

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

SUBJECT CHEMISTRY

Date: 03 September, 2020 (Shift-1) Time: 9 AM to 12 PM

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1. Aqua regia on reaction with nobel metals produces which gas
(1) NO₂ (2) NO (3) NH₃ (4) N₂O
Ana: (2)
Sol. Aqua regia is a mixture of HNO₃ and in HCl in 1:3 molar ratio.
Au + NO₃ + CT → AuCI₄ + NO
Pt + NO₃ + CT → PtCI₄⁻² + NO
Pt + NO₃ + CT → ptCI₄⁻² + NO
(1) The diameter of particles of DP is smaller than the wavelength of light
(2) The diameter of particles of DP is smaller than the wavelength of light
(3) The diameter of particles of DP is larger than the wavelength of light
(4) The refractive index of DP = Refractive index of DM
Arns: (2)
Sol. Tyndall effect is observed only when the following two conditions are satisfied.
(i) The diameter of the dispersed particles is not much smaller than the wavelength of the light.
(ii) The refractive index of the dispersed phase and the dispersion medium differ greatly in magnitude.
3. Bond order will be lowest in
(i) NO (2) NO⁻ (3) NO₂⁺ (4) NO₂.
Ans: (4)
Sol. (1) NO₀ (2) NO⁻ (3) NO₂⁺ (4) NO₂.
Ro² σ⁺k² σ²s² σ²2p²
$$\begin{bmatrix} \pi^2 px^2 \\ \pi^2 px^2 \\ \pi^2 px^2 \end{bmatrix} \begin{bmatrix} \pi^2 tx^2 \\ \pi^2 tx^2 \\ \pi^2 tx^2 \end{bmatrix} = \begin{bmatrix} 10-4 \\ 2 \\ mx^2 \end{bmatrix} = 3$$

(3) NO²
 $\begin{bmatrix} 0 \\ 0 \\ mx^2 \\ 0 \\ mx^2 \end{bmatrix} = \begin{bmatrix} 10-4 \\ 2 \\ mx^2 \end{bmatrix} = 3$
(4) $\begin{bmatrix} s_{20} x^3 = x^3 = x^2 + x^2 + x^2 + x^2 + x^2 + x^2 \end{bmatrix} = \begin{bmatrix} R^2 px^2 \\ R^2 px^2 \\ R^2 px^2 \end{bmatrix} = \begin{bmatrix} RO \\ RO \\ RO \\ RO \end{bmatrix} = 1.5$
4. Emissions from the thermal power plants causes
(1) Depletion of zone
(2) Blue baby syndrome
(3) Eutrophication
(4) Acid rain

Sol. In thermal power plants, we burn coal for generating electricity. Coal is mostly carbon with variable amounts of other elements chiefly hydrogen, sulfur, oxygen and nitrogen.

On the burning of coal different goes of sulfur and nitrogen are produced these caused acid rain.





= 20m mol Moles of NaOH = $0.1 \times 100 \times 10$ m mol CH₃COOH+NaOH \rightarrow CH₃COONa+H₂O 20m mol 10m mol

 $10 \text{m} \text{mol} \times 10 \text{m} \text{mol}$

 $[CH_3COOH + CH_3COONa] \rightarrow Acidic buffer$

8. Volume strength of 8.9 M H_2O_2 solution at P = 1atm and T = 273K is Ans: 100V

 $8.9MH_2O_2SO1$ Sol. $H_2O_2 \rightarrow H_2O + \frac{1}{2}O_2.$ $\left(\frac{V}{22.4}\right)$ $M = \frac{V}{11.2} = 8.9$ $V = 8.9 \times 11.2$ V = 99.68VV = 100V9. H_2/Ni Cl_2/hv monohalogenation (simplest optically active alkene) The no. of monohalogenation products (including stereo isomers) in above reaction are. Ans: 8 $\begin{array}{c} H_2C=CH-CH-CH_2-CH_3 \xrightarrow{H_2/Ni} H_3C=CH_2-CH-CH_2-CH_3 \xrightarrow{Cl_2/h\nu} \\ CH_3 & CH_3 \end{array}$ Sol. ĊH₃ (A) H₃C–CH₂–CH₂–CH₂–CH₂–CH₂–Cl H₃C-CH₂-ČH-CH-CH3 CH₃ CH₃Cl (2)(4) H₃C-CH₂-CH₂-CH₂-CH₃ + H₃C-CH₂-CH₂-CH₂-CH₃ CH₃ CH₂-CH₂-CH₂-CH₃ (1)(1)

- 10. If boiling point of H_2O is 373K then boiling point of H_2S will be
 - (1) Greater than 373K
 - (2) Greater than 300K
 - (3) Less than 373K but greater than 300K
 - (4) Less than 300K

Ans: (4)

Sol. Due to the presence of hydrogen bonding boiling point of water is higher than H_2S in which weak Vander Waal forces are present

 H_2S is a gas at room temp that means its boiling point is less than 298K.

- $11. \qquad A B \to A^{\oplus} B^{\Theta} \xrightarrow{C^{-}} A C + B^{\Theta}$
 - Which statement <u>incorrect</u> for the above S_N^{-1} reaction ?
 - (1) Rate of reaction is higher if A is bulkier
 - (2) Rate of reaction is higher in it solvent is non-polar
 - (3) Weaker the nucleophile (C^{-}) higher the rate of reaction
 - (4) Stronger the nucleophile (C^{-}) higher the rate of reaction

Ans: (1)



- (1) For the S_N^{-1} reaction, rate of reaction is directly proportional to the stability of carbocation so higher Sol. degree substrate has a high rate of reaction.
 - (2) S_N^{-1} is favored in a polar protic solvent with a high dielectric constant.
 - (3) The rate of S_N^{-1} is independent of concentration and strength of the nucleophile as it is not involved in the slowest step.
- Mole fraction of glucose in an aqueous solution is 0.1, find percentage by mass of glucose (in nearest 12. integer)

Ans: 53

13. A cubic cell with an edge length of 405 pm has a density of 2.27×10^2 kg/m³ & an atomic mass of 2.27×10^{-3} kg. Find the radius of atom in pm

Ans: 143.16

In which of the following reaction product Kjeldahl method is not applicable for the estimation of nitrogen ? 14.



Ans

Sol. NH₂
$$Cl^{-} \stackrel{\otimes}{\mathbb{N}} \equiv \mathbb{N}$$

Kjeldahl method is not applicable to compounds containing nitrogen in nitro and azo groups and nitrogen present in the ring.

- 15. Nevostrol will give which of the following reactions:
 - (1) $Br_2 / H_2O, HCl + ZnCl_2, neutral FeCl_3$

(3) Alc.HCN,
$$I_2 / OH^-$$
, HCl + ZnCl₂

(2)
$$Br_2 / H_2O, HCI + ZnCI_2, I_2 / OH$$

- (4) alc.HCN, I_2 / OH^- , NaOH

Ans. 1



Novestrol (Anti Fertility Drugs) Novestrol has a phenolic functional group, alcoholic functional group and terminal alkyne.



16. Which of the following compound has the strongest acidic hydrogen?

(1)
$$H_2C$$
 COOEt
(2) $CH \equiv CH$
(3) H_2C
(4) H_2C
(4) H_2C
(4) H_2C
(5) CH_3
(4) H_2C
(6) CH_3
(6) CH_3
(7) CH_3

Ans. 3

- Sol. Acidic strength ∞ –I, –M effect due to strong –I, –M effect of –CN in CH₂(CN)₂ it has the most acidic hydrogen among these compounds.
- 17. Which method is used for separating glycerol from spent-lye in soap industry?
 - (2) Steam Distillation
 - (3) Destructive Distilliation (4) Reduced pressure Distillation

Ans. 4

(1) Fractional Distillation

- Sol. Glycerol can be separated from spent-lye in the soap industry by using the reduced pressure distillation technique.
- 18. Which of the following is most reactive towards nucleophilic addition reaction.



Ans. 3

Sol. The aldehydes are more reactive than the ketones in nucleophilic addition reactions. Factors which influence the reactivity of ketone and aldehyde are:

(i) Electronic factor : magnitude of δ + on carbonyl carbon

(a) +I, +M groups decreases reactivity.

- (b) -I, -M groups increases reactivity.
- 19. An element habe IUPAC name un-nil-ennium, the atomic number of element is.

	(1) 109	(2) 102	(3) 119	(4) 108
Ans.	1			
~ 1				

Sol. un = 1

nil = 0 enn = 9 So atomic number = 109

20. Pyrophosphoric acid contains.

	ľ	No. of P=O bond	No. of P-OH bond	No. of P-O-P bond
	(1)	2	4	1
	(2)	4	2	1
	(3)	2	3	2
	(4)	2	2	1
Ans.	1			



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21. Four gases $\alpha, \beta, \gamma \& \delta$ have K_{H} values 50 kbar, 20 kbar, 2×10^{-3} kbar and 2 kbar respectively. Then the correct statement is?

- (1) α is more soluble in water
- (2) Pressure of γ in 55.5 molal solution is 1 bar
- (3) Pressure of δ in 55.5 molal solution is 250 bar
- (4) Pressure of β in 55.5 molal solution is 50 bar

Ans. 2

Sol. (i) From Henery's law

 $P = k_{\mu}(X)$

Higher the value of k_{H} smaller will be solubility so γ is more soluble.

(ii) for γ (P)_{γ} = (K_H)_{γ} (X)_{γ}

$$=2 \times \left[\frac{55.5}{55.5 + \frac{1000}{18}} \right] = 1 \text{ bar}$$

(iii) For
$$\delta \Rightarrow P_{\delta} = (K_{H})_{\delta} (X)_{\delta}$$

$$=20 \times 10^3 \times \frac{1}{2} = 10000$$
 bar

(iv) For β

$$(P)_{\beta} = (K_{H})_{\beta} (X)_{\beta}$$
$$= 20 \times 10^{3} \times \frac{1}{2} = 10000 \text{ bar}$$

- 22. When the helium gas balloon explodes, this process is -
 - (1) isothermal reversible
 - (2) isothermal irreversible
 - (3) adiabatic reversible
 - (4) adiabatic irreversible

Ans. 4

Sol. The process is adiabatic irreversible as process is very fast and no heat will be exchanged.



- 23. The conductance of NaCl and BaSO₄ is C_1 and C_2 at temperature T_1 , then which of the following statement is correct.
 - (1) $C_1 >> C_2$ (2) $C_1(T_1) > C_1(T_2)$ [where $T_2 > T_1$] (3) $C_2 >> C_1$ (4) $C_1 \approx C_2$

Ans. 1

Sol. (i) NaCl is completely soluble salt while $BaSO_4$ is sparingly soluble salt so $C_1 >> C_2$ (ii) On increase in temperature conductance of electrolytic solution increase.

24. In 0.1 mole fraction glucose solution, find % (w/w) of water in the sample [in nearest integer].

- Ans. 47.37
- Sol. Let total mole solution = 1

so mole of glucose = 0.1
mole of H₂O = 0.9
% (w/w) of H₂O =
$$\left[\frac{0.9 \times 18}{0.9 \times 18 + 0.1 \times 180}\right] \times 100$$

= 47.368
= 47.37

25. A beam of light falls on sodium metal (work function=2.5eV), to stop photoelectric current following cell is used.

If same light falls on potassium metal (work function = 2.3 eV) and to stop photoelectic current, The same cell is used then pH of HCl solution (if other condition remains same) is -

Given :
$$E_{CI^-|AgCI|Ag}^0 = 0.22V \& \frac{2.303RT}{F} = 0.06$$

Ans. 3.33

Sol. Sodium metal:

$$E = E_{s} + (KE)_{max} ; E_{cell}^{0} = 0.22V$$

$$(KE)_{max} = E_{cell}^{0} = 0.22eV$$
So $E = 2.5 + 0.22 = 2.72 eV$
For potassium metal :
$$E = E_{0} + (KE)_{max}$$

$$2.72 = 2.3 + (KE)_{max}$$

$$(KE)_{max} = 0.42eV = eE_{Cell}$$

$$E_{Cell} = 0.42V$$
Cell reaction
Cathode : AgCl(s) + e⁻ \longrightarrow Ag(s) + Cl⁻(aq)
Anode : $\frac{1}{2}H_{2}(g) \longrightarrow H^{+}(aq) + e^{-}$
Overall : AgCl(s) + $\frac{1}{2}H_{2}(g) \longrightarrow Ag(s) + H^{+}(aq) + Cl^{-}(aq)$



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$E_{cell} = E_{cell}^{0} - \frac{0.06}{1} \log \left[H^{+} \right] \left[Cl^{-} \right]$ 0.42 = 0.22 - 0.06 log [H⁺] 0.2-0.06 × pH pH = 3.33







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	2020	
65 Students Abo	80 Out of 80 Cracked JEE Main	
145 Students Abo	We had three Batches	
208 Students Abo	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.
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