RA	CE # 23	RI	EDOX	CHEMISTRY			
1.	A 5.0 mL solution of $H_2O_2$ liberates 0.508 g of iodine from an acidified Kl solution. The volume strength of the $H_2O_2$ solution at STP is approximately						
	(A) 4.00	(B) 4.5	(C) 6.05	(D) 5.5			
2.	A fresh $H_2O_2$ solution is labeled 11.2 V. This solution has the same concentration as a solution which is						
	(A) 3.4% (wt/wt)	(B) 3.4%(vol/vol)	(C) 3.4%(wt/vol)	(D) None of these			
3.	20 ml of $H_2O_2$ after acidification with dil $H_2SO_4$ required 30 ml of $\frac{N}{12}$ KMnO <sub>4</sub> for complete oxidation. The strength						
	of $H_2O_2$ solution is nearly. [Molar mass of $H_2O_2 = 34$ ]						
	(A) 2 g/L	(B) 4 g/L	(C) 8 g/L	(D) 6 g/L			
4.	10 ml of a solution of $H_2O_2$ labelled .10 volume. just decolorises 100 ml of potassium permangante solution acidified with dilute $H_2SO_4$ . Calculate the amount of the potassium permanganate in the given solution.						
	(A) 0.1563 gm	(B) 0.563 gm	(C) 5.63 gm	(D) 0.256 gm			
5.	50 ml of an aqueous required 20 ml of 0.1 (A) 25 mL of 0.016M (B) 20 mL of $\frac{M}{30}$ K <sub>2</sub> (C) 100 mL of 0.008 (D) 10 mL of $\frac{M}{30}$ K <sub>2</sub>	solution of $H_2O_2$ was added M Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> solution for con M KMnO <sub>4</sub> in acidic medium $Cr_2O_7$ solution in acidic med M KMnO <sub>4</sub> in acidic mediun $Cr_2O_7$ solution in acidic mediun	into excess of a solution nplete reaction. The same ium. n.	on of KI in dil. $H_2SO_4$ . The liberated iodine me amount of $H_2O_2$ with exactly titrate with			
	50	% Lat	celling of Oleum				
6.	What is the % of free SO <sub>3</sub> in an oleum sample that is labelled as '104.5% $H_3SO_4$ '?						
	(A) 30%	(B) 15%	(C) 20%	(D) 25%			
7.	Maximum labelling of oleum is :						
	(A) 109%	(B) 100%	(C) 122.5%	(D) 112%			
8.	What is the % of free SO <sub>3</sub> in an oleum sample that is labelled as '109% $H_2SO_4$ '?						
	(A) 30%	(B) 15%	(C) 20%	(D) 40%			
9.	Similar to the % labelling of oleum, a mixture of $H_3PO_4$ and $P_4O_{10}$ is labelled as $(100 + x)$ % where x is the maximum amount of water which can react with $P_4O_{10}$ present in the mixture. If such a mixture is labelled as 127%. The mass of $P_4O_{10}$ in 100 gm of mixture is :						
	(A) 71 g	(B) 47 g	(C) 83	(D) 35 g			
10.	A sample of oleum is labelled as 104.5%. What amount of pure NaOH is required to neutralize the 100 g of the sample of oleum.						
	(A) 172.2 g	(B) 80 g	(C) 85.3 g	(D) 62 g			

- 11\*. Fuming  $H_2SO_4$  (oleum) is a homogenous mixture of  $H_2SO_4$  and  $SO_3$ . Then which of the following statement(s) are correct :
  - (A) If  $H_2SO_4$  and  $SO_3$  are equimolar in an oleum sample, then strength of oleum is 110.11%
  - (B) If H<sub>2</sub>SO<sub>4</sub> and SO<sub>3</sub> are having equal masses in an oleum sample, then strength of oleum is 111.25%
  - (C) Strength of an oleum sample may be less than 100%.
  - (D) If strength of oleum is (100 + x) %, then x g of water is to be added to 100 g oleum sample to convert whole of SO<sub>3</sub> to H<sub>2</sub>SO<sub>4</sub>.
- 12. An oleum sample is labelled as 118 %, Calculate
  - (i) Mass of  $H_2SO_4$  in 100 gm oleum sample.
  - (ii) Maximum mass of  $H_2SO_4$  that can be obtained if 30 gm sample is taken.
  - (iii) Composition of mixture (mass of components) if 40 gm water is added to 30 gm given oleum sample.
- 13. A mixture is prepared by mixing 10 gm  $H_2SO_4$  and 40 gm  $SO_3$  calculate,
  - (a) mole fraction of  $H_2SO_4$  (b) % labelling of oleum

## %Availiblity of chlorine in bleaching powder

- 14. 10 gm sample of bleaching powder was dissolved into water to make the solution one litre. To this solution 35 mL of 1.0 M Mohr salt solution was added containing enough  $H_2SO_4$ . After the reaction was complete, the excess Mohr salt required 30 mL of 0.1 M KMnO<sub>4</sub> for oxidation. The % of available Cl<sub>2</sub> approximately is
  - (A) 10% (B) 12.7% (C) 7.1% (D) 22%
- 15. 3.55 gm sample of bleaching powder suspended in  $H_2O$  was treated with enough acetic acid and KI solution. Iodine thus liberated required 80ml of 0.2M hypo for titration. Calculate the % of available chlorine.

[Available Chlorine = mass of chlorine liberated/ mass of bleaching powder  $\times$  100]

(A) 20% (B) 16 % (C) 30% (D) 10 %

## Hardness of water

16. One litre of a sample of hard water contain 4.44 mg  $CaCl_2$  and 1.9 mg of MgCl\_2. What is the total hardness in terms of ppm of  $CaCO_3$ ?

(A) 6	(B) 3	(C) 1	(D) 10

17. One litre hard water contains 1 mg  $CaCl_2$  and 1 mg  $MgSO_4$ . Find hardness of water sample (in ppm).

(A) 1.734 ppm (B) 1.934 ppm (C) 1.534 ppm (D) 1.334 ppm

**18.** Calculate the amount of Ca(OH)<sub>2</sub> required to remove the hardness in 60 litre of pond water, containing 1.62mg of calcium bicarbonate per 100mL of water.

(A) 0.246g	(B) 0.897g	(C) 0.444g	(D) 1.286g
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**19.** If 100 Kg of a hard water sample contains  $5g MgSO_4$ , find hardness of water (in ppm).

(A) 33.46ppm (B) 52.24ppm (C) 64.26ppm (D) 41.66ppm

## Answers

RACE # 23

 1. (B)
 2. (C)
 3. (A)
 4. (C)
 5. (BC)
 6. (C)
 7. (C)
 8. (D)
 9. (A)
 10. (C)

 11. (ABD)
 12. (i)
 20 gm
 (ii)
 35.4gm
 (iii)
 39.6gm
 13. (a)
 0.169
 (b)
 118%

 14. (C)
 15. (B)
 16. (A)
 17. (A)
 18. (C)
 19. (D)