Exercise-1

Marked Questions may have for Revision Questions.

OBJECTIVE QUESTIONS

Section (A) : Classical Concept of Equivalent weight/Mass, Equivalent weight, n-factor and Normality for Acid, Base and Precipitate

A-1.	When N2 is converted i	nto NH3, the equivalent v	weight of nitrogen will be	:	
	(1) 1.67	(2) 2.67	(3) 3.67	(4) 4.67	
A-2.	In the ionic equation 2 the equivalent weight o (1) M/5 (where M = molecular v	K+BrO3 ⁻ + 12H+ + 10e f KBrO3 will be : (2) M/2 weight of KBrO3)	→ Br₂ + 6H₂O + 2K⁺, (3) M/6	(4) M/4	
A-3.	If molecular weight of k (1) M	KMnO₄ is 'M', then its equ (2) M/2	iivalent weight in acidic r (3) M/5	nedium would be : (4) M/4	
A-4.	The equivalent weight	of phosphoric acid (H ₃ PC	D ₄) in the reaction :		
	NaOH + H₃PO (1) 59	4 ──── NaH₂PO4 + H₂O (2) 49	(3) 25	(4) 98	
A-5.	The equivalent weight ((1) Its molecular weight (3) half-its molecular we	of Mohr's salt, FeSO₄.(NI t eight	H ₄) ₂ SO ₄ .6H ₂ O is equal to (2) Atomic weight (4) one-third its molecu) Ilar weight	
A-6.	Which of the following (1) 3 N Al ₂ (SO ₄) ₃ = 0.5 (3) 1 M H ₃ PO ₄ = 1/3 N	relations is incorrect for s M Al2(SO4)3 H3PO4	or solutions? (2) 3 M H2SO4 = 6 N H2 SO4 (4) 1 M Al2 (SO4)3 = 6 N Al2(SO4)3		
A-7.	28 NO₃⁻ + 3As₂S₃ + 4⊦ What will be the equiva	$I_2O \longrightarrow 6AsO_{4^{3-}} + 28N$ Ilent mass of As2S ₃ in ab	IO + 9SO4 ²⁻ + 8H ⁺ . ove reaction : (Molecula	r mass of As ₂ S ₃ = M)	
	M	M	M	M	
	(1) 2	(2) 4	(3) 24	(4) 28	
Section	on (B) : Titration				
B-1.	How many millilitres c containing 0.125 g of p (1) 23.6 mL	of 0.1N H ₂ SO ₄ solution ure Na ₂ CO ₃ : (2) 25.6 mL	will be required for cor (3) 26.3 mL	mplete reaction with a solution (4) 32.6 mL	
B-2.	If 25 mL of a H2SO4 so acid solution : (1) 1 N	lution reacts completely (2) 0.5 N	with 1.06 g of pure Na ₂ C (3) 1.8 N	CO ₃ , what is the normality of this (4) 0.8 N	
В-3.	A certain weight of pur	e CaCO3 is made to rea	ct completely with 200 n	nL of a HCl solution to give 224	
	mL of CO ₂ gas at STP. (1) 0.05N	The normality of the HC (2) 0.1 N	l solution is: (3) 1.0 N	(4) 0.2 N	
B-4.	Equivalent mass of a b (1) 68.2	ivalent metal is 32.7. Mol (2) 103.7	lecular mass of its chlorid (3) 136.4	de is : (4) 166.3	

B-5.

10 mL of 1 N HCl is mixed with 20 mL of 1 M H₂SO₄ and 30 mL of 1 M NaOH. The resultant solution has (1) 20 meg of H⁺ ions (2) 20 meg of OH-(3) 0 meq of H^+ or OH^- (4) 30 milli moles of H⁺ Section (C) : Equivalent Concept for Redox reactions, $KMnO_4 / K_2Cr_2O_7 v/s$ Reducing **Agents & their Redox Titration** C-1. If equal volumes of 0.1 M KMnO4 and 0.1 M K2Cr2O7 solutions are allowed to oxidise Fe²⁺ to Fe³⁺ in acidic medium, then Fe²⁺ oxidised will be : (1) more by KMnO₄ (2) more by K₂Cr₂O₇ (3) equal in both cases (4) cannot be determined. C-2. Which of the following solutions will exactly oxidize 25 mL of an acid solution of 0.1 M iron (II) oxalate: (1) 25 mL of 0.1 M KMnO4 (2) 25 mL of 0.2 M KMnO4 (3) 25 mL of 0.6 M KMnO4 (4) 15 mL of 0.1 M KMnO4 C-3. An element A in a compound ABD has oxidation number –n. It is oxidised by Cr₂Or²⁻ in acid medium. In the experiment, 1.68×10^{-3} moles of K₂Cr₂O₇ were used for 3.36×10^{-3} moles of ABD. The new oxidation number of A after oxidation is :

C-4. Consider the reactions shown below :

> $CrO_4^{2-}(aq) \xrightarrow{H_2SO_4(aq)} Cr_2O_7^{2-}(aq)$ FeSO₄(aq) / H⁺(aq) AgNO₃(ag) Cr³⁺(aq) Х silver chromate (VI) Zn(s) / H⁺(aq) Cr2+ (aq)

Which of the following statements is false : [Atomic Mass of Zinc = 65.4]

(1) Silver chromate (VI) has the formula Ag₂CrO₄.

(2) The minimum mass of zinc required to reduce 0.1 mole of Cr³⁺ to Cr²⁺ is 6.54 g.

(3) The conversion of CrO_4^{2-} into $Cr_2O_7^{2-}$ is not a redox reaction.

(4) The equation $Cr_2O_7^{2-} + 14H^+ + 6Fe^{2+} \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$ correctly describes the reduction of Cr₂O₇²⁻ by acidified FeSO₄.

Section (D) : Hydrogen peroxide, Hardness of water, Available chlorine

D-1. The volume strength of 1.5 N H₂O₂ solution is : (1) 4.8 V (2) 8.4 V (3) 3 V (4) 8 V D-2. Find the volume strength of H2O2 solution prepared by mixing of 250 mL of 3N H2O2 & 750 mL of 1N H₂O₂ solution : (1) 1.5 V (2) 8.4 V (3) 5.6 V (4) 11.2 V

D-3. Temporary hardness is due to bicarbonates of Mg²⁺ and Ca²⁺. It is removed by addition of CaO as follows

 $Ca(HCO_3)_2 + CaO \longrightarrow 2CaCO_3 + H_2O$ Mass of CaO required to precipitate 2 g CaCO₃ is :

CHE	MISTRY FOR JI	ĒE	EQUIVALENT CONCEPT & TITRATIONS			
•	(1) 2 g	(2) 0.56 g	(3) 0.28 g	(4) 1.12 g		
D-4.	125 mL of 63% (w/ The resulting soluti (1) neutral	v) H2C2O4.2H2O solutio on is: (ignoring hydroly (2) acidic	n is made to react with 125 sis of ions) (3) strongly acidic	mL of a 40%(w/v) NaOH solution. (4) alkaline		
	Exercis	e-2 🚃				
Mark	ed Questions may h	ave for Revision Que	stions.			
1.	Volume V ₁ mL of 0 volume of 0.3 M KN $\frac{2}{5}$ V ₁	.1M K ₂ Cr ₂ O ₇ is needed AnO ₄ needed for same $\frac{5}{2}$ V ₄	for complete oxidation of 0. oxidation in acidic medium	678 g N ₂ H ₄ in acidic medium. The will be:		
2	(1) V	(2) = v		(4) can not be determined		
Ζ.	$(1) 2 NO_2 \longrightarrow N_2$					
	(1) $2 \ln 0^2$ $2 \ln 0^2$		(2) NH3 + H2O			
	(3) N2O5 + H2O	⁷ 2ΠΝΟ3	(4) None of these			
3.	In the reaction xHI (1) x = 3, y = 2	+ yHNO ₃ \longrightarrow NO + (2) x= 2, y = 3	$H_2 + H_2O$: (3) x = 6, y = 2 (4) x	= 6, y = 1		
4.	 In which of the following reactions, hydrogen is acting as an oxidising agent ? (1) With iodine to give hydrogen iodide (2) With lithium to give lithium hydride (3) With nitrogen to give ammonia (4) With sulphur to give hydrogen sulphide 					
5.	The violent reactior (1) Reduction	between sodium and (2) Oxidation	water is an example of : (3) Redox reaction	(4) Neutralization reaction		
6.	When SO ₂ is pass changes from : (1) + 4 to 0	ed through an acidifier $(2) \pm 4$ to ± 2	d solution of potassium dic (3) ± 4 to ± 6	hromate, the oxidation state of S $(4) \pm 6$ to ± 4		
-		(2) + 4 10 + 2	(3) + 4 to $+0$	(+) + 0 10 + 4		
7.			ce the following equation,			
	(1) 5	(2) 4	(3) 3	(4) 2		
8.	(1) CaCO ₃ CaO + CO ₂ (3) Na + H ₂ O NaOH + 1/2 H ₂		ion ? (2) O ₂ + 2H ₂ 2H ₂ O (4) MnCl ₃ MnCl ₂ + 1	/2 Cl ₂		
9.	In which of the foll elements?	owing pairs, there is g	reatest difference in the ox	idation number of the under lined		
10.	(1) <u>N</u> O ₂ and <u>N</u> ₂ O ₄ Which substance s	(2) <u>P</u> ₂O₅ and <u>P</u> ₄O erves as reducing ager	10 (3) <u>N</u> 2O and <u>N</u> O at in the following reaction ?	(4) <u>S</u> O ₂ and <u>S</u> O ₃		
	14H+ + Cr ₂ (1) H ₂ O	O7 ^{2−} + 3Ni → 2Cr ^{3−} (2) Ni	+ 7H ₂ O + 3Ni ²⁺ (3) H+	(4) Cr ₂ O ₇ ^{2–}		
11.	M is molecular weig (1) M	ght of KMnO₄. The equi (2) M/3	valent weight of KMnO₄ who (3) M/5	en it is converted into K₂MnO₄ is : (4) M/7		

EQUIVALENT CONCEPT & TITRATIONS

12.	Which of the following reactions depicts the oxidising property of SO ₂ ?				
	(1) SO ₂ + H ₂ O \longrightarrow H ₂	2SO3	(2) 2H ₂	$S + SO_2 \longrightarrow 3S + 2H_2$	2 0
	$(3) \operatorname{Cl}_2 + \operatorname{SO}_2 \longrightarrow \operatorname{SO}_2$	D ₂ Cl ₂	(4) 2Mr	$10_4^- + 5SO_2 + 2H_2O^-$	\rightarrow 5SO ₄ ²⁻ + 2Mn ²⁺ + 4H ⁺
13.	Nitric oxide acts as a re	educing agent in t	he react	tion	
	(1) $4NH_3 + 5O_2 \longrightarrow 4$	NO + 6H ₂ O		(2) 2NO + 3I ₂ + 4H ₂ O	\longrightarrow 2NO ₃ ⁻ + 6l ⁻ + 8H ⁺
	(3) 2NO + H ₂ SO ₃	\rightarrow N ₂ O + H ₂ SO ₄		$(4) 2NO + H_2S \longrightarrow N$	$J_2O + S + H_2O$
14.	 +3 In the reaction, 2FeCl₃ (1) FeCl₃ acts as an ox (3) FeCl₃ is oxidised who have a second se	$+ H_2S \longrightarrow 2$ idizing agent nile H ₂ S is reduce	+2 !FeCl₂ + 2I ed	HCl + S (2) Both H₂S and FeCl (4) H₂S acts as an oxid	₃ are oxidized dizing agent
15.	When KMnO ₄ reacts wi (1) Only FeSO ₄ is oxidi (3) FeSO ₄ is oxidised a	ith acidified FeSC sed nd KMnO₄ is redเ)₄ uced	(2) Only KMnO₄ is oxid(4) None of the above	lised
16.	Which of the following is a redox reaction ? (1) H ₂ SO ₄ with NaOH (2) In atmosphere, O ₃ from O ₂ by lightning (3) Nitrogen oxides from nitrogen and oxygen by lightning (4) Evaporation of H ₂ O				
17.	Which of the following e (1) Ni(CN)4	elements has leas (2) Ni(CO)4	st oxidat	tion number ? (3) Fe₂O₃	(4) SF ₆
18.	KMnO4 oxidises oxalic a equation is (1) 10	acid in acidic med	lium. Th	e number of CO ₂ molect	(4) 3
10	A motal ion M ³⁺ lagon 2		dation n		(ד) ס
19.	(1) +3	(2) +6		(3) 0	(4) –3
20.	In which of the following (1) [Fe(CO)₅]	g, transition metal (2) NH2.NH2	l has ze	ro oxidation state ? (3) NOCIO4	(4) CrO ₅
21.	 Which statement is not correct ? (1) Potassium permanganate is a powerful oxidising substance (2) Potassium permanganate is a weaker oxidising agent than potassium dichromate (3) Potassium permanganate is a stronger oxidising agent than potassium dichromate (4) Potassium dichromate oxidised a secondary alcohol into a ketone. 				
22. 23.	How many litres of Cl ₂ a (Atomic weight : $Mn = 5$ (1) 3.54 Which of the following s (1) 0.2 moles of KMnO4 (2) 1.5 moles of KMnO4 in acidic medium in acid	at STP will be liber 55 and K = 39) (2) 7.08 statements is inco 4 will oxidise one is 4 will oxidise 1 mo dic medium.	rated by prrect : mole of ble of fer	the oxidation of NaCl wi (3) 1.77 ferrous ions to ferric ior rous oxalate to one mol	th 10 g KMnO4 in acidic medium: (4) None of these ns in acidic medium. e of ferric ion and carbon dioxide
	(3) 0.6 moles of KMnO2 in acidic medium.	i wili oxidise 1 mo	ole of fer	rous oxalate to one mol	e of terric ion and carbon dioxide

(4) 1 mole of $K_2Cr_2O_7$ will oxidise 2 moles of ferrous oxalate to ferric ions and carbon dioxide in acidic medium.

24. Assertion : A substance which gets reduced can act as an oxidising agent.

Reason : In the reaction, $3CIO^{-} \longrightarrow CIO_{3^{-}} + 2CI^{-}$, CI atom is oxidised as well as reduced.

- (1) Both assertion and reason are correct, and the reason is the correct explanation for the assertion
- (2) Both assertion and reason are correct, but the reason is not the correct explanation for the assertion
- (3) The assertion is incorrect, but the reason is correct
- (4) Both are assertion and reason are incorrect
- **25. Assertion :** Fe₃O₄ contains iron atoms in two different oxidation numbers.

Reason : Fe²⁺ ions decolourize KMnO₄ solution.

- (1) Both assertion and reason are correct, and the reason is the correct explanation for the assertion
- (2) Both assertion and reason are correct, but the reason is not the correct explanation for the assertion
- (3) The assertion is incorrect, but the reason is correct
- (4) Both are assertion and reason are incorrect
- **26.** Assertion : In the reaction, $MnO4^-$ + $5Fe^{2+}$ + $8H^+ \longrightarrow Mn^{2+}$ + $5Fe^{3+}$ + $4H_2O$, $MnO4^-$ acts as oxidising agent.

 \mbox{Reason} : In the above reaction, n-factor for $\mbox{}^{MnO_4^-}$ is 5.

- (1) Both assertion and reason are correct, and the reason is the correct explanation for the assertion
- (2) Both assertion and reason are correct, but the reason is not the correct explanation for the assertion
- (3) The assertion is incorrect, but the reason is correct
- (4) Both are assertion and reason are incorrect

PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

OFFLINE JEE-MAIN

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1.	When KMnO4 acts as a	n oxidising agent and ult	imately forms Mn $O_4^{2^-}$, I	MnO2, Mn2O3 and Mn2+, then the
	number of electrons transferred in each case is :			[AIEEE 2002, 3/225]
	(1) 4, 3, 1, 5	(2) 1, 5, 3, 7	(3) 1, 3, 4, 5	(4) 3, 5, 7, 1

What will happen if the solution of potassium chromate reacts with excess amount of nitric acid (1) Cr reduces in the oxidation state +3 from CrO4²⁻ [AIEEE 2003, 3/225] (2) On available in the oxidation state +3 from CrO4²⁻

- (2) Cr oxidises in the oxidation state +7 from $CrO_{4^{2-}}$
- (3) Cr^{+3} and Cr_2O^{-2-} will be formed.
- (4) Cr_2O7^{2-} and H_2O will be formed.
- The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is :

 (1) + 4
 (2) + 6
 (3) + 2
 (4) + 3
- Amount of oxalic acid present in a solution can be determined by its titration with KMnO₄ solution in the presence of H₂SO₄. The titration gives unsatisfactory result when carried out in the presence of HCl, because HCl : [AIEEE 2008, 3/105]

(1) furnishes H⁺ ions in addition to those from oxalic acid.

2.	An aqueous soluti completely neutral	on of 6.3 g of oxalic acid lise 10 mL of this solutio	is made upto 250 mL. Th n is :	e volume of 0.1 N [JEE 2001(I	NaOH required to I), 1/35]
[°] Mark 1.	The equivalent may (A) Mn2O3	ass of MnSO4 is half its r (B) MnO2	orrect option. nolecular mass when it is (C) MnO4 ⁻	converted to : (D) MnO4 ^{2–}	[JEE 1998, 2 M]
P/	ART - II : JEE ((ADVANCED)/II	T-JEE PROBLEM	S (PREVIOU	S YEARS)
4.	The volume of 0.1 aqueous solution i (1) 400 mL	N dibasic acid sufficient s : (2) 600 mL	t to neutralize 1 g of a bas [JEE(Main (3) 200 mL	e that furnishes 0 1) 2016 Online (1 (4) 80 mL	.04 mole of OH⁻ in 0-04-16), 4/120]
3.	1.4 g of an organiwas absorbed in 6solution for neutra(1) 24	c compound was digest 0 mL of M/10 H ₂ SO ₄ solu lization. The percentage (2) 5	ed according to Kjeldahl's ution. The excess sulphurio of nitrogen in the compou [JEE(Ma (3) 10	s method and the c acid required 20 und is : ain) 2015 Online (4) 3	ammonia evolved mL of M/10 NaOH (10-04-15), 4/120]
2.	Permanent hardne (1) Treatment with (3) Ion exchange r	ess in water cannot be c washing soda method	ured by : [JEE(Main) (2) Boiling (4) Calgon's metho	2015 Online (10-0 d	04-15), 4/120]
1.	Hydorgen peroxid reacting species. I (1) MnO4 ⁻	e acts both as an oxidisi n which of the following (2) Cr ₂ O _{7²⁻}	ng and as a reducing age cases H ₂ O ₂ acts as a redu [JEE(Main) 20 (3) SO ₃ ^{2–}	nt depending upo ucing agent in acio 1 14 Online (12-04 (4) KI	n the nature of the d medium ? -14), 4/120]
	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			(1) - 11	
	$\frac{M}{10}$ sodium hydrox	ide for complete neutrali	ization. The percentage of	f nitrogen in the co [JEE(Main) 20 (4) 5%	ompound is : 014, 4/120]
	evolved ammonia	was absorbed in 60 mL	of $\frac{10}{10}$ sulphuric acid. Th	e unreacted acid	required 20 mL of
7.	For the estimation	of nitrogen, 1.4 g of an	organic compound was d	ligested by Kjelda	hl method and the
	xMnO₄- + yC₂O₄₂- The values of x, y (1) 5, 2 and 16	+ zH ₊ → xMn ₂₊ + 2yCO ₂ and z in the reaction are (2) 2, 5 and 8	$\frac{2}{2+2}$ H ₂ O e, respectively : (3) 2, 5 and 16	(4) 5, 2 and	8
6.	Consider the follow	wing reaction :		[JEE M	ains-2013, 4/120]
	(1) 59.0	(2) 47.4	(3) 23.7	(4) 29.5	EE 2010, 4/144]
5.	29.5 mg of an org the evolved ammo mL of 0.1 M NaOH	anic compound containi onia was absorbed in 20 I solution for complete n	ng nitrogen was digested mL of 0.1 M HCl solution. eutralization. The percent	according to Kjelo The excess of th age of nitrogen in	dahl's method and e acid required 15 the compound is :
	(2) reduces perma(3) oxidises oxalic(4) gets oxidised b	acid to carbon dioxide a acid to carbon dioxide a acid to carbon dioxide a	and water.		

3.	In basic medium, I⁻ is	oxidised by MnO4 In th	is process, I- changes to	: [JEE 2004(S), 3/84]
	(A) IO ₃ -	(B) I2	(C) IO4 ⁻	(D) IO-
4.	Consider a titration diphenylamine as ind	of potassium dichroma icator. The number of m	ate solution with acidif noles of Mohr's salt requ	ed Mohr's salt solution using ired per mole of dichromate is : [JEE 2007, 3/162]
	(A) 3	(B) 4	(C) 5	(D) 6
5.	25 mL of household b the titration of the liber of the household blea	leach solution was mixed rated iodine, 48 mL of 0.22 ch solution is :	with 30 mL of 0.50 M K $5 \text{ N} \text{ Na}_2\text{S}_2\text{O}_3$ was used to	and 10 mL of 4N acetic acid. In reach the end point. The molarity [JEE 2012, 3/136]
	(A) 0.48 M	(B) 0.96 M	(C) 0.24 M	(D) 0.024 M
6.	Bleaching powder cor is	ntains a salt of an oxoacio	as one of its component	s. The anhydride of that oxoacid [JEE 2012, 3/136]
	(A) Cl ₂ O	(B) Cl ₂ O ₇	(C) CIO ₂	(D) Cl ₂ O ₆

Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

Max. Marks : 120

Important Instructions

- 1. The test is of 1 hour duration.
- 2. The Test Booklet consists of 30 questions. The maximum marks are 120.
- 3. Each question is allotted 4 (four) marks for correct response.
- 4. Candidates will be awarded marks as stated above in Instructions No. 3 for correct response of each question.

¹/₄ (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

5. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 4 above.

1.	In the reaction : Na ₂ S ₂ C the equivalent weight o	D₃ + 4Cl₂ + 5H₂O -→ Na₂ f Na₂ S₂ O₃ will be : (M =	2SO ₄ + H ₂ SO ₄ + 8H molecular weight	HCI, of Na₂S	S ₂ O ₃)
	(1) M/4	(2) M/8	(3) M/1		(4) M/2
2.	In the reaction, 2CuSC the equivalent weight o (1) 79.75	$D_4 + 4KI \rightarrow 2Cu_2I_2 + I_2 + f$ CuSO ₄ will be : (2) 159.5	2K ₂ SO ₄ (3) 329	(4) Non	e of these
3.	100 milli moles of dichlo ammonium dichloroace	proacetic acid (CHCl₂CO etate : (2) 0.1	OH) can neutraliz	e how n	nany moles of ammonia to form
	(1) 0.0107	(2) 0.1	(3) 0.3		(4) 0.0
4.	The number of moles of (1) 5/2	f ferrous oxalate oxidised (2) 2/5	d by one mole of k (3) 3/5	KMnO₄ i	in acidic medium is : (4) 5/3
5.	How many moles of KM medium : (1) 4/5	InO₄ are needed to oxidis	se a mixture of 1 n (3) 3/4	nole of	each FeSO ₄ & FeC ₂ O ₄ in acidic
6.	22.7 mL of (N/10) Na ₂ 0 that must be added to 4 (1) 490.2 mL	CO ₃ solution neutralises 400 mL of this H ₂ SO ₄ sol (2) 890.2 mL	10.2 mL of a dilute ution in order to m (3) 90.2 mL	e H₂SO. nake it e	 4 solution. The volume of water exactly N/10. (4) 290.2 mL
7.	HNO ₃ oxidises NH ₄ ⁺ io mole of (NH ₄) ₂ SO ₄ is :	ns to nitrogen and itself	gets reduced to N	IO2. The	e moles of HNO₃ required by 1
	(1) 4	(2) 5	(3) 6		(4) 2
8.	The mass of oxalic acid	d crystals (H2C2O4 . 2H2C	D) required to prep	oare 50	mL of a 0.2 N solution is :
	(1) 4.5 g	(2) 6.3 g	(3) 0.63 g		(4) 0.45 g
9.	When HNO3 is converted	ed into NH3, the equivale	nt weight of HNO	3 will be	:
10	(1) M/2 (M = molecular weight	(2) M/1 of HNO3) OH> N2O	(3) M/6		(4) M/8
10.		OII = 7 IN2O,			

Max. Time : 1 Hr.

CHE	MISTRY FOR JEE		EQUIVALENT CONCEPT & TITRATIONS		
•	the equivalent weight c (1) M/4 (M = molecular weight	of NH2OH will be : (2) M/2 of NH2OH)	(3) M/5	(4) M/1	
11.	Number of moles of Ca bicarbonate and 74.5 p	aO required to remove opm of potassium chlor	hardness from 1000 litre ide is :	water having 324 ppm of calcium	
12.	A 5.0 cm ³ solution of solution in terms of volu	H_2O_2 liberates 0.508 (ume strength at STP is	g of I ₂ from an acidified k	(4) Z (I solution. The strength of H_2O_2	
	(1) 2.24 V	(2) 1.12 V	(3) 4.48 V	(4) 8.96 V	
13.	When hypo solution is (1) Na2S2O3 is converted (3) KMnO4 is converted	added to KMnO4 soluti ed to Na2SO4 d to K2MnO4	ion then (2) Na₂S₂Oȝ is conver (4) KMnO₄ is converte	ted to Na2S4O6 ed to MnSO4	
14.	Which of the following equations is a balanced one : (1) $5BiO_{3-} + 22H_{+} + Mn_{2+} 5Bi_{3+} + 7H_2O + MnO_{4-}$ (2) $5BiO_{3-} + 14H_{+} + 2Mn_{2+} 5Bi_{3+} + 7H_2O + 2MnO_{4-}$ (3) $2BiO_{3-} + 4H_{+} + Mn_{2+} 2Bi_{3+} + 2H_2O + MnO_{4-}$ (4) $6BiO_{3-} + 12H_{+} + 3Mn_{2+} 6Bi_{3+} + 6H_2O + 3MnO_{4-}$				
15.	10 mL of sulphuric acions the volume of 2 N NaO (1) 9.2 mL	d solution (specific grav PH solution required to (2) 92 mL	vity = 1.84) contains 98% just neutralize the acid. (3) 18.4 mL	by weight of pure acid. Calculate (4)184 mL	
16.	The equivalent mass o (1) Mn ₂ O ₃	f MnSO4 is half its mol (2) MnO2	ecular mass when it is cor (3) MnO₄⁻	nverted to : (4) MnO4 ^{2–}	
17.	An aqueous solution of required to completely (1) 40 mL	f 6.3 g of oxalic acid di neutralise 10 mL of thi (2) 20 mL	hydrate is made upto 250 s solution is : (3) 10 mL	0 mL. The volume of 0.1 N NaOH (4) 4 mL	
18.	In the reaction H ₂ O _{2¹⁸ - (1) water}	+ O₃ → water + oxygen (2) oxygen	, radioactivity will be show (3) both (1) & (2)	vn by which of the product : (4) none of these	
19.	1 mole of how many of conditions? HCI, HNO3, H2SO4, H2	the following acids neu SO3, H3PO4, H3PO3, F	Haralize exactly one mol of	NaOH, under required favourable	
	(1) 4	(2) 7	(3) 8	(4) 9	
20.	Which amongst the foll (1) 16.0 g of NaOH in 2 (3) 2 M sulphuric acid	lowing has the highest 200 mL of water	normality ? (2) 1 N oxalic acid (4) 1.5 hydrochloric ac	cid	
21.	The number of moles c [Fe(C ₂ O ₄)] in acidic sol	of KMnO₄ that will be no ution is	eeded to react completely	with one mole of ferrous oxalate	
	(1) 1	(2) 2/5	(3) 3/5	(4) 4/5	
22.	What volume of waters be 0.2 N ? (1) 40 mL	should be added to 160	00 ml of a 0.205 N solutior (3) 100 mL	n so that the resulting solution will (4) 20 mL	
23.	In alkaline medium, KN 2KMnO4 + 2K0	InO ₄ reacts as follows OH → 2K ₂ MnO ₄ + H ₂ O	(Atomic weights K = 39.09 + [O]	9, Mn = 54.94, O = 16.00)	

			EQUIVALENT (EQUIVALENT CONCEPT & TITRATIONS		
•	Hence, its equival (1) 31.6	ent weight is : (2) 63.2	(3) 126.4	(4) 158		
24.	0.14 g of a substa (1) nitrogen	nce when burnt in oxy (2) carbon	gen yields 0.28 g of oxide (3) sulphur	. The substance is – (4) phosphorous		
25.	CrO₅ has structure The oxidation num (1) 4	e as shown of chromium in the (2) 5	e above compound is (3) 6	(4) 0		
26.	The normality of o (1) 11 N	rthophosphoric acid ha (2) 22 N	aving purity of 70% by wei (3) 33 N	ight and specific gravity 1.54 is : (4) 44 N		
27.	The normality of n (1) 0.0267	hixture obtained by mix (2) 0.2670	king 100 mL of 0.2 M H₂S0 (3) 1.0267	O₄ and 200 mL of 0.2 M HCl is : (4) 1.1670		
28.	The reagent comn (1) oxalic acid (3) sodium citrate	nonly used to determin	e hardness of water titrim (2) disodium salt (4) sodium thiosu	netrically is : of EDTA Jphate		
29.	40 mL of 0.05 M s HCI. When pheno methyl orange as (1) 80 mL	olution of sodium sest plhthalein is used as ir indicator, y ml of HCl is (2) 30 mL	quicarbonate (Na ₂ CO ₃ .Na ndicator, x mL HCl is used s used. The value of (y – x (3) 120 mL	HCO ₃ .2H ₂ O) is titrated against 0.05 M d. In a separate titration of same using x) is : (4) 180 mL		
30.	In the following rea The radioactive ox (1) H ₂ O (3) both	action 2MnO₄⁻ + 5H₂O xygen will appear in :	$_{2^{18}}$ + 6H ⁺ → 2Mn ²⁺ + 8H ₂ C (2) O ₂ (4) above reactio	D + 5O ₂ on does not take place		

Practice Test (IIT-JEE (Main Pattern))

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

OBJECTIVE RESPONSE SHEET (ORS)

PART - II : PRACTICE QUESTIONS

1.	Oxidation number of Os in OsO4 :						
	(1) + 2	(2) + 4	(3) + 8	(4) + 10			
2.	The oxidation number of	of sulphur in H ₂ S ₂ O ₇ is :					
	(1) + 2	(2) + 6	(3) + 4	(4) + 8			

3.	Which of the following (1) HNO ₃ , Fe^{2+} , F_2	is a set of reducing agen (2) F⁻ , Cl⁻ ,MnO₄⁻	ts ? (3) I⁻ , Na, Fe²+ (4) Cr₂'	O ₇ ²⁻ , CrO₄²⁻ , Na	
4.	Both oxidation and red (1) NaBr + HCl \rightarrow NaG (3) H ₂ + Br ₂ \rightarrow 2HBr	uction takes place in : Cl + HBr	(2) HBr + AgNO ₃ \rightarrow AgBr + HNO ₃ (4) CaO + H ₂ SO ₄ \rightarrow CaSO ₄ + H ₂ O		
5.	MnO ^{2–} 4 (1 mol) in neutr (1) 2/3 mol of MnO [–] 4 ar (3) 1/3 mol of Mn ₂ O ₇ ar	ral aqueous medium is di nd 1/3 mol MnO₂ nd 1/3 mol MnO₂	sproportionate to : (2) 1/3 mol of MnO⁻₄ ar (4) 2/3 mol of Mn₂O⁊ an	nd 2/3 mol MnO ₂ nd 1/3 mol MnO ₂	
6.	Which of the following (1) KCN + Fe(CN) ₂ \longrightarrow (3) H ₂ O ₂ \longrightarrow H ₂ O + C	is not a redox reaction ? → K₄ [Fe(CN) ₆]	(2) Rb + H ₂ O \longrightarrow RbC (4) Cul ₂ \longrightarrow Cul + I ₂	DH + H ₂	
7.	Which of the following	reaction is balanced?			
	(1) MnO ₄ ⁻ + C ₂ O ₄ ²⁻ -	\longrightarrow Mn ²⁺ + CO ₂	(2) AsO ₄ ^{2–} + MnO ₄ –	\rightarrow AsO ₄ ³⁻ + MnO ₂ + 2H ₂ O	
	(3) Cu + 4HNO ₃	• Cu(NO ₃) ₂ + 2NO ₂	(4) $H_2S + HNO_3 \longrightarrow$	H ₂ O + NO + S	
8.	In the reaction				
	As ₂ S ₅ + x HNC	$0_3 \longrightarrow 5 H_2SO_4 + yNO_4$	2 + 2 H ₃ AsO ₄ + 12 H ₂ O		
	the values of x and y a (1) 40, 40	re (2) 10, 10	(3) 30, 30	(4) 20, 20	
9.	The normality of orthor	hosphoric acid having p	urity of 70% by weight an	d specific gravity 1.54 is :	
•	(1) 11 N	(2) 22 N	(3) 33 N	(4) 44 N	
10.	Normality of 0.3 M H ₃ P	O4 solution is :			
	(1) 0.3 N	(2) 0.4 N	(3) 0.6 N	(4) 0.9 N	
11.	One gram equimolecul	ar mixture of Na ₂ CO ₃ and	d NaHCO₃ is reacted with	h 0.1 NHCI. The milliliters of 0.1	
	(1) 15.78 mL	(2) 157.8 mL	(3) 198.4 mL	(4) 295.5 mL	
12.	Consider the redox reaction $2S_2O_3^{2-} + I_2$ (1) $S_2O_3^{2-}$ gets reduced to $S_4O_6^{2-}$ (3) I2 gets reduced to I ⁻		 → S₄O₆^{2−} + 2 I[−]: (2) S₂O₃^{2−} gets oxidised to S₄O₆^{2−} (4) I₂ gets oxidised to I[−] 		
13.	Equivalent weight of ch	nlorine molecule in the ec	uation is :		
	3 Cl ₂ + 6 NaOł	H ──→ 5 NaCl + NaClO	3 + 3 H2O		
	(1) 42.6	(2) 35.5	(3) 59.1	(4) 71	
14.	$Cr_2O_7^2 \xrightarrow{H^-} Cr^3 + ,$ (1) mol. wt./6	Eq. wt of Cr ₂ O _{7²⁻ is (2) mol.wt./3}	(3) mol.wt./4	(4) mol.wt./1	
15.	One mole of acidified k	$x_2Cr_2O_7$ on reaction with (2)	excess KI will liberate	mole (s) of I ₂	
	(1) b	(2) 1	(3) /	(4) 3	
16.	Number of moles of K ₂ (1) 1/6	Cr ₂ O ₇ reduced by 1 mole (2) 1/3	e of Sn ²⁺ is (3) 2/3	(4) 1	

17.	Which compound decol (1) H ₂ SO ₄	lourises iodine solution ? (2) Na ₂ S	(3) Na ₂ SO ₄	(4) Na ₂ S ₂ O ₃			
18.	For neutralisation of on (1) 48 g	e mol of NaOH the mass (2) 70 g	of 70% H₂SO₄ required (3) 49 g	l is : (4) 35 g			
19.	Which will be the prope	r alternative in place of A	in the following equation.				
	2Fe ³⁺ (aq) + Sn (1) Sn ⁴⁺	²⁺ (aq)	+ A (3) Sn ²⁺	(4) Sn			
20.	20. Which of the following reaction is disproportionation ?						
	(1) $2H_2S + SO_2 \longrightarrow 2$	2H ₂ O + 3S	(2) $4P + 3NaOH \longrightarrow 3H_2O + PH_3 + 3NaH_2PO_2$				
	$(3) Ca + H_2 \longrightarrow CaH_2$		(4) All of the above				
21.	In which of the following	metal is reduced (this is not balanced equation) :					
	(1) $[Cr_2O_7]^{2-} \longrightarrow [CrO_4]^{2-}$		(2) $[Fe(CN)_6]^{4-} \longrightarrow [Fe(CN)_6]^{3-}$				
	(3) $MnO_4^- \longrightarrow MnO_2$		(4) $MnO_4^{2-} \longrightarrow MnO_2^{-1}$				
22.	In the reaction Ca(OH) ₂ +H ₃ PO ₄ \longrightarrow Ca ₃ (PO ₄) ₂ + H ₂ O, the equivalent mass of H ₂ O is : (M molecular mass)						
	(1) M	(2) M / 2	(3) M / 3	(4) M / 6			
23.	When hypo solution is added to KMnO4 solution then						
	(1) Na ₂ S ₂ O ₃ is converted	ed to Na2SO4	(2) Na ₂ S ₂ O ₃ is converted to Na ₂ S ₄ O ₆				
	(3) KIVINU4 IS CONVERTED		(4) KIVINU4 IS CONVERTED TO IVINSU4				

	APSP Answers									
	PART-I									
1.	(2)	2.	(2)	3.	(2)	4.	(4)	5.	(1)	
6.	(1)	7.	(3)	8.	(3)	9.	(4)	10.	(2)	

					EQUIVALENT CONCEPT & TITRATIONS						
11.	(4)	12.	(3)	13.	(1)	14.	(2)	15.	(4)		
16.	(2)	17.	(1)	18.	(2)	19.	(1)	20.	(3)		
21.	(3)	22.	(1)	23.	(4)	24.	(3)	25.	(3)		
26.	(3)	27.	(2)	28.	(2)	29.	(1)	30.	(2)		
	PART - II										
1.	(3)	2.	(2)	3.	(3)	4.	(3)	5.	(1)		
6.	(1)	7.	(3)	8.	(1)	9.	(3)	10.	(4)		
11.	(2)	12.	(2,3)	13.	(1)	14.	(1)	15.	(4)		
16.	(2)	17.	(4)	18.	(2)	19.	(1)	20.	(2)		
21.	(3)	22.	(1)	23.	(1)						