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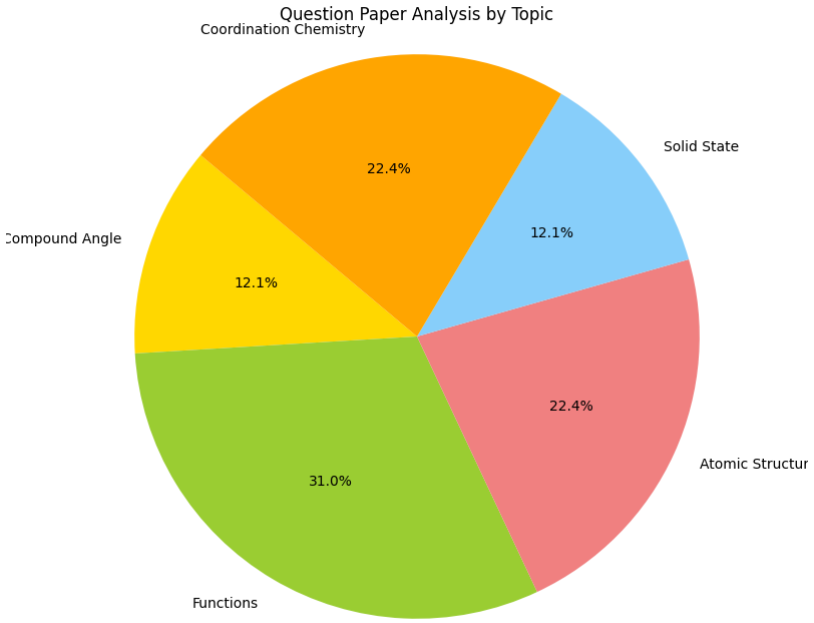
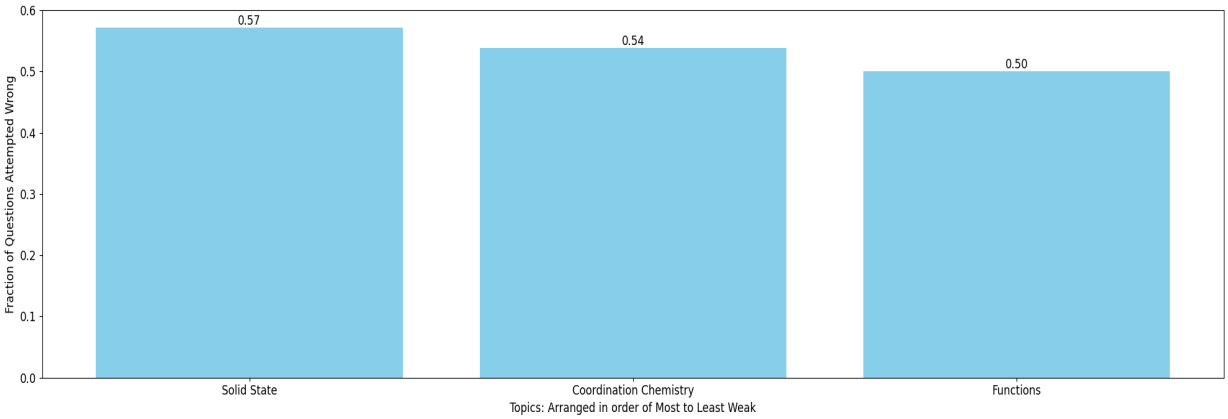
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Solid State:

14. Element 'B' forms ccp structure and 'A' occupies half of the octahedral voids, while oxygen atoms occupy all the tetrahedral voids. The structure of bimetallic oxide is : **[Jee Main, April 2019]**

(A) AB_2O_4 (B) A_4B_2O (C) A_4BO_4 (D) A_2B_2O

11. An element crystallizes in a face-centred cubic (fcc) unit cell with cell edge a. The distance between the centres of two nearest octahedral voids in the crystal lattice is: **[Jee Main, 2020]**

(A) $\frac{a}{\sqrt{2}}$ (B) $\frac{a}{2}$ (C) a (D) $\sqrt{2}a$

2. Metal deficiency defect is shown by $Fe_{0.93}O$. In the crystal, some Fe^{2+} cations are missing and loss of positive charge is compensated by the presence of Fe^{3+} ions. The percentage of Fe^{2+} ions in the $Fe_{0.93}O$ crystals is _____ . (Nearest integer) **[JEE Main, June 2022]**

13. Which of the following is incorrect for simple cubic metallic crystal -

(A) The coordination number of an atom is 6

(B) The atom along the edge length of the cube touches each other

(C) There is no empty space in between the atoms.

(D) An atom touches 6 other atoms.

28. The coordination number of a metal crystallising in a hcp structure is **[JEE-2000]**

(A) 12 (B) 4 (C) 8 (D) 6

Coordination Chemistry:

5. Number of ambidentate ligands in a representative metal complex $[M(en)(SCN)_4]$ is _____. [en = ethylenediamine] **[JEE MAIN 2023]**

Ans. (4)

EXERCISE : JEE-ADVANCED

. The complex ion which has no 'd' electrons in the central metal atom is : **[JEE 2001]**

[Atomic number Cr = 24, Mn = 25, Fe = 26, Co = 27]

(A) $[MnO_4]^-$ (B) $[Co(NH_3)_6]^{3+}$ (4) $[Fe(CN)_6]^{3-}$ (D) $[Cr(H_2O)_6]^{3+}$

. The correct order of hybridisation of the central atom in the following species. **[JEE 2001]**

NH_3, $[PtCl_4]^{2-}$, PCl_5 and BCl_3 is [At No. Pt = 78]

(A) dsp^2,sp^3d,sp^2 and sp^3 (B) sp^3,dsp^2, sp^3d, sp^2

(C) dsp^2,sp^2,sp^3 and sp^3d (D) dsp^2, sp^3,sp^2 and sp^3d

. The species having tetrahedral shape is : **[JEE 2004]**

(A) $[PdCl_4]^{2-}$ (B) $[Ni(CN)_4]^{2-}$ (C) $[Pd(CN)_4]^{2-}$ (D) $[NiCl_4]^{2-}$

. The pair of compounds having metals in their highest oxidation state is **[JEE 2004]**

(A) MnO_2, $FeCl_3$ (B) $[MnO_4]^-$, CrO_2Cl_2

(C) $[Fe(CN)_6]^{3-}$, $[Co(CN)_6]^{-3}$ (D)$[NiCl_4]^{2-}$, $[CoCl_4]^-$

. Spin only magnetic moment of the compound $Hg^{+2}[Co(SCN_4)]$ is **[JEE 2004]**

(A) $\sqrt{3}$ (B) $\sqrt{15}$ (C) $\sqrt{24}$ (D) $\sqrt{8}$

30. Consider the following complex ions P, Q and R ,

$P = [FeF_6]^{3-}$, $Q = [V(H_2O)_6]^{2+}$ and $R = [Fe(H_2O)_6]^{2+}$

The correct order of the complex ions, according to their spin-only magnetic moment values (in B.M.) is - **[JEE 2013]**

(A) R < Q < P (B) Q < R < P (C) R < P < Q (D) Q < P < R

89. In the complex $FeK_2[Fe(CN)_6]$,

(A) Both Fe atoms are in the same oxidation state.

(B) Both Fe atoms are in different oxidation state.

(C) The coordination number of ion is 4.

(D) The complex is a high spin complex.

49. Which one of the following complexes shows optical isomerism :- **[J-MAIN–2016]**

(1) $[Co(NH_3)_4Cl_2]Cl$ (2) $[Co(NH_3)_3Cl_3]$

(3) cis$[Co(en)_2Cl_2]Cl$ (4) trans$[Co(en)_2Cl_2]Cl$

(en = ethylenediamine)

39. $NiCl_2$ in the presence of dimethyl glyoxime (DMG) gives a complex which precipitates in the presence of NH_4OH, giving a bright red colour. **[JEE 2004]**

(a) Draw its structure and show H-bonding

(b) Give oxidation state of Ni and its hybridisation

(c) Predict whether it is paramagnetic or diamagnetic

Functions:

7. Let $f(x) = \frac{9^x}{9^x+3}$ then find the value of the sum $f\left(\frac{1}{2006}\right) + f\left(\frac{2}{2006}\right) + f\left(\frac{3}{2006}\right) + \cdots + f\left(\frac{2005}{2006}\right)$

6. Suppose $f(x) = \sin x$ and $g(x) = 1 - \sqrt{x}$. Then find the domain and range of the following functions.

(a) fog (b) gof (c) fof (d) gog

1. Find the number of integer in the range of the function,

$$f(x) = \sqrt{\sin\frac{\pi x}{2}} + \sqrt{16 - x^2} + \sqrt{x} + \log_2(x(x-2))$$

Daily Work Sheet-2

INGLE CORRECT TYPE

. Which of the following statements are incorrect? I. If $f(x)$ and $g(x)$ are one to one then $f(x) + g(x)$ is also one to one.

II. If $f(x)$ and $g(x)$ are one-one then $f(x) \cdot g(x)$ is also one-one.

III. If $f(x)$ is odd then it is necessarily one to one.

(A) I and II only (B) II and III only

(C) III and I only (D) I, II and III

9. Let f be a one-one function with domain $\{x, y, z\}$ and range $\{1,2,3\}$. It is given that exactly one of the following statements is true and the remaining two are false.

$f(x) = 1; f(y) \neq 1; f(z) \neq 2$. Determine $f^{-1}(1)$

$\{1 - x \quad \text{if } x < 0$

8. Find the formula for the function fogoh, given $f(x) = \frac{x}{x+1}; g(x) = x^{10}$ and $h(x) = x + 3$. Find also the domain of this function. Also compute (fogoh)(-1).