutralization. The ratio of V_1 to V_2 is :-

(A) 1 : 2 (B) 2 : 1 (C) 4 : 5 (D) 5 : 4

17. The number of mole of oxalate ions oxidised by one mole of MnO_4^- is :

(A) 1/5 (B) 2/5 (C) 5/2 (D) 5

18. 10 mole of ferric oxalate is oxidised by x mole of MnO_4^- in acidic medium. The value of 'x' is-

(A) 12 (B) 4 (C) 40 (D) 18

19. A solution containing 2.10 gm of $Fe(NH_4)_2(SO_4)_2\ 6H_2O$(M = 392g mol^{-1}) was titrated with acidic 23 mL of $Na_2Cr_2O_7$ solution. What is molarity of $Na_2Cr_2O_7$ -

(A) 0.0215 M (B) 0.0388 M (C) 0.0644 M (D) 0.0744 M

20. Consider the redox reactions in column-I and molar ratios of oxidizing to reducing agents in column-II respectively. Match the items in the column appropriately.

Column-I	**Column-II**
(A) $MnO_4^- + C_2O_4^{2-} \rightarrow MnO_2 + CO_2$	(P) 2 : 1
(B) $ClO^- + Fe(OH)_3 \rightarrow Cl^- + FeO_4^{2-}$	(Q) 3 : 1
(C) $HO_2^- + Cr(OH)_3^- \rightarrow CrO_4^{2-} + HO^-$	(R) 2 : 3
(D) $N_2H_4 + Cu(OH)_2 \rightarrow N_2O + Cu$	(S) 3 : 2

Volume strength of H_2O_2

21. What is the volume strength of 1.5 N H_2O_2 (aq.)

(A) 4.8 (B) 8.4 (C) 3.0 (D) 8.0

22. A 10-volume H_2O_2 solution is equal to

(A) 3% (w/w) H_2O_2 (B) 30 g/L H_2O_2 (C) 1.76 N (D) all of these

23. 10 mL of H_2O_2 solution (vol strength x) required 10 mL of (1/0.56) N MnO_4^- solution in acidic medium. Hence, x is -

(A) 0.56 (B) 5.6 (C) 0.1 (D) 10

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1. (C) **2.** (C) **3.** (A) **4.** (A) **5.** (C) **6.** (C) **7.** (B) **8.** (B) **9.** (B) **10.** (B)
11. (A) **12.** (C) **13.** (B) **14.** (C) **15.** (D) **16.** (C) **17.** (C) **18.** (A) **19.** (B)
20. A–R, B–S, C–P, D–Q **21.** (B) **22.** (B) **23.** (D)