



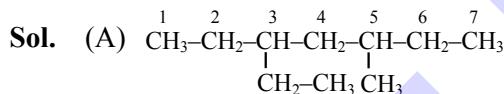
## 55. Match List-I with List-II.

	List-I (Structure)		List-II (IUPAC Name)
		(I)	4-Methylpent-1-ene
(A)	$\begin{array}{ccccccc} \text{H}_3\text{C}-\text{CH}_2 & -\text{CH} & -\text{CH}_2 & -\text{CH} & -\text{C}_2\text{H}_5 \\ &   & &   & \\ & \text{C}_2\text{H}_5 & & \text{CH}_3 & \end{array}$	(II)	3-Ethyl-5-methylheptane
(B)	$(\text{CH}_3)_2\text{C}(\text{C}_3\text{H}_7)_2$	(III)	4,4-Dimethylheptane
(C)		(IV)	2-Methyl-1,3-pentadiene
(D)			

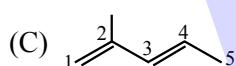
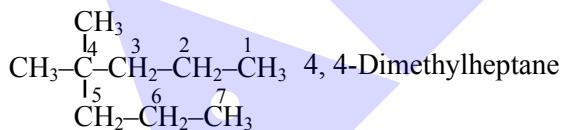
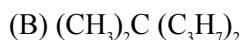
Choose the **correct** answer from the options given below:

- (1) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)
- (2) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
- (3) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
- (4) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

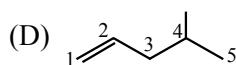
**Ans. (3)**



3-Ethyl-5-methylheptane



2-Methyl-1,3-pentadiene



4-Methylpent-1-ene

56. Choose the **correct** statements.

- (A) Weight of a substance is the amount of matter present in it.
- (B) Mass is the force exerted by gravity on an object.
- (C) Volume is the amount of space occupied by a substance.
- (D) Temperatures below  $0^\circ\text{C}$  are possible in Celsius scale, but in Kelvin scale negative temperature is not possible.
- (E) Precision refers to the closeness of various measurements for the same quantity.

- (1) (B), (C) and (D) Only
- (2) (A), (B) and (C) Only
- (3) (A), (D) and (E) Only
- (4) (C), (D) and (E) Only

**Ans. (4)**

**Sol.** Theory based

57. The correct increasing order of stability of the complexes based on  $\Delta_\circ$  value is :

- |                                       |                                      |
|---------------------------------------|--------------------------------------|
| (I) $[\text{Mn}(\text{CN})_6]^{3-}$   | (II) $[\text{Co}(\text{CN})_6]^{4-}$ |
| (III) $[\text{Fe}(\text{CN})_6]^{4-}$ | (IV) $[\text{Fe}(\text{CN})_6]^{3-}$ |
| (1) II < III < I < IV                 | (2) IV < III < II < I                |
| (3) I < II < IV < III                 | (4) III < II < IV < I                |

**Ans. (3)**

**Sol.** (I)  $[\text{Mn}(\text{CN})_6]^{3-}$   $-1.6 \Delta_\circ$

(II)  $[\text{Co}(\text{CN})_6]^{4-}$   $-1.8 \Delta_\circ$

(III)  $[\text{Fe}(\text{CN})_6]^{4-}$   $-2.4 \Delta_\circ$

(IV)  $[\text{Fe}(\text{CN})_6]^{3-}$   $-2.0 \Delta_\circ$

I < II < IV < III



Level up your prep for JEE Adv. 2025 with  
ALLEN Online's LIVE Rank Booster Course!

Enrol Now

## 58. Match List-I with List-II.

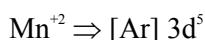
List-I (Complex)	List-II (Hybridisation & Magnetic characters)		
(A) $[\text{MnBr}_4]^{2-}$	(I)	$\text{d}^2\text{sp}^3$ & diamagnetic	
(B) $[\text{FeF}_6]^{3-}$	(II)	$\text{sp}^3\text{d}^2$ & paramagnetic	
(C) $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$	(III)	$\text{sp}^3$ & diamagnetic	
(D) $[\text{Ni}(\text{CO})_4]$	(IV)	$\text{sp}^3$ & paramagnetic	

Choose the **correct** answer from the options given below :

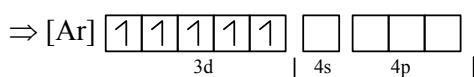
- (1) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
- (2) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)
- (3) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
- (4) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

**Ans. (4)**

**Sol.** (A)  $[\text{MnBr}_4]^{2-}$

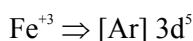


In presence of ligand field

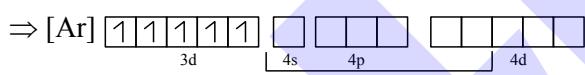


$\Rightarrow \text{sp}^3$  hybridization, paramagnetic in nature

(B)  $[\text{FeF}_6]^{3-}$



In presence of ligand field

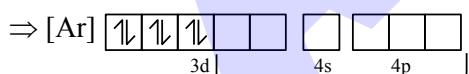


$\Rightarrow \text{sp}^3\text{d}^2$  hybridization, paramagnetic in nature

(C)  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$



In presence of ligand field

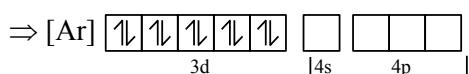


$\Rightarrow \text{d}^2\text{sp}^3$  hybridization, diamagnetic in nature

(D)  $[\text{Ni}(\text{CO})_4]$

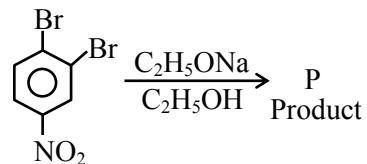


In presence of ligand field

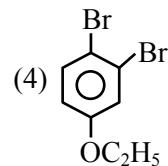
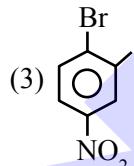
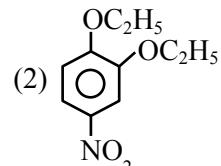
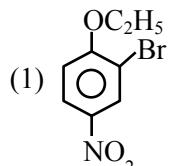


$\Rightarrow \text{sp}^3$  hybridization, diamagnetic in nature

## 59. In the following substitution reaction :

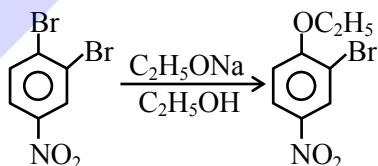


Product 'P' formed is :



**Ans. (1)**

**Sol.** It is an example of nucleophilic Aromatic substitution reaction.

60. For a  $\text{Mg} | \text{Mg}^{2+} \text{(aq)} \parallel \text{Ag}^+ \text{(aq)} | \text{Ag}$  the correct

Nernst Equation is :

$$(1) E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{RT}{2F} \ln \frac{[\text{Ag}^+]}{[\text{Mg}^{2+}]}$$

$$(2) E_{\text{cell}} = E_{\text{cell}}^{\circ} + \frac{RT}{2F} \ln \frac{[\text{Ag}^+]^2}{[\text{Mg}^{2+}]}$$

$$(3) E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{RT}{2F} \ln \frac{[\text{Mg}^{2+}]}{[\text{Ag}^+]} \quad \text{R}$$

$$(4) E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{RT}{2F} \ln \frac{[\text{Ag}^+]^2}{[\text{Mg}^{2+}]}$$

**Ans. (2)**



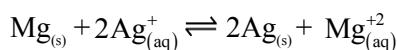
Level up your prep for JEE Adv. 2025 with  
ALLEN Online's LIVE Rank Booster Course!

Enrol Now

**Sol.** According to Nernst equation :-

$$E = E^\circ - \frac{RT}{nF} \ln Q.$$

Cell reaction :-



$$\Rightarrow Q = \frac{[\text{Mg}^{+2}]}{[\text{Ag}^+]^2}$$

$$\Rightarrow E = E_{\text{Cell}}^\circ - \frac{RT}{2F} \ln \left[ \frac{[\text{Mg}^{+2}]}{[\text{Ag}^+]^2} \right]$$

61. The correct option with order of melting points of the pairs (Mn, Fe), (Tc, Ru) and (Re, Os) is :
- Fe < Mn, Ru < Tc and Re < Os
  - Mn < Fe, Tc < Ru and Re < Os
  - Mn < Fe, Tc < Ru and Os < Re
  - Fe < Mn, Ru < Tc and Os < Re

**Ans.** (3)

**Sol.** M.P.  $\Rightarrow$  Mn < Fe, Tc < Ru, Os < Re

NCERT based

62. 1.24 g of  $\text{AX}_2$  (molar mass 124 g mol<sup>-1</sup>) is dissolved in 1 kg of water to form a solution with boiling point of 100.0156°C, while 25.4 g of  $\text{AY}_2$  (molar mass 250 g mol<sup>-1</sup>) in 2 kg of water constitutes a solution with a boiling point of 100.0260°C.

$$K_b(\text{H}_2\text{O}) = 0.52 \text{ K kg mol}^{-1}$$

Which of the following is **correct** ?

- $\text{AX}_2$  and  $\text{AY}_2$  (both) are completely unionised.
- $\text{AX}_2$  and  $\text{AY}_2$  (both) are fully ionised.
- $\text{AX}_2$  is completely unionised while  $\text{AY}_2$  is fully ionised.
- $\text{AX}_2$  is fully ionised while  $\text{AY}_2$  is completely unionised.

**Ans.** (4)

**Sol.** For  $\text{AX}_2$  :-  $\Delta T_b = K_b \times m \times i$

$$0.0156 = 0.52 \times \frac{0.01}{1} \times i_{\text{AX}_2}$$

$$\Rightarrow i_{\text{AX}_2} = 3 \Rightarrow \text{complete ionisation}$$

For  $\text{AY}_2$  :-  $\Delta T_b = K_b \times m \times i$

$$0.026 = 0.52 \times 0.0508 \times i_{\text{AY}_2}$$

$$\Rightarrow i_{\text{AY}_2} \approx 1 \therefore \text{complete unionisation}$$

63. 500 J of energy is transferred as heat to 0.5 mol of Argon gas at 298 K and 1.00 atm. The final temperature and the change in internal energy respectively are :

$$\text{Given : } R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$$

- 348 K and 300 J
- 378 K and 300 J
- 368 K and 500 J
- 378 K and 500 J

**Ans.** Allen Ans. (1)

NTA Ans. (4)

**Sol.**  $q_p = n \times c_p \times \Delta T$

$$\Rightarrow 500 = 0.5 \times \frac{5}{2} \times 8.3 (T_f - 298)$$

$$\Rightarrow T_f \approx 346.2 \text{ K}$$

$$\frac{\Delta H}{\Delta U} = \frac{C_p}{C_v} = \left( \frac{5}{3} \right)$$

$$\Rightarrow \Delta U = \frac{3}{5} \times 500 = 300 \text{ J}$$



Level up your prep for JEE Adv. 2025 with  
ALLEN Online's LIVE Rank Booster Course!

Enrol Now



68. Match List – I with List – II.

	List – I (Carbohydrate)		List – II (Linkage Source)
(A)	Amylose	(I)	$\beta$ -C <sub>1</sub> -C <sub>4</sub> , plant
(B)	Cellulose	(II)	$\alpha$ -C <sub>1</sub> -C <sub>4</sub> , animal
(C)	Glycogen	(III)	$\alpha$ -C <sub>1</sub> -C <sub>4</sub> , $\alpha$ -C <sub>1</sub> -C <sub>6</sub> , plant
(D)	Amylopectin	(IV)	$\alpha$ -C <sub>1</sub> -C <sub>4</sub> , plant

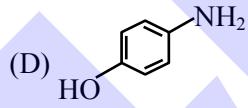
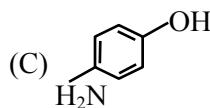
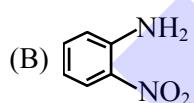
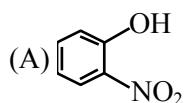
Choose the **correct** answer from the options given below :

- (1) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
- (2) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
- (3) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
- (4) (A)-(IV), (B)-(I), (C)-(III), (D)-(II)

**Ans. (2)**

**Sol.** Informative

69. The steam volatile compounds among the following are :



Choose the **correct** answer from the options given below :

- (1) (B) and (D) only
- (2) (A) and (C) only
- (3) (A) and (B) only
- (4) (A),(B) and (C) only

**Ans. (3)**

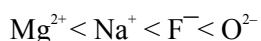
**Sol.** (A)

& (B)

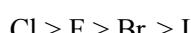
are steam volatile due to intramolecular hydrogen bonding.

70. Given below are two statements :

**Statement (I) :** The radii of isoelectronic species increases in the order.



**Statement (II) :** The magnitude of electron gain enthalpy of halogen decreases in the order.



In the light of the above statements, choose the **most appropriate answer** from the options given below :

- (1) **Statement I** is incorrect but **Statement II** is correct
- (2) Both **Statement I** and **Statement II** are incorrect
- (3) **Statement I** is correct but **Statement II** is incorrect
- (4) Both **Statement I** and **Statement II** are correct

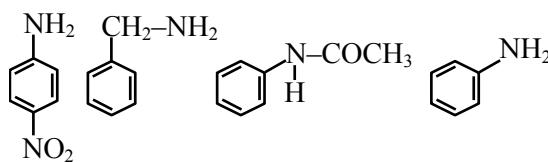
**Ans. (4)**

**Sol.** (i) For isoelectronic species –ve charge increases, radii increases.

(ii) Magnitude of E.G.E : Cl > F > Br > I

## SECTION-B

71. Given below are some nitrogen containing compounds.



Each of them is treated with HCl separately. 1.0 g of the most basic compound will consume \_\_\_\_\_ mg of HCl.

(Given molar mass in g mol<sup>-1</sup> C:12, H : 1, O : 16, Cl : 35.5)

**Ans. (341)**



Level up your prep for JEE Adv. 2025 with  
ALLEN Online's LIVE Rank Booster Course!

Enrol Now





# Level up your prep for JEE Adv. 2025 with our **Online Rank Booster Course!**



LIVE classes for JEE Main & Advanced



Soft copies of ALLEN's study material

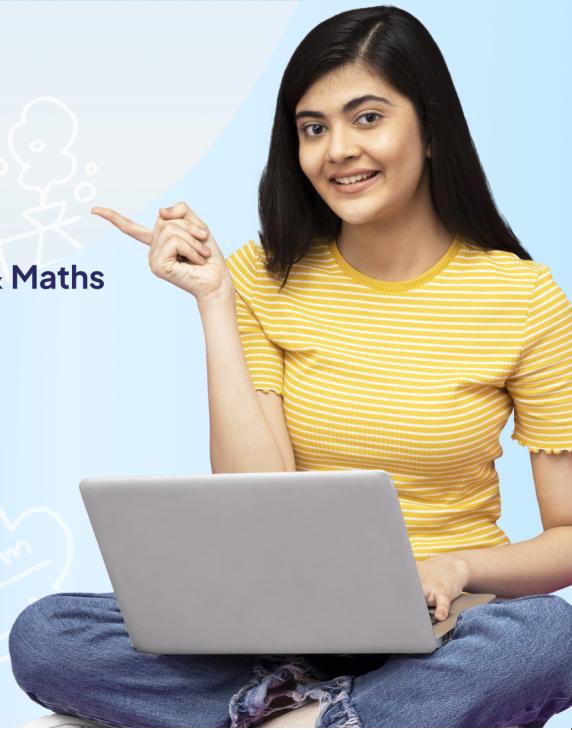


Covers important questions across **Physics, Chemistry & Maths**



ALLEN App Advantage: **24/7 doubt support,  
Custom Practice & more**

**Enrol Now**



Win up to  
**90% scholarship\***

with the ALLEN Online Scholarship Test

at just **₹49/-**



1-hour online test  
Can be taken from anywhere

**Register Now**

