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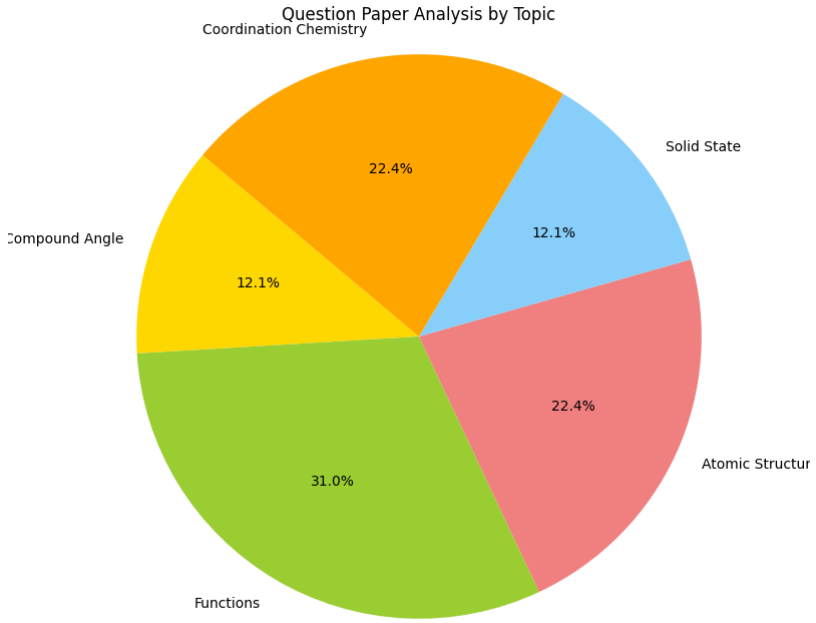
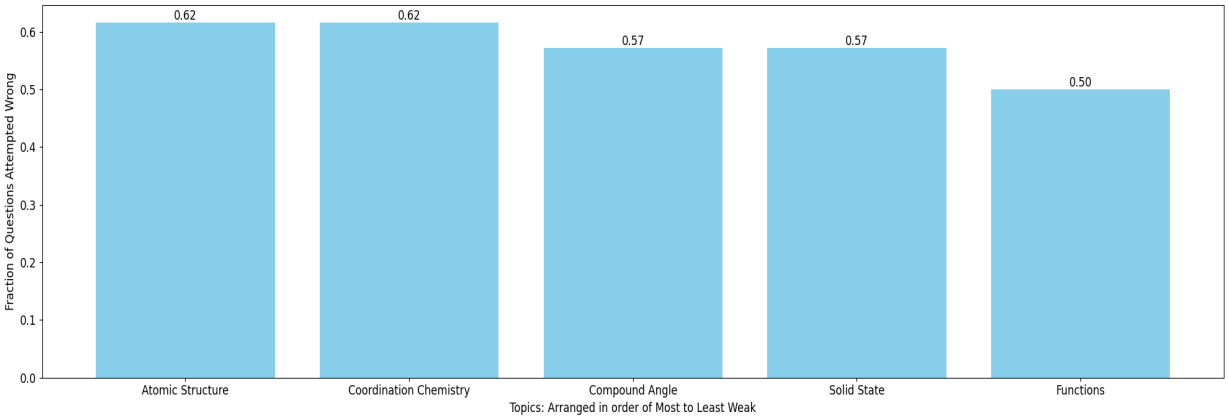
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Atomic Structure:

52. A ball weighing 10 g is moving with a velocity of 90 ms^{-1}. If the uncertainty in its velocity is 5%, then the uncertainty in its position is_____ $\times 10^{-m}$ m. (Rounded off to the nearest integer)

[Given: $h = 6.63 \times 10^{-}$Js]

[JEE Main (April) 2021]

Ans. **1**

58. If wavelength of the first line of the Paschen series of hydrogen atom is 720 nm, then the wavelength of the second line of this series is _____ nm. (Nearest integer)

[JEE Main (April) 2023]

Ans. **492**

46. The ratio of the shortest wavelength of two special series of hydrogen spectrum is found to be about 9. The spectral series are : **[JEE Main (April) 2019]**

(1) Paschen and Pfund (2) Balmer and Brackett

(3) Lyman and Paschen (4) Brackett and Pfund

36. Electromagnetic radiations having $\lambda = 310$ Å are subjected to a metal sheet having work function = 12.8 eV. What will be the velocity of photoelectrons with maximum Kinetic Energy..

(A) 0, no emission will occur (B) 2.18×10^6 m/s

(C) $2.18\sqrt{2} \times 10^6$ m/s (D) 8.72×10^6 m/s

6. 1st excitation potential for the H-like (hypothetical) sample is 24 V. Then :

(A) Ionisation energy of the sample is 36 eV

(B) Ionisation energy of the sample is 32 eV

(C) Binding energy of 3rd excited state is 2 eV

(D) 2nd excitation potential of the sample is $\frac{32 \times 8}{9}$ V

Coordination Chemistry:

31. $EDTA^{4-}$ is ethylenediaminetetraacetate ion. The total number of N–Co–O bond angles in $[Co(EDTA)]^{-1}$ complex ion is **[JEE 2013]**

26. Consider the following statements:
According the Werner's theory.
(a) Ligands are connected to the metal ions by covalent bonds.
(b) Secondary valencies have directional properties
(c) Secondary valencies are non-ionisable
Of these statements:
(A) a, b and c are correct
(B) b and c are correct
(C) a and c are correct
(D) a and b are correct

13. Which of the following is correct about?
Tetraamminedithiocyanato-Scobalt(III) tris(oxalato)cobaltate(III)
(A) formula of the complex is $[Co(SCN)_2(NH_3)_4][Co(ox)_3]$
(B) It is a chelating complex and show linkage isomerism.
(C) It shows optical isomerism.
(D) It shows geometrical isomerism.

77. Among TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and – $NiCl_4^{2-}$ the coloureless species are:
(A) CoF_6^{3-} and $NiCl_4^{2-}$
(B) TiF_6^{2-} and CoF_6^{3-}
(C) $NiCl_4^{2-}$ and Cu_2Cl_2
(D) TiF_6^{2-} and Cu_2Cl_2

16. Both $[Ni(CO)_4]$ and $[Ni(CN)_4]^{2-}$ are diamagnetic. The hybridisations of nickel in these complexes, respectively, are **[JEE 2008]**

(A) sp^3, sp^3 (B) sp^3, dsp^2 (C) dsp^2, sp^3 (D) dsp^2, dsp^2

Compound Angle:

4. If the product $(\sin1°)(\sin3°)(\sin5°)(\sin7°)\ldots\ldots\ldots\ldots(\sin89°) = \frac{1}{2^n}$, then find the value of n

13. Let α and β be nonzero real numbers such that $2(\cos\beta - \cos\alpha) + \cos\alpha\cos\beta = 1$. Then which of the following is/are true? **[JEE Advanced 2017]**

(A) $\tan\left(\frac{\alpha}{2}\right) - \sqrt{3}\tan\left(\frac{\beta}{2}\right) = 0$ (B) $\sqrt{3}\tan\left(\frac{\alpha}{2}\right) - \tan\left(\frac{\beta}{2}\right) = 0$

(C) $\tan\left(\frac{\alpha}{2}\right) + \sqrt{3}\tan\left(\frac{\beta}{2}\right) = 0$ (D) $\sqrt{3}\tan\left(\frac{\alpha}{2}\right) + \tan\left(\frac{\beta}{2}\right) = 0$

5. If $0 < x < \pi$ and $\cos x + \sin x = 1/2$, then $\tan x$ is **[AIEEE 2006]**

(A) $\frac{(1-\sqrt{7})}{4}$ (B) $\frac{(4-\sqrt{7})}{3}$ (C) $-\frac{(4+\sqrt{7})}{3}$ (D) $\frac{(1+\sqrt{7})}{4}$

3. In a right angled triangle, acute angles A and B satisfy

$\tan A + \tan B + \tan^2 A + \tan^2 B + \tan^3 A + \tan^3 B = 70$ find the angle A and B in radians.

2. A person standing on the bank of a river observes that the angle of elevation of the top a tree on the opposite bank of the river is 60° and when he retires 40 meters away from the tree the angle of elevation becomes 30°. The breadth of the river is **[AIEEE 2004]**

(A) 60 m (B) 30 m (C) 40 m (D) 20 m

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

31. If the anions (A) form hexagonal closest packing and cations (C) occupy only 2/3 octahedral voids in it, then the general formula of the compound is

(A) CA (B) CA_2 (C) C_2A_3 (D) C_3A_2

PROBLEMS BASED ON IONIC CRYSTAL

28. The size of an octahedral void formed in a closest packed lattice as compared to tetrahedral void is

(A) Equal (B) Smaller (C) Larger (D) Not definite

22. KF crystallizes in the NaCl type structure. If the radius of K^+ ions 132 pm and that of F^- ion is 135 pm, what is the shortest K–F distance? What is the edge length of the unit cell? What is the closet K–K distance?

43. Strongly heated ZnO crystal can conduct electricity. This is due to

(A) Movement of extra Zn^{2+} ions present in the interstitial sites

(B) Movement of electrons present in the interstitial sites

(C) Movement of oxide ions

(D) None of these

Functions:

1. If the equation $(p^2-4)(p^2-9)x^3+\left[\frac{p-2}{2}\right]x^2+(p-4)(p^2-5p+6)x+\{2p-1\}=0$ is satisfied by all values of x in (0,3] then sum of all possible integral values of ' p ' is

(A) 0 (B) 5 (C) 9 (D) 10

23. Let $f:(1,3)\to R$ be a function defined by $f(x)=\frac{x[x]}{1+x^2}$ where [x] denotes the greatest integer $\le x$. Then the range of f is: **[JEE - Main 2020]**

(A) $\left(\frac{2}{5},\frac{1}{2}\right)\cup\left(\frac{3}{5},\frac{4}{5}\right]$ (B) $\left(\frac{2}{5},\frac{4}{5}\right]$ (C) $\left(\frac{3}{5},\frac{4}{5}\right)$ (D) $\left(\frac{2}{5},\frac{3}{5}\right]\cup\left(\frac{3}{4},\frac{4}{5}\right)$

12. Let $f(x)x^2, x \in R$. For any $A \subseteq R$, define $g(A) = \{x \in R: f(x) \in A\}$. If $S = [0,4]$, then which one of the following statemetns is not true? **[JEE - Main 2019]**

(A) $f(g(S)) = S$ (B) $g(f(f)) \neq S$ (C) $g(f(S)) = g(S)$ (D) $f(g(S)) = f(S)$

10. Consider, $f(x) = \{x + [\log_2 (2 + x)]\} +$

$\{x + [\log_2 (2 + x^2)]\} + \cdots .. +$
$\{x + [\log_2 (2 + x^{10})]\}$

Identify the correct statement(s)

(A) $[f(e)] = 7$.

(B) $f(\pi) = 20\pi - 60$.

(C) the number of solutions of the equation $f(x) = x$ is 9 .

(D) the number of solutions of the equation $f(x) = x$ is 10 .

[Note : $\{y\}$ and $[y]$ denotes the fractional part function and greatest integer function respectively.]

INTEGERTYPE

1. The domain of the function $f(x) = \frac{1}{\sqrt{|x|-x}}$ is :- **[AIEEE 2011]**

(A) $(-\infty, 0)$ (B) $(-\infty, \infty) - \{0\}$ (C) $(-\infty, \infty)$ (D) $(0, \infty)$