



JEE (MAIN) 2024

MEMORY BASED QUESTIONS & SOLUTIONS

SHIFT-1

DATE & DAY: 30th January 2024 & Tuesday

PAPER-1

Duration: 3 Hrs.

Time: 09:00 - 12:00 IST

SUBJECT: CHEMISTRY

ADMISSIONS OPEN FOR CLASS 12+

ACADEMIC SESSION 2024-25



TARGET: JEE (ADV.) 2024

For Class XII Passed Student

VISHESH COURSE

MODE: OFFLINE/ONLINE



CLASS STARTS
08th APRIL, 2024



TARGET: JEE (MAIN) 2024

For Class XII Passed Student

ABHYAAS COURSE

MODE: OFFLINE/ONLINE



CLASS STARTS
08th APRIL, 2024

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PART : CHEMISTRY

1. **Assertion** : There is considerable increase in covalent radius from N to P but not so from As to Bi.
Reason : Covalent and ionic radii in particular oxidation state increase down the group.
- (1) A is false but R is true
(2) Both A and R are true and R is the correct explanation of A
(3) Both A and R are true but R is not the correct explanation of A
(4) A is true but R is false

Ans. (3)

Sol. Due to the presence of completely filled d and/ or f orbitals in heavier members.

2. On mixing benzene and naphthalene freezing point :
- (1) Decreases (2) Increases
(3) Firstly decreases then increases (4) Remains unchanged

Ans. (4)

Sol. Benzene and naphthalene forms ideal solution.

3.

	Column-I		Column-II
(a)	$_{24}\text{Cr}^{+2}$	(i)	$3d^7$
(b)	$_{25}\text{Mn}^{+1}$	(ii)	$3d^2$
(c)	$_{23}\text{V}^{+3}$	(iii)	$3d^4$
(d)	$_{27}\text{Co}^{+2}$	(iv)	$3d^5, 4s^1$

Select the correct matching

(1) a-(iii), b-(iv), c-(ii), d-(i)

(2) a-(ii), b-(iii), c-(i), d-(ii)

(3) a-(i), b-(ii), c-(iii), d-(iv)

(4) a-(iv), b-(i), c-(iii), d-(ii)

Ans. (1)

Sol. ${}_{24}\text{Cr}^{+2} = [\text{Ar}] 3d^4$

${}_{25}\text{Mn}^{+1} = [\text{Ar}] 3d^5, 4s^1$

${}_{23}\text{V}^{+3} = [\text{Ar}] 3d^3$

${}_{27}\text{Co}^{+2} = [\text{Ar}] 3d^7$

4. **Statement-I** : Orbitals of same energy are degenerate orbitals.

Statement-II : 3p and 3d orbitals in H atom are not degenerate.

(1) Statement I and Statement II are correct.

(2) Statement I is correct and Statement II is incorrect

(3) Statement I is incorrect and Statement II is correct

(4) Statement I and Statement II are incorrect

Ans. (2)

Sol. Same energy orbitals are degenerate orbital

In hydrogen atom 3p and 3d orbital have same energy because for H-atom $E_n = -13.6 \times \frac{Z^2}{n^2}$ eV, energy depends on only n.

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5.

	List-I		List-II
(P)	H ₂ O	(i)	Bent
(Q)	BrF ₅	(ii)	See-Saw
(R)	SF ₄	(iii)	T-shape
(S)	ClF ₃	(iv)	Square pyramidal
		(v)	Linear

Select the correct matching

(1) P-(i), Q-(iv), R-(ii), S-(iii)

(2) P-(iv), Q-(v), R-(iii), S-(i)

(3) P-(v), Q-(i), R-(iii), S-(iv)

(4) P-(i), Q-(v), R-(iv), S-(iii)

Ans. (1)

Sol.

	Molecule	Shape		Molecule	Shape
(1)		Bent	(2)		Square pyramidal
(3)		See-Saw	(4)		T-Shape

6. Which of the following set of ions is diamagnetic?

(1) La⁺³, Ce⁺⁴

(2) Nd⁺³, Ce⁺⁴

(3) Lu⁺³, Eu⁺²

(4) Nd⁺³, Gd⁺³

Ans. (1)

Sol. ${}_{57}\text{La} : [{}_{54}\text{Xe}] 5d^1 6s^2$

${}_{58}\text{Ce} : [{}_{54}\text{Xe}] 4f^1 5d^1 6s^2$

${}_{60}\text{Nd} : [{}_{54}\text{Xe}] 4f^4 6s^2$

${}_{63}\text{Eu} : [{}_{54}\text{Xe}] 4f^7 6s^2$

${}_{64}\text{Gd} : [{}_{54}\text{Xe}] 4f^7 5d^1 6s^2$

${}_{71}\text{Lu} : [{}_{54}\text{Xe}] 4f^{14} 5d^1 6s^2$

7. **Statement-I** : Reaction of a compound on treatment with dil. H₂SO₄ produces a gas which on passing through lead acetate filter paper turns paper black. It is confirmatory test for S⁻² acid radical.

Statement-II : Lead sulphite is formed

(1) Statement I and Statement II are correct.

(2) Statement I is correct and Statement II is incorrect

(3) Statement I is incorrect and Statement II is correct

(4) Statement I and Statement II are incorrect

Ans. (2)



(Black)

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8. Aluminium chloride in acidified aqueous solution forms an ion with the shape _____.

- (1) Tetrahedral (2) Octahedral
(3) Square planar (4) Trigonal bipyramidal

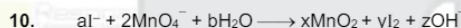
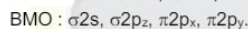
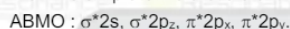
Ans. (2)

Sol. AlCl_3 in acidified aqueous solution forms octahedral $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$ ion.

9. The maximum number of molecular orbitals formed by 2s and 2p atomic orbitals of two atoms are _____.

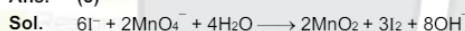
Ans. (8)

Sol. From 2s & 2p atomic orbitals of two atoms following MO are formed.



Determine value of z.

Ans. (8)



11. For a first order reaction



concentration of A at 10 min. and 20 min is 0.04 M and 0.03 M respectively calculate $t_{1/2}$ in minute.

(Given : $\log 2 = 0.3, \log 3 = 0.48$)

Ans. (24)

Sol. $K = \frac{2.303}{t} \log \frac{[A_0]}{[A_1]}$

$\frac{0.693}{t_{1/2}} = \frac{2.303}{10} \log \frac{[A_0]}{0.04}$ (1)

$\frac{0.693}{t_{1/2}} = \frac{2.303}{20} \log \frac{[A_0]}{0.03}$ (2)

on solving

$\frac{0.693}{t_{1/2}} = \frac{2.303}{10} \log \frac{0.04}{0.03}$

$t_{1/2} = 24 \text{ min}$

12. 250 mL solution of CH_3COONa of molarity 0.35 M is prepared. What is mass of CH_3COONa required in gram (nearest integer) ? [Molar mass of $\text{CH}_3\text{COONa} = 82.08 \text{ g/mol}$]

Ans. (7)

Sol. Molarity = $\frac{\text{moles of solute}}{\text{Volume (lit) of solution}}$

$0.35 = \frac{\text{moles}}{250/1000}$

moles = $0.35 \times \frac{1}{4} = 0.0875$

mass of $\text{CH}_3\text{COONa} = 0.0875 \times 82.08 = 7.18 \text{ g}$

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13. The number of atom in silver plate having area 0.05 cm^2 and thickness 0.05 cm is _____ $\times 10^{19}$.
[Given density of Ag = 7.9 gram/cm^3 and atomic mass of Ag = 108]

Ans. (11)

Sol. Density = $\frac{\text{mass}}{\text{volume}}$

$$\begin{aligned} \text{mass of Ag deposited} &= \text{density} \times \text{volume} \\ &= 7.9 \times [0.05 \times 0.05] \text{ gram} \\ &= 0.01975 \text{ gram} \end{aligned}$$

$$\text{No. of mole of Ag deposited} = \left(\frac{197.5 \times 10^{-4}}{108} \right) = 1.83 \times 10^{-4}$$

$$\begin{aligned} \text{No. of Ag atom} &= [1.83 \times 10^{-4}] \times 6.02 \times 10^{23} \\ &= 11.01 \times 10^{19} \text{ atom} \end{aligned}$$

14. The element with IUPAC name 'unununium' belongs to _____ group of the periodic table.

Ans. (11)

Sol. Unununium—111 (Uuu)

Electronic configuration : $[\text{Rn}] 5f^{14}, 6d^{10} 7s^1$

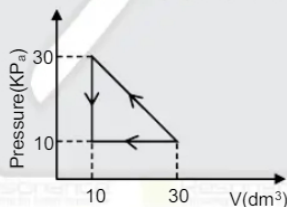
This element belongs to d-block, 7th period and 11th group

15. Given K_{sp} of $\text{Mg}(\text{OH})_2$ is 10^{-11} and $[\text{Mg}^{+2}]$ is 0.1 M, then find pH at which precipitation will start?

Ans. (9)

Sol. $K_{sp} = 10^{-11} = [\text{Mg}^{+2}] [\text{OH}^-]^2$
or $10^{-11} = [0.1] [\text{OH}^-]^2$
or $[\text{OH}^-] = 10^{-5}$
or $\text{pOH} = 5$ or $\text{pH} = 9$

16. Find work done in the following cyclic process (in J)



Ans. (200)

Sol. $W = \frac{1}{2} \times \text{base} \times \text{height}$

$$\begin{aligned} &= \frac{1}{2} \times 20 \times 10^3 \times 20 \times (10^{-1} \text{ m})^3 \\ &= 200 \text{ J.} \end{aligned}$$

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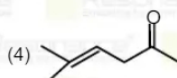
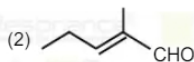
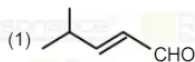
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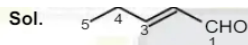
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17. Correct structure of 4-Methyl-pent-2-enal is.



Ans. (1)



18. Which of the following is most stable.



Ans. (2)

Sol. is aromatic species.

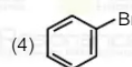
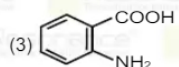
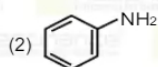
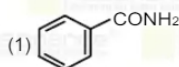
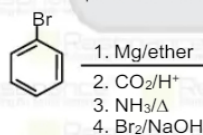
19. Statement-I : Structure of allylic halide is $\text{CH}_2=\text{CH}-\text{CH}_2-\text{X}$.
Statement-II : In allylic halide, halide atom is attached to sp^2 hybrid carbon

- (1) Both Statement-I & Statement-II are correct.
(2) Both Statement-I & Statement-II are incorrect.
(3) Statement-I is correct whereas Statement-II is incorrect.
(4) Both Statement-I and Statement-II are incorrect.

Ans. (3)

Sol. (3) Statement-I is correct whereas Statement-II is incorrect.

20. The final product "A" formed in the following reaction sequence ;



Ans. (2)

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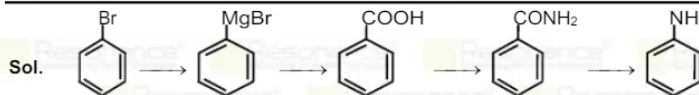
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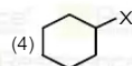
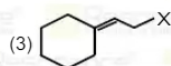
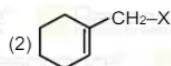
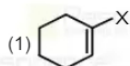
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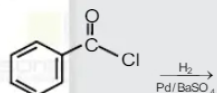


21. Structure of vinylic halide is :



Ans. (1)

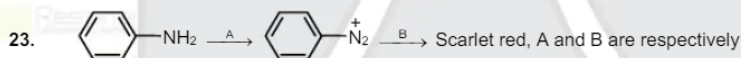
22. What is the name of given reaction

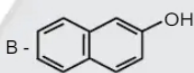
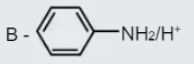
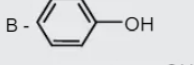
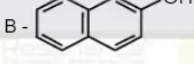


- (1) Etard reaction
(3) Wolf kishner reduction

- (2) Stephen's reduction
(4) Rosenmund reaction

Ans. (4)



- (1) A - NaNO_2/HCl (0-5°C) ; B - 
- (2) A - NaNO_2/HCl (0-5°C) ; B - 
- (3) A - NaNO_2/HCl (0-5°C) ; B - 
- (4) A - HNO_3 ; B - 

Ans. (1)

24. Which sugar does not give reddish brown precipitate with Fehling solution

- (1) Lactose (2) Maltose (3) Sucrose (4) Glucose

Ans. (3)





Sol. Sucrose do not have hemiacetal group, therefore it will not produce aldehyde group in solution, hence no precipitate with Fehling solution.

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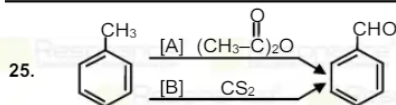
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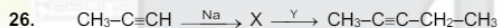
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A and B are

- (1) A = CrO_3 ; B = CrO_2Cl_2
 (2) A = CrO_2Cl_2 ; B = CrO_2Cl_2
 (3) A = CrO_3 ; B = CrO_3
 (4) A = CrO_2Cl_2 ; B = CrO_3

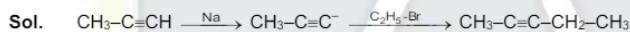
Ans. (1)



Correct set of X and Y is :

- (1) X = 2-Butene ; Y = $\text{C}_2\text{H}_5\text{Br}$
 (2) X = $\text{CH}_3\text{-C}\equiv\text{C}^-$; Y = $\text{C}_2\text{H}_5\text{-Br}$
 (3) X = $\text{C}_2\text{H}_5\text{Br}$; Y = $\text{CH}_3\text{-C}\equiv\text{C}^-$
 (4) X = $\text{CH}_3\text{-C}\equiv\text{C}^-$; Y = $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-Br}$

Ans. (2)



27. Calculate R_f value, if solute travelled by 3.5 cm and solvent travelled by 0.5 cm.

Ans. 7

Sol. R_f i.e. retention factor is the ratio of the distance travelled by the compound as compared to the distance moved by the solvent

$$R_f = \frac{\text{Distance by solute}}{\text{Distance by solvent}} = \frac{3.5}{0.5} = 7$$

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JEE (Advanced) 2023 RESULT

AIR 7 BIKKINA A. CHOWDARY All India Ranks (AIR-CRL) in Top 50 : 8 Top 100 : 15 All Students are from Our Offline/Online Classroom Programs	AIR 22 DESHANK P. SINGH	AIR 26 MAYANK SONI	AIR 29 TANISHQ M MANDHANE	AIR 32 KRITIN GUPTA
	AIR 33 NAMAN GOVAL	AIR 37 S S SUMEDH	AIR 44 KAUSHAL VIJAYVERGIYA	

JEE (Main) 2023 RESULT

22 वर्षों से लगातार... श्रेष्ठ शिक्षण, श्रेष्ठ परिणाम...

6 AIRs in TOP-50

AIR 5 300/300 Marks KAUSHAL VIJAYVERGIYA	AIR 26 100%ile SOHAM DAS	AIR 29 100%ile ASHIK STENNY	AIR 31 100%ile KRISH GUPTA	AIR 34 100%ile MAYANK SONI	AIR 50 100%ile (Maths) HARSHAL LASOD
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JEE
(Advanced)



JEE
(Main)



NEET
(UG)

SCHOLARSHIP UPTO



100%

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