

JEE Main (Phase-II) 2020 Memory Based Questions & Solutions

SUBJECT CHEMISTRY

Date: 03 September, 2020 (Shift-2) Time: 3 PM to 6 PM

HAZRATGANJ

9A, Opp. St. Francis College, Shahnajaf Road, Hazratganj, Lucknow -Call : 0522-4242040, 7518804005 **INDIRA NAGAR**

D-3221, Sector D Near Munshipulia, Lucknow

GOMTI NAGAR

CP-15, 16, II Floor, SS Tower, Near Sahara Hospital. Viraj Khand-4, Lucknow Call : 0522-4954072, 7518804004 Call : 0522-2986600, 9369845766 ALIGANJ

A-1/4, II Floor, Above Bank of Baroda , Sector-A, Kapoorthala, Lucknow -Call: 7518804003

www.gravityclasses.org

enguiry@gravityclasses.org

www.gravityclasses.live

avity JEE (Main & Advanced) | NEET | AIIMS | KVPY | NTSE | OLYMPIAD | Class VII to XII

- 1. A mixture of one mole of each of $O_2(g)$, $H_2(g)$ and He(g) are present in a container of volume V at a temperature T, in which partial pressure of $H_2(g)$ is 2 atm. The total pressure in the container in : 6 atm (1)(2)18 atm (3)33 atm (4)24 atm (1)Ans. $P_{gass} = \frac{n_{gas}RT}{V}$ Sol. as n=1, T & V constant So $P_{H_2} = P_{O_2} = P_{He} = 2atm$ So, $P_{Total} = P_{H_2} + P_{O_2} + P_{He}$ = 6 atmWhat is the concentration(M) and %(w/w) of 5.6 V H₂O₂ solution ? [Given molar mass of H₂O₂ =34 g/ 2. mol, density = 1 g/mL] (2)0.25, 1.70 (3)0.5, 0.85 0.5, 1.70 (4)0.25, 0.85 (1)Ans. (1)For H₂O₂ Sol. Molarity = $\frac{\text{Volume strength}}{11.2} = \frac{5.6}{11.2} = 0.5 \text{ M}$ Molarity = $\frac{\%(w/w) \times 10 \times d}{GMM}$ for the second secon $\%(w / w) = \frac{0.5 \times 34}{10} = 1.7$ 3.
 - Find incorrect statement about manganate and permanganate ions.
 - (1)Both manganate and permanganate ions are Paramagnetic.
 - Manganate ion is green in colour while permanganate ion is purple in colour. (2)
 - (3) Both manganate and permanganate ions have tetrahedral shapes.
 - (4)In manganate and permanganate ions Mn from $p\pi - d\pi$ bond with oxygen.
- Ans.

Sol.

(1)

Manganate

 MnO_4^{2-}

Paramagnetic, green in colour, Tetrahedral & contains $p\pi$ -d π bond

Permanganate

 MnO_4^{Θ}

Diamagnetic, purple in colour, Tetrahedral & contains $p\pi$ -d π bond



1

avity JEE (Main & Advanced) | NEET | AIIMS | KVPY | NTSE | OLYMPIAD | Class VII to XII

- 4. Among the following statements identify the correct set of statements
 - Size of Be is smaller than Mg. (a)
 - Ionisation energy of Be is greater than Al. (b)
 - Both Be and Al form covalent compounds readily. (c)
 - (d) Both Be and Al does not react with nitrogen.
 - (1)a, b, c (2)a, c, d (3)b, c, d (4) a, b, d

Ans. (1)

Sol. Both Be and Al react with nitrogen to form nitride

 $3\text{Be} + \text{N}_2 \xrightarrow{\Delta} \text{Be}_3\text{N}_2$

 $6Al + 3N_2 \longrightarrow 6AlN$

Remaining all statements are correct.

5. In 0.1 M HCl solution, 0.1 M NaOH solution is added gradually then identify the correct graph for this titration.



Ans. (2)

Sol. At equivalence point pH is 7 and pH increases with addition of NaOH so correct graph is (2)

6. For the reaction,
$$2A + 2B + \frac{3}{2}C \rightarrow 3P$$

the correct relation between the rate of reaction of species A,B and C is:

(1)
$$\frac{\mathrm{dn}_{\mathrm{A}}}{\mathrm{dt}} = \frac{2}{3} \frac{\mathrm{dn}_{\mathrm{B}}}{\mathrm{dt}} = \frac{4}{3} \frac{\mathrm{dn}_{\mathrm{C}}}{\mathrm{dt}}$$
(2)
$$2 \frac{\mathrm{dn}_{\mathrm{A}}}{\mathrm{dt}} = 3 \frac{\mathrm{dn}_{\mathrm{B}}}{\mathrm{dt}} = \frac{3}{2} \frac{\mathrm{dn}_{\mathrm{C}}}{\mathrm{dt}}$$
(3)
$$\frac{3}{2} \frac{\mathrm{dn}_{\mathrm{A}}}{\mathrm{dt}} = \frac{\mathrm{dn}_{\mathrm{B}}}{\mathrm{dt}} = \frac{3}{4} \frac{\mathrm{dn}_{\mathrm{C}}}{\mathrm{dt}}$$
(4)
$$\frac{\mathrm{dn}_{\mathrm{A}}}{\mathrm{dt}} = \frac{\mathrm{dn}_{\mathrm{B}}}{\mathrm{dt}} = \frac{\mathrm{dn}_{\mathrm{C}}}{\mathrm{dt}}$$

(3)
$$\frac{3}{2}\frac{\mathrm{dn}_{\mathrm{A}}}{\mathrm{dt}} = \frac{\mathrm{dn}_{\mathrm{B}}}{\mathrm{dt}}$$

Sol. For a given reaction

$$rate = -\frac{1}{2}\frac{dn_A}{dt} = -\frac{1}{3}\frac{dn_B}{dt} = -\frac{2}{3}\frac{dn_C}{dt}$$
$$rate = \frac{dn_A}{dt} = \frac{2}{3}\frac{dn_B}{dt} = \frac{4}{3}\frac{dn_C}{dt}$$



dt

7.	The crystal field configuration of complexes $\left[Ru(en)_{3}\right]Cl_{2}$ and $\left[Fe(H_{2}O)_{6}\right]^{2+}$ respectively is:			
	(1) t_{2g}^{4}, e_{g}^{2} and t_{2g}^{6}, e_{g}^{0} (2) t_{2g}^{6}, e_{g}^{0} and t_{2g}^{4}, e_{g}^{2}			
Ans.	(3) t_{2g}^{4}, e_{g}^{2} and t_{2g}^{4}, e_{g}^{2} (4) t_{2g}^{6}, e_{g}^{0} and t_{2g}^{6}, e_{g}^{0} (2) [Pu(en)]Cl \rightarrow Pu ²⁺ = 4d ⁶ = t ⁶ e ⁰			
501.	$[\operatorname{Ru}(\operatorname{ell})_3] \subset I_2 \Longrightarrow \operatorname{Ru}^{-1} = 4u^2 = t_{2g}^2, \varepsilon_g^2$			
	$[Fe(H_2O)_6]^+ \Rightarrow Fe^{2+} = 3d^6 = t_{2g}^{-}, e_g^{-}$ So, correct answer is (2)			
8.	What is the valency of an atom if it's successive ionisation energies respectively are 800, 900, 925, 25356, 32456 kJ/mole ?			
Ans. Sol.	(1) 3 (2) 4 (3) 5 (4) 6 (1) As difference in 3^{rd} and 4^{th} ionisation energies is high so atom contains 3 valence electrons. Hence valency of the atom is 3.			
9.	 For a hypothetical case let value of l is defind as 0,1,2,3(n+1) for principle quantum number n, then select the correct statement ? (1) Atomic number of 1st noble gas is 8 (2) Atomic number of 1st alkali metal is 9 			
	(3) Carbon has electron in $2p_z$ (4) Element with atomic number 13 has half filled valence shell			
Ans. Sol.	For n = 1 (1) 1 st noble gas atomic number is 18 (2) 1 st alkali metal electronic configuration \Rightarrow 1s ² 1p ⁶ 1d ¹⁰ 2s ¹ \Rightarrow (Z = 19) (3) Electronic configuration of C (Z = 6) \Rightarrow 1s ² 1p ⁴ (4) Z = 13, Electronic configuration = 1s ² 1p ⁶ 1d ⁵ So it has half filled electronic configuration			
10.	A current of 2A is passed through a dichromate solution for 5 min. Then 0.104 g of Cr^{3+} ions are formed. What is the percentage efficiency of cell ? $\left[\text{Given } Cr_2O_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightarrow 2Cr^{3+} + 7\text{H}_2\text{O}, \text{Atomic mass of} Cr = 52 \right]$			
Ans.	96.50			
Sol.	$Charge(q) = 1 \times t = 2 \times 5 \times 60$ $= 600 \text{ C}$			
	moles of electrons $=\left(\frac{600}{96500}\right)$ mol			
	$Cr_{2}O_{7}^{2-} + 14H^{+} + 6e^{-} \longrightarrow 2Cr^{3+} + 7H_{2}O$ $\left(\frac{600}{96500}\right) \text{mole} \qquad \frac{1}{3} \left(\frac{600}{96500} \text{ Mole}\right)$ Theoritical mass of $Cr^{3+} = \frac{1}{3} \times \frac{600}{96500} \times 52g$			
	So, efficiency = $\frac{W_{actual}}{W_{theoritical}} \times 100 = \frac{0.104 \times 3 \times 96500}{52 \times 600} \times 100 = 96.50$			



Starting Intelligence JEE (Main & Advanced) | NEET | AIIMS | KVPY | NTSE | OLYMPIAD | Class VII to XII

11. How much volume of 0.1 N NaOH will neutralize 10 mL of 0.1 N phosphonic acid ?

Ans. 10.00

- Sol. Phosphonic acid is phosphorous acid (H_3PO_3) NaOH + $H_3PO_3 \longrightarrow NaH_2PO_3 + H_2O$ For neutrization $(N_1V_1)_{acid} = (N_2V_2)_{base}$ $0.1 \times 10 = 0.1 \times (V_{mL})_{NaOH}$ $V_{NaOH} = 10 \text{ mL}$
- **12.** In Isotonic solution of protein A and protein B, 0.73 gram of protein A is dissolved in 250 ml of solution while 1.65 gram of protein B is dissolved in 1 L solution, then what is the ratio of molecular mass of protein A and protein B ?

Ans. 1.77

Sol.

For isotonic soluiton

$$i_1C_1 = i_2C_2$$
 {For protein i = 1}
 $C_1 = C_2$
 $\Rightarrow \frac{0.73 \times 1000}{M_A \times 250} = \frac{1.65}{M_B \times 1}$
 $\frac{M_A}{M_B} = \frac{0.73 \times 4}{1.65} = 1.77$

- 13. 6.022×10^{22} molecules of a compound X has mass 10g. What is the molarity of solution containing 5g of 'X' in 2 L solution, answer as Y [Where $M = Y \times 10^{-3}$ Mole / Lit]
- Ans. 25.00

Sol. Number of mole of $X = \frac{6.022 \times 10^{22}}{6.022 \times 10^{23}} = \frac{10}{\text{molar mass of } X}$ So molar mass of X = 100g Molarity = $\frac{5}{100 \times 2} = 0.025M$ M = 25×10⁻³ so Y = 25

14. Correct order of reactivity in nucleophilic substitution $(S_N 2)$ reaction for following compounds is.



Ans. (

Sol. Rate of S_N^2 reaction increases by presence of electron withdrawing groups hence -I, -M groups increases rate of S_N^2 reaction.







5



Crowded base preferably abstracts less crowded β 1 hydrogen to give major product.





7

Sol. molecular wt = 52 + 12 + 96 + 35.5 × 3 = 266.5 Water of crystallisation will be lost on treatment with conc. H₂SO₄ so, $\frac{266.5 \times 13.5}{100} = 35.978 = 36$ No. of moles of H₂O = $\frac{36}{18} = 2$ So, compound is $\left[Cr(H_2O)_4 Cl_2 \right] Cl_2 H_2O$







JEE MAIN 2020 PHASE 1

JEE Main - 2020	Best Result in U.P.	SCHOOL INTEGRATED
	Aditya Pandey Percentile 99.936 City Topper	PROGRAM (SIP) Tradition of Gravity Continues, Once Again Historical Result, 100% Students Cracked JEE Main (Based on Last Yr Cut off)
A	pplication No. 200310320565 DOB - 23-12-2002	2020
65 Students Abo	ve 99 Percentile	80 Out of 80 Cracked JEE Main
145 Students Abo	ove 98 Percentile	We had three Batches
208 Students Abo	ove 97 Percentile	Many Top Ranks are
		from these Batches
Abdullah (99.92) (99.92) (99.92) (99.93) (99.89)	Jnaneswar Rao (99,88) Pranav Rastogi (99,88) Jnaneswar Rao	2019
Neeraj Gartia (99.86)Ayush Kumar (99.85)Kishna Bhardwaj (99.85)Ganesh (99.85)	$ \begin{array}{ c c } \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ Prashant Singh} \\ Prashant Singh \\ (99.74) \end{array} \\ \hline \\ \hline \\ Adarsh Goyal \\ (99.71) \end{array} \\ \hline \\ \hline \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ Adarsh Goyal \\ (99.71) \end{array} \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \\ \hline \\ \\ \\ \\ \hline \\$	79 Out of 80 50 Out of 79 in in JEE Main JEE Adv.
Abhishek Kumar (99.66) Abiresh Pratap (99.66) Abiresh Pratap	Sameed (99.58) Sameer (99.56) Abhishek Kumar (99.54) Ayush Jaiswal (99.52)	2018 83 Out of 85 62 Out of 83 in in
Sanjay Pratap Suryanshu Kumar Mihr Agarwal Mohil	Brijes Kumar Harshit Mishra Harshit Mishra Abdul Nasir	JEE Main JEE Adv.
(99.52) (99.52) (99.50) (99.49) Vinay Kumar (99.42) Rustam Naryaan Tejeswar Reddy (99.39) Pruthvi Raj (99.39)	(99.48) (99.47) (99.46) (99.43) Debdut Saini G Sai Kiran Sahil Kumar Pankaj (99.38) G Sai Kiran Sahil Kumar Pankaj	80 Out of 85 63 Out of 80 in in JEE Main JEE Adv.
Satyam Agarwal (99.31)Divyanshu Yadav (99.28)Piyush Tiwari (99.26)Alisha Verma (99.23)	Avinash Kumar (99.19)Amisha Verma Amisha Verma (99.15)Chetan Singh (99.13)Ritik umar (99.13)	2016 39 Out of 40 31 Out of 39
Shubham Kumar (99.10) Randheer (99.08) Aryansh Tripathi Saurabh Maurya M	Abhammad Affan Pradumna Awasthi (99.02)	in in JEE Main JEE Adv.



13 Page