JEE-Main-29-01-2024 (Memory Based) [MORNING SHIFT]

Chemistry

Question: Which of the following pair will be formed by the decomposition of $KMnO_4$?
Options:
(a) MnO_4, MnO_2
(b) K_2 MnO_4 , MnO_2
(c) $KMnO_4$, MnO_2
(d) MnO_2 , H_2O
Answer: (b) K_2 MnO_4 , MnO_2
Solution:
Potassium permanganate forms dark purple (almost black) crystals which are isostructural with those of $KCLO_4$. The salt is not very soluble in water (6.4 g / 100 g of water at 293 K), but when heated it decomposes at 513 K.

$2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

Question: Interaction b/w r. Bond & lone pair l-s on adjacent atoms
Options:
(a) Resonance
(b) Hyper conjugation
(c) Inductive Effect
(d) Electronic Effect
Answer: (a) Resonance
Solution:

Question: Assertion. Electronegativity increase across a period
Reason. Effective increase in nuclear charge is more than effective shielding.
Options:
(a) Step 1: Electronegativity increase down the group 14 is to pb
(b) Step 2: Group 14 contains metals, non metals and also metalloids
Solution: Assertion true reason true
Step : 1 is incorrect but Step : 2 is correct

Question:

Column - I	**Column - II**
Ziegler Natta Catalyst	Rh
Blood Pigment	CO
Wilkinson Catalyst	Fe
Vitamin B12	Ti

Solution:
1 → Ti
2 → Fe
3 → Rh
4 → Co

Question: Appearance of Red colour on treatment with Na fusion extract of an organic compound with $FeSO_4$ in presence of conc. H_2SO_4 indicate element
Options:
(a) N
(b) Br
(c) S
(d) N & S
Answer: (d) N & S
Solution:(d) N & S

Question: Cl- shows disproportionation in alkaline meol :
a cl_2 + b OH^- → c cl O^- + d cl^- + H_2O
Options:
(a) 1 1 1 3
(b) 3 6 2 4
(c) 1 2 1 1
(d) 2 4 1 3

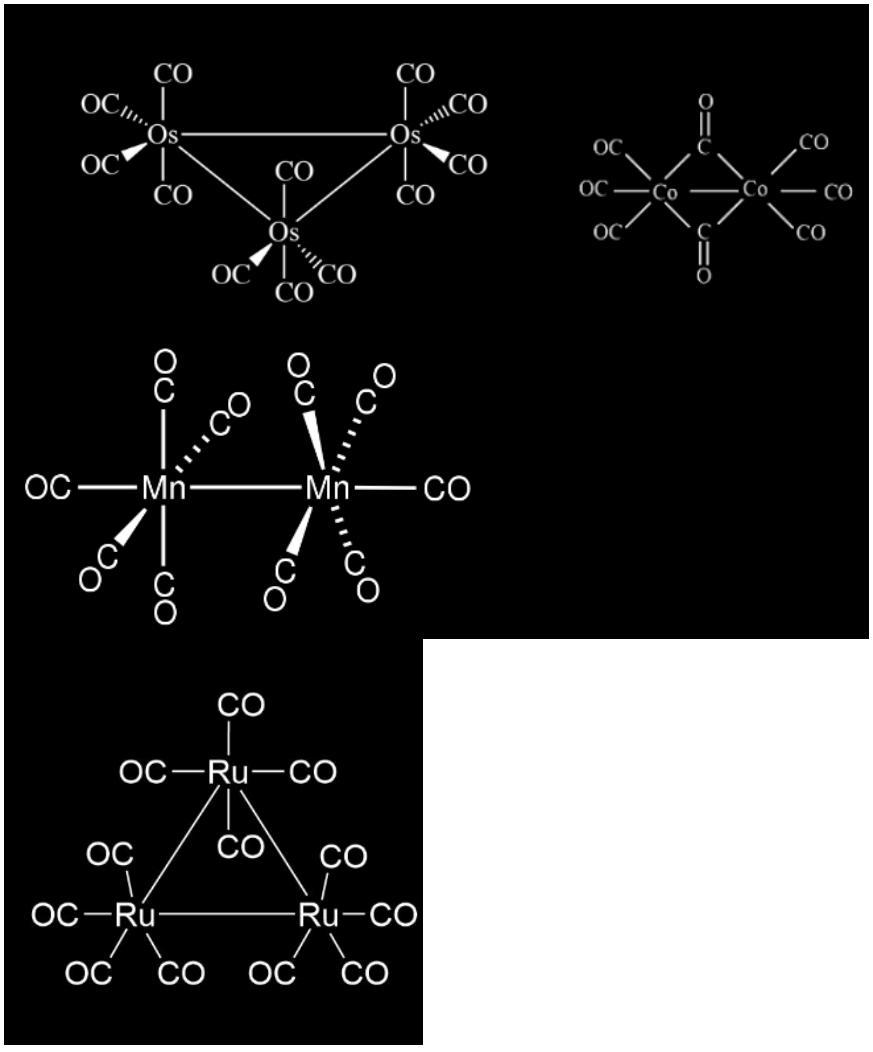
Answer: (b)
Solution: $3Cl_2 + 6OH^- \rightarrow 2ClO^-_3 + 4Cl^- + 3H_2O$

Question: The correct set of 4 Quantum numbers of Valence e^- of Rb(37)
Options:
(a) n = 5 ., l= 0 ., m = 1.,
(b) n = 5., l = 0., m = 0.,
(c) n = 5., l = 1., m = 0.,
(d) n = 5., l = 1., m = 1.,
Answer:
Solution:
Rb ⇒ 5 sl
↓
n = 5
l = 0
Ml = 0
Mg = +1/2 or - 1/2
The electronic configuration of rubidium atom (Z = 37) is given by
Rb = [Kr] 5 s1
Hence, the quantum numbers for 5 s1 electron is given by
n = 5, I = 0, m = 0, s=+1/2 or - 1/2

Question: Type of amino acids obtained on hydrolysis of proteins
Options:
(a) a
(b) β

(c) $\gamma\gamma$
(d) δ
Answer: (a)
Solution: Alpha amino acid

Question: CO forms a bridge b/w M atoms
Options:
(a) $Os_3 (CO)_{12}$
(b) $Co_2 (CO)_8$
(c) $Ru_3 (CO)_{12}$
(d) $Mn_2 (CO)_{10}$
Solution:



Question: Calculate the Molarity of a Solution having density = 1.25 g/ml. % (w/w) of Solute is 31.4% of H_2SO_4 solution
Options:
(a) 4
(b) 9
(c) 8
(d) 6
Answer: (a)
Solution:

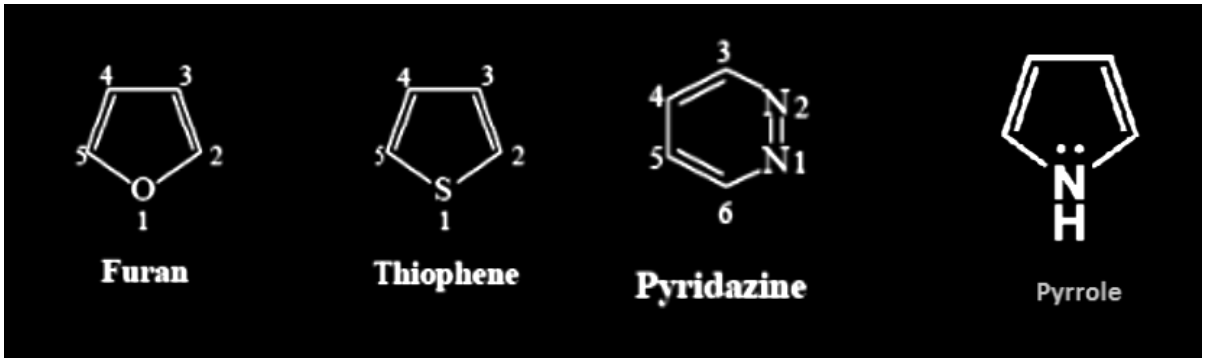
$$M = \frac{10 \times w/w\ \% \times d}{M_{solute}}$$

$$M = \frac{10 \times 31.4 \times 125 \times 100}{98}$$

$= 4$

Question: Find all quantum numbers Z = 37
Options:
(a) n = 5 ., l= 0 ., m = 1.,
(b) n = 5., l = 0., m = 0.,
(c) n = 5., l = 1., m = 0.,
(d) n = 5., l = 1., m = 1.,
Answer: (a)

Question: Among the heterocyclic compound that contain Sulphur atom is :
Options:
(a) Pyradizine
(b) Furan
(c) Thiophene
(d) Pyrrole
Answer: (c)
Solution:



Question: Find weight of Zinc in Zinc sulphate electrolysis i = 0.015 A t = 15 minutes
Solution:
$Zn^{+2} + 2e^- \rightarrow Zn$
1 mol Zn = 65.3 gm = 2 F

$$\text{Number of Faradays} = \frac{0.015 \times 15 \times 60}{965}$$

= 0.00013 g F
= .0046

Question: Number of compound in which B.O = 1 and is paramagnetic
He_2^+, O_2^+, O_2^{-2}, N_2^+
Answer: 0
Solution:

	B.O	Magnetic nature
He_2^+	0.5	Paramagnetic
O^+_2	1.5	Paramagnetic
O^{2-}_2	1	Diamagnetic

N^{+}_{2}	2.5	Paramagnetic

Question: Number of compounds that gives positive fehling test Benzaldehyde, acetophenone, methanal

Answer: 1

Solution: Aliphatic aldehyde group. Aromatic aldehydes and ketones do not a give Fehling's test.