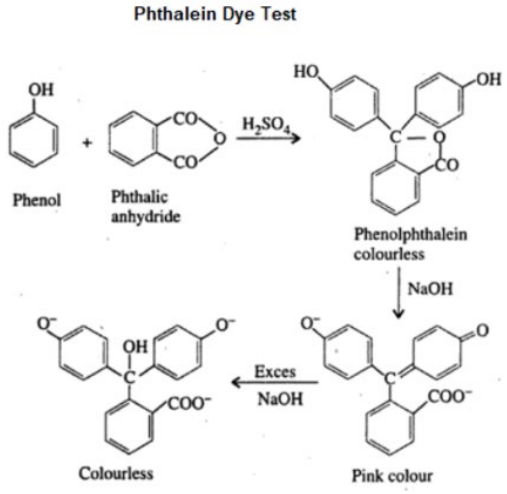
JEE-Main-27-01-2024 (Memory Based) [EVENING SHIFT]

Chemistry

Question: Which of the following cannot act as an oxidising agent?
Options:
(a) MnO_4^-
(b) SO_4^{2-}
(c) N_3^-
(d) BrO_3^-
Answer: (c)
Solution: N_3^-

Question: The quantity which changes with temperature:
Options:
(a) Mole fraction
(b) Mass Percentage
(c) Molarity
(d) Molality
Answer: (c)
Solution: Molarity is dependent on temperature. As the temperature increases, water expands, so the solution's volume therefore increases

Question: Phenolic group can be identified by a positive
Options:
(a) Lucas test
(b) Carbylamine test
(c) Phthalein test
(d) Tollen's test
Answer: (c)
Solution:



Question: Find the longest wavelength in Paschen series terms of R
Options:
(a) 144/7R
(b) 123/2R
(c) 170/R
(d) 16/R
Answer: (a)
Solution:

$$\frac{1}{\lambda}=\mathrm{R}\left(\frac{1}{3^2}-\frac{1}{4^2}\right)=\mathrm{R}\frac{7}{144}$$

Question: First order reaction 99.9 % completion and half life ratio?
Options:
(a) 10
(b) 5
(c) 20
(d) 4
Answer: (a)
Solution:

$$t=\frac{2.303}{k}\log\frac{a}{a-x}$$

(i) $t_1=\frac{2.303}{k}\log\frac{100}{100-99.9}(\text{for 99.9\% completion})$

$$=\frac{2.303}{k}\log\frac{100}{0.1}$$

$$=\frac{2.303}{k}\times 3$$

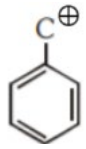
(ii) $t_2=\frac{2.303}{k}\log\frac{100}{100-50}(\text{for 50\% completion})$

$$=\frac{2.303}{k}\log 2$$

$$\frac{t_1}{t_2}=\frac{3}{0.3010}\approx 10$$

Question: S1: Ce^{4+} is stable because of noble gas configuration
S2: Ce^{4+} is good R. A. as it can go to +3 O.S.
Options:
(a) Statement I is incorrect but statement II is correct
(b) Both statement I and II are correct
(c) Both statement I and II are incorrect
(d) Statement I is correct but statement II is incorrect
Answer: (d)
Solution: Statement I is correct but statement II is incorrect

Question: Which of the following not undergo S_N1?
Options:
(a) C = C⊕
(b) 2° C⊕
(c)



(d) C = C – C⊕
Answer: (a)

Question: C_2H_6 newman projection find incorrect information
Options:
(a) Infinite conformers
(b) Interconvertible
(c) Dihedral angle in staggered 60°
(d) Eclipsed is more stable.
Answer: (d)
Solution: Staggered form is more stable

Question: 1 mole of Pbs reacts with x mol of O_3 to give y moles of O_2 then x + y?
Options:
(a) 8
(b) 9
(c) 4
(d) 6
Answer: (a)
Solution:
$Pbs + 4O_3 \rightarrow PbSO_4 + 4O_2$

$x = 4 \quad y = 4$

$x + y = 8$

Question: Which structure of protein is intact after coagulation of egg white on boiling?
Options:
(a) Primary
(b) Secondary
(c) Tertiary
(d) Quaternary
Answer: (a)
Solution: Denaturation of protein causes structural change in secondary & tertiary structure of protein but primary structure remain unchanged.

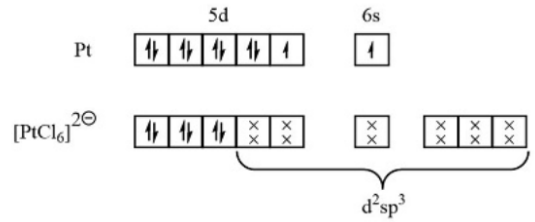
Question: The molecular formula of second homologue in the homologous series of monocarboxylic acid is
Options:
(a) CH_3COOH
(b) CH_3CH_2COOH
(c) $CH_3CH(CH_3)COOH$
(d) $CH_3CH_2CH_2COOH$
Answer: (a)
Solution: 1st homologue HCOOH
2nd homologue CH_3COOH

Question: The technique used for purification of steam volatile water immiscible substance is:
Options:
(a) Fractional Distillation
(b) Distillation under reduced pressure
(c) Steam Distillation
(d) Simple Distillation
Answer: (c)
Solution: Steam distillation method is used to separate substances which are steam volatile and are immiscible with water. However, the impurities should not be steam volatile in order to purify the substance by steam distillation.

Question: In which of the options all the elements have d^{10} configuration in their ground state
Options:
(a) Cu, Zn, Cd, Ag
(b) Cd, Au, Hg, Ni
(c) Sc, Ti, Fe, Zn
(d) Fe, Cr, Co, Ni
Answer: (a)
Solution:
Zn - $3d^{10}\ 4s^2$
Cu - $3d^{10}\ 4s^1$
Cd - $4d^{10}\ 5s^2$
Ag- $4d^{10}\ 5s^1$

Question: Number of non - polar molecules
H_2O, CH_4, SO_2, $CHCl_3$, PF_3, NH_3, SO_2, HF
Answer: 2
Solution: Number of non - polar molecules = 2
CH_4, CO_2

Question: How many of them have d^2sp^3 Hybridisation?
(a) $[Co(NH_3)_6]^{3+}$
(b) $[PtCl_6]^{2-}$
(c) SF_6
(d) BrF_2^-
Answer: 2
Solution:
(a) $[Co(NH_3)_6]^{3+}$
(b) $[PtCl_6]^{2-}$
Co^{3+} - $3d^6$
In presence of NH_3 ligand pairing of electron takes place
$[Co(NH_3)_6]^{3+}$ have d^2sp^3 Hybridisation
Pt^{4+} - $5d^6$



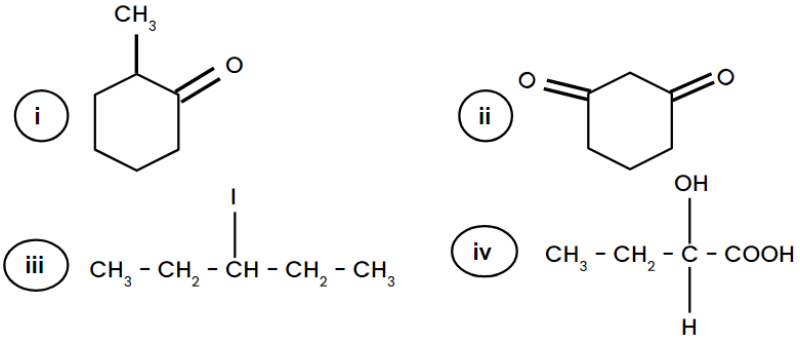
Question: How many have noble gas configuration?
(a) Fe^{2+}
(b) Cs^{+}
(c) Sr^{2+}
(d) Pb^{2+}
Answer: 2
Solution:
Cs^{+} – [Xe]
Sr^{2+} – [Kr]
Both have noble gas configuration.

Question: In a standard Hydrogen Electrode, pH = 3
What is the EMF of the electrode in this case?
Solution:
$E_{H^+} / H_2 = -0.0591$ pH $\quad \because -\log [H^+] = pH$

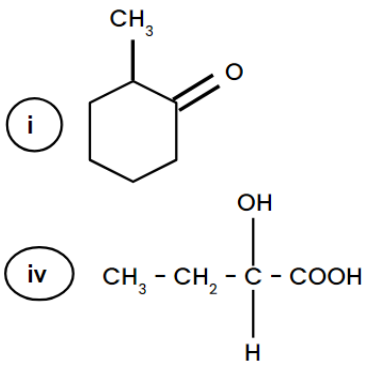
$= -0.0591 \times 3$

$= -0.1773$

Question: How many compound(s) given below have chiral carbon ?



Answer: 2
Solution:



Question: What volume of 3M NaOH solution can be formed using 84g of NaOH
Solution:

Moles of NaOH = $\frac{84}{40} = \frac{21}{10} = 2.1$

$M \times V = 2.1$
$3 \times V = 2.1$
$V = 0.7$ ltr $= 700$ ml