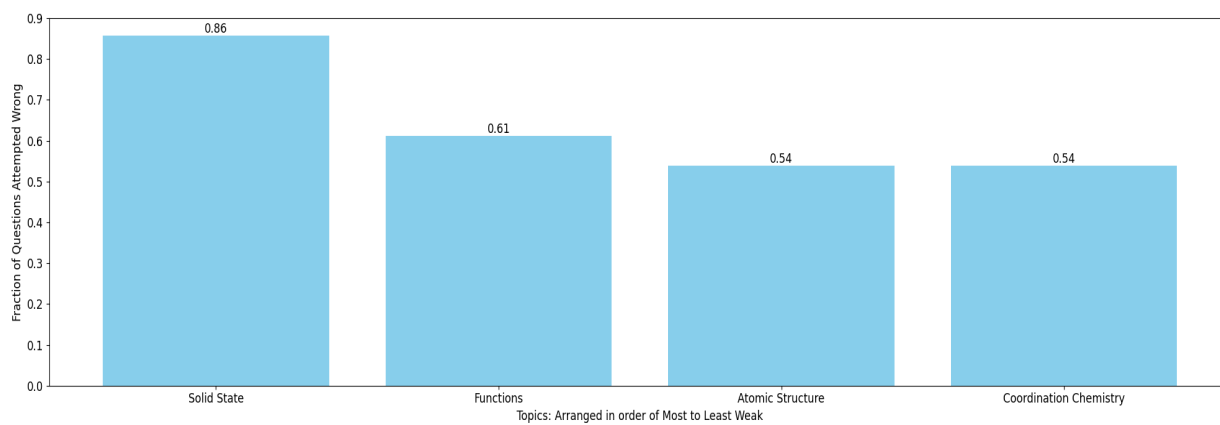


Samarth Rajput Total MLAssist - Personalised DPP

Question Paper Analysis:



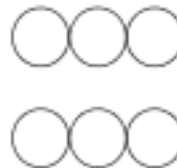
Weak Topic Analysis:



Practice Questions:

Solid State:

28. The coordination number of a metal crystallising in a hcp structure is [JEE-2000]
(A) 12 (B) 4 (C) 8 (D) 6
11. Gold crystallizes in a face centered cubic lattice. If the length of the edge of the unit cell is 407 pm, calculate the density of gold as well as its atomic radius assuming it to be spherical. Atomic mass of gold = 197 amu.
25. The figures given below show the location of atoms in three crystallographic planes in FCC lattice. Draw the unit cell for the corresponding structure and identify these planes in your diagram. [JEE-2000]



11. A match box exhibit -
(A) Cubic geometry (B) Monoclinic geometry
(C) Tetragonal geometry (D) Orthorhombic geometry
6. A metal crystallises in bcc. Find the % fraction of edge length not covered and also % fraction of edge length covered by atom is:

Functions:

10. The number of elements in the range of $f(x) = [x] + [2x] + \left[\frac{2}{3}x\right] + [3x] + [4x] + [5x]$ for $0 \leq x < 3$ is

4. If $X = \{4^n - 3n - 1 : n \in \mathbb{N}\}$ and $Y = \{9(n - 1) : n \in \mathbb{N}\}$, where \mathbb{N} is the set of natural numbers, then $X \cup Y$ is equal to : [JEE - Main 2014]

(A) \mathbb{N} (B) $Y - X$ (C) X (D) Y

2. Find the domain & range of the following functions. (Read the symbols $[*]$ and $\{*\}$ as greatest integers and fractional part functions respectively.)

(i) $y = \log_{\sqrt{5}} (\sqrt{2}(\sin x - \cos x) + 3)$

(ii) $y = \frac{2x}{1+x^2}$

(iii) $f(x) = \frac{x^2 - 3x + 2}{x^2 + x - 6}$

(iv) $f(x) = \frac{x}{1+|x|}$

(v) $y = \sqrt{2-x} + \sqrt{1+x}$

(vi) $f(x) = \frac{\sqrt{x+4}-3}{x-5}$

7. If range of $f(x) = \frac{\cos x + \cos(x+\cos x)}{\sin^2 x + \sin x + 1}$ is $[p, q]$ then $6p - 3q$ equals

$2F(n)+1$

$F(101)$

37. Let a function $f : \mathbb{N} \rightarrow \mathbb{N}$ be defined by.

[JEE - Main 2022]

$$f(x) = \begin{cases} 2n, & n = 2, 4, 6, 8, \dots \\ n-1, & n = 3, 7, 11, 15, \dots \\ \frac{n+1}{2}, & n = 1, 5, 9, 13, \dots \end{cases} \text{ then } f \text{ is}$$

- (A) One-one but not onto (B) Onto but not one-one
(C) Neither one-one nor onto (D) one-one and onto

Atomic Structure:

8. Which of the following sets of quantum number is correct for an electron in 4f orbital ?

[AIEEE-2004]

- (1) $n = 3, l = 2, m = -2, s = +\frac{1}{2}$ (2) $n = 4, l = 4, m = -4, s = -\frac{1}{2}$
 (3) $n = 4, l = 3, m = +1, s = +\frac{1}{2}$ (4) $n = 4, l = 3, m = +4, s = +\frac{1}{2}$

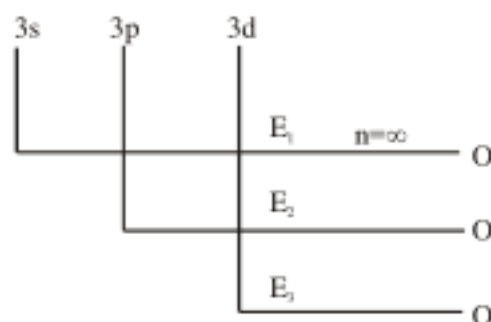
47. What will be de-Broglie wavelength of an electron moving with a velocity of $1.2 \times 10^5 \text{ ms}^{-1}$:

- (A) $6.068 \times 10^{-9} \text{ m}$ (B) $3.133 \times 10^{-37} \text{ m}$ (C) $6.626 \times 10^{-9} \text{ m}$ (D) $6.018 \times 10^{-7} \text{ m}$

48. For a valid Bohr orbit, its circumference should be:

- (A) $= n \lambda$ (B) $= (n - 1) \lambda$ (C) $> n \lambda$ (D) $< n \lambda$

62. For H atom, the energy required for the removal of electron from various sub-shells is given as under:-



The order of the energies would be :-

- (A) $E_1 > E_2 > E_3$ (B) $E_3 > E_2 > E_1$ (C) $E_1 = E_2 = E_3$ (D) None of these

36. The ground state energy of hydrogen atom is -13.6 eV . The energy of second excited state He^+ ion in eV is :

[JEE Main (Jan.) 2019]

- (1) -54.4 (2) -6.04 (3) -3.4 (4) -27.2

Coordination Chemistry:

18. Which one of the following has a square planar geometry :- [AIEEE-2007]
(Co = 27, Ni = 28, Fe=26, Pt = 78)
(1) $[\text{CoCl}_4]^{2-}$ (2) $[\text{FeCl}_4]^{2-}$ (3) $[\text{NiCl}_4]^{2-}$ (4) $[\text{PtCl}_4]^{2-}$

8. **Statement-1:** Complexes containing three bidentate groups such as $[\text{Cr}(\text{ox})_3]^{3-}$ and $[\text{Co}(\text{en})_3]^{3+}$ do not show optical activity.

Statement-2: Octahedral complex, $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ shows geometrical isomerism.

- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

44. The number of geometric isomers possible for the complex $[\text{CoL}_2\text{Cl}_2]^-$ ($\text{L} = \text{H}_2\text{NCH}_2\text{CH}_2\text{O}^-$) is [JEE Ad. 2016]

22. $\text{Ti}^{3+}(\text{aq})$ is violet while $\text{Ti}^{4+}(\text{aq})$ is colourless because -
(A) There is no crystal field effect in Ti^{4+}
(B) There energy difference between t_{2g} and e_g of Ti^{4+} is quite high and does not fall in the visible region.
(C) Ti^{4+} has d^0 configuration.
(D) Ti^{4+} is very small in comparison to Ti^{3+} and hance does not absorb any radiation.

37. The formula of the complex hydridotrimethoxidoborate(III) ion is:
(A) $[\text{BH}(\text{OCH}_3)_3]^{2-}$ (B) $[\text{BH}_2(\text{OCH}_3)_3]^{2-}$ (C) $[\text{BH}(\text{OCH}_3)_3]^-$ (D) $[\text{BH}(\text{OCH}_3)_3]^+$
-