PAPER SOLUTION

From Meerut

JEE MAIN

2025

JAN	SHIFT
24	2nd

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#Q. Consider the following reaction:

$$S(s)+\frac{3}{2}O_2(g)\longrightarrow SO_3(g)+2x\ kJ$$

$$SO_2(g)+\frac{1}{2}O_2(g)\longrightarrow SO_3(g)+y\ kJ$$

calculate ΔH_r for the following reaction (kJ)

$$S(s)\ +\ O_2\longrightarrow SO_2(g)$$

A. –(x + y)

B. –(2x + y)

C. $x\sqrt{y}$

D. Y–2x

Ans. (D)

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#Q. $t_{2g}^3 e_g^1$ configuration in a metal complex is possible for a complex which is:

(A) Strong field ligand; High spin complex

(B) Weak field ligand; High spin complex

(C) Strong field ligand; Low spin complex

(D) Weak field ligand; Low spin complex

Ans. (B)

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#Q. When ethylenediamine is added to aq. $NiCl_2$ solution, the sequence of colours will be–

(A) Pale Blue → Blue → Green → Violet

(B) Violet → Blue → Pale Blue → Green

(C) Pale Blue → Blue → Violet → Green

(D) Green → Pale Blue → Blue → Violet

Ans. (D)

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#Q. Statement I : Ionisation energy of Ge is more than Si.
Statement II : Ionisation energy of Pb is more than Sn.

A. Both statement I & statement II are correct.

B. Both statement I & statement II are incorrect.

C. Statement I is correct but statement II is incorrect.

D. Statement I is incorrect but statement II is correct.

Ans. (D)

#Q. 0.25 gm of organic compound gives 0.15 gm of AgBr in Carius method. Percentage of bromine in organic sample is _____ $\times 10^{-1}$.
(Atomic mass : Ag = 108, Br = 80) (Nearest Integer)

Ans. 255

#Q. $A \xrightarrow{Aqua-regia} B \xrightarrow[CH_3COOH]{KNO_2} \underset{(C)}{Yellow\ ppt}$

A is:

(A) NiS

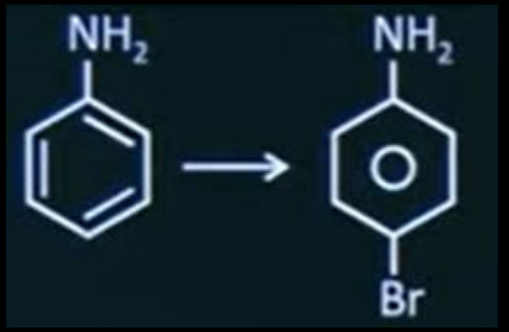
(B) CoS

(C) MnS

(D) FeS

Ans. (B)

#Q. How can the following conversion be brought about?



A Fe/Br_2, $H_2O(\Delta)$, H_2SO_4

B Ac_2O, H_2SO_4, Br_2, NaOH

C Ac_2O, H_2O/H^+

D Ac_2O, Br_2/Fe, NaOH

Ans. (D)

#Q. Match the column and select the correct option:

Column–I (Ionic species)	Column–II (spin only magnetic moment (BM))
A. Sc^{3+}	p. 2.84
B. Ti^{2+}	q. 0
C. V^{2+}	r. 5.92
D. Mn^{2+}	s. 3.87

(A) A – p, B – q, C – r, D – s

(B) A – r, B – s, C – p, D – q

(C) A – q, B – p, C – r, D – s

(D) A – q, B – p, C – s, D – r

Ans. (D)

#Q. In a compound contains 54.2% carbon, 9.2% of hydrogen and rest are oxygen. What is molecular formula of compound, if molecular mass is 132 g/mol?

A $C_6H_{12}O_3$

B $C_4H_{12}O_3$

C $C_4H_{12}O_6$

D $C_6H_{12}O_6$

Ans. (A)

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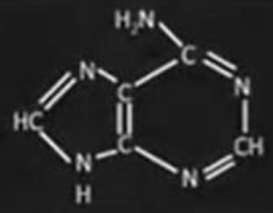
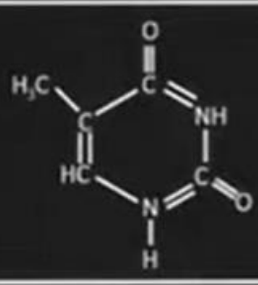
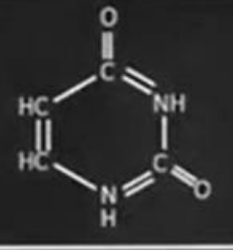
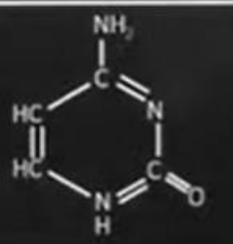
#Q. Match the following nitogenous bases present in List – I with their structures present in List – II.

(A) A – i, B – ii, C – iii, D – iv

(B) A – ii, B – i, C – iv, D – iii

(C) A – ii, B – i, C – iii, D – iv

(D) A – iii, B – iv, C – i, D – ii

	List-I		List-II
A.	Thymine	(i)	
B.	Adenine	(ii)	
C.	Cytosine	(iii)	
D.	Uracil	(iv)	

Ans. (B)

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#Q. Number of sp^2 and sp hybrid carbon atoms respectively in the compound.

A. 5, 2

B. 4, 3

C. 5, 3

D. 4, 2

Ans. (C)

#Q. How many stereoisomers of 5–Phenylpent–4–en–2ol are possible?

Ans. 4

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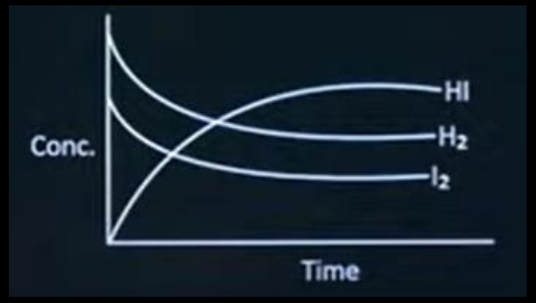
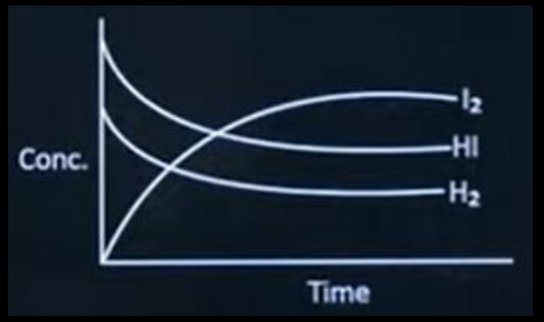
#Q. Consider the following gaseous reaction.

$$H_2(g) + I_2(g) \longrightarrow 2HI$$

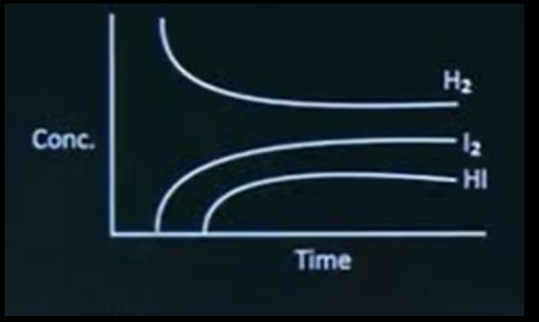
The above reaction is started with 'a' moles of H_2 and 'b' moles of I_2 in a closed container at a certain temperature T(K) till the equilibrium is established. Which one of the following plots correctly describes the progress of reaction?



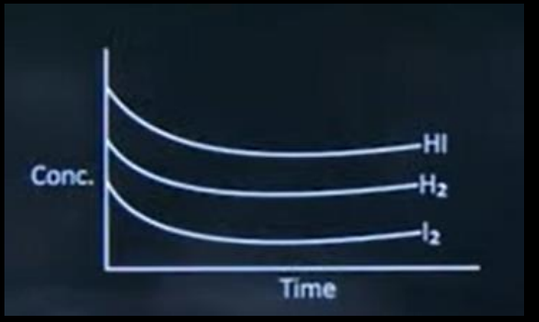
A



B



C



D

Ans. (A)

#Q. A hydrocarbon X which has molar mass 80g contains 90% carbon. Find degree of unsaturation in X.

Ans. 3

#Q. Let k_1, k_2 and k_3 be the rate constant of reaction and $k = \sqrt{\frac{k_1 k_3}{k_2}}$. Then find activation energy of overall reaction.

(*Given* : E_{a_1} = 10 kJ/mol, E_{a_2} = 30 kJ/mol, E_{a_3} = 60 kJ/mol)

Ans. 20

#Q. The successive ionisation energy (I.E.) of an element 'X' is given.

	$I.E_1$	$I.E_2$	$I.E_3$	$I.E_4$	$I.E_5$
X →	500	600	2000	2200	2600

Data given in KJ/mol.

Find out the group number of element X.

(A) Group – 3

(B) Group – 14

(C) Group – 2

(D) Group – 13

Ans. (C)

#Q. Statement I : Oxygen–Oxygen bond length in O_3 is larger than O_2.
Statement II : O – O bond order in O_3 is 1.5 and O – O bond order in O_2 is 2.

(A) Both statement I & statement II are correct.

(B) Both statement I & statement II are incorrect.

(C) Statement I is correct but statement II is incorrect.

(D) Statement I is incorrect but statement II is correct.

Ans. (A)

#Q. A solution is prepared by mixing MX_2 (normal molar mass = 164) into aq. Solution. Abnormal molar mass is 65.4 percentage of ionization of MX_2 is:

Ans. 75%

#Q. Which of the following is the strongest reducing agent:

$E^{o}_{Cr^{3+}/Cr} = -0.76\ V$

$E^{o}_{MnO_4^-/Mn^{2+}} = 1.57\ V$

$E^{o}_{Cl_2/Cl^-} = 1.36\ V$

$E^{o}_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33\ V$

A. Cr

B. Cl_2

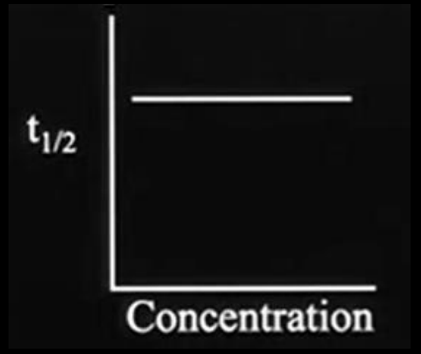
C. Cr^{3+}

D. MnO_4^-

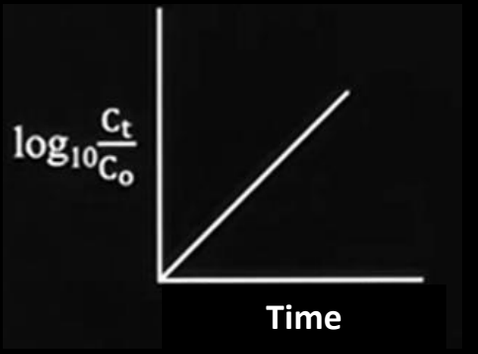
Ans. (A)

#Q. Statements with respect to 1st order reaction:

Statement–1



Statement–2



A. Both statement I & statement II are correct.

B. Both statement I & statement II are incorrect.

C. Statement I is correct but statement II is incorrect.

D. Statement I is incorrect but statement II is correct.

Ans. (C)