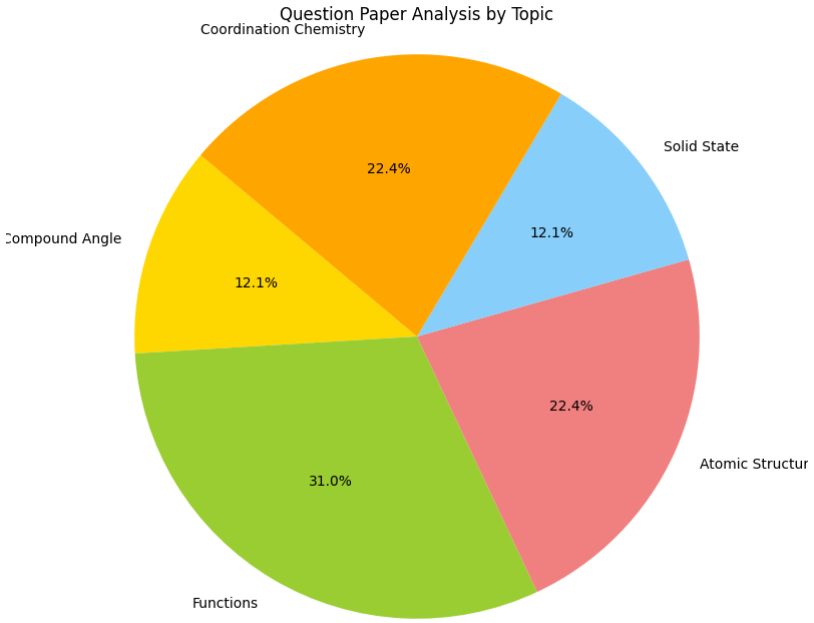
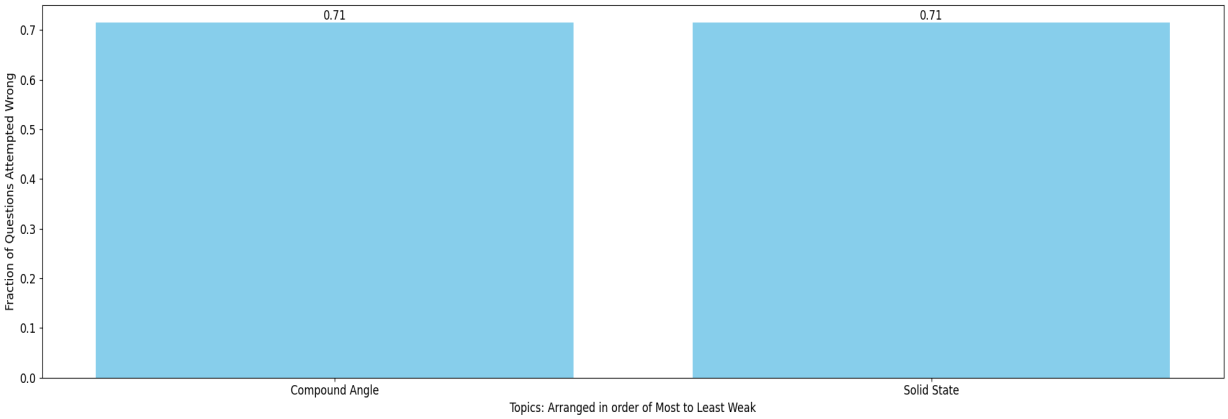
Sarthak Sastare Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Compound Angle:

8. If $\tan A - \tan B = x$ and $\cot A - \cot B = y$, prove that $\cot(A - B) = \frac{1}{x} - \frac{1}{y}$

14. Prove that from the equality $\frac{\sin^{\alpha} \alpha}{a} + \frac{\cos^{\alpha} \alpha}{b} = \frac{1}{a+b}$ follows the relation; $\frac{\sin^{\alpha} \alpha}{a^3} + \frac{\cos^{\alpha} \alpha}{b^3} = \frac{1}{(a+b)^3}$.

8. Prove that: $\frac{\cos 3\theta + \cos 3\phi}{2\cos(\theta - \phi) - 1} = (\cos\theta + \cos\phi)\cos(\theta + \phi) - (\sin\theta + \sin\phi)\sin(\theta + \phi)$

3. Prove that $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$

6. Show that $2(\sin^6 x + \cos^6 x) - 3(\sin^4 x + \cos^4 x) + 1 = 0$.

Solid State:

18. Match the crystal system / unit cells mentioned in Column I with their characteristic features mentioned in Column II. Indicate your answer by darkening the appropriate bubbles of the 4 × 4 matrix given in the ORS. **[JEE 2007]**

Column I	**Column II**
(A) simple cubic and face-centred cubic	(P) have these cell parameters a = b = c and $\alpha = \beta = \gamma$
(B) cubic and rhombohedral	(Q) are two crystal systems
(C) cubic and tetragonal	(R) have only two crystallographic angles of 90°
(D) hexagonal and monoclinic	(S) belong to same crystal system.

21. Spinel is a important class of oxides consisting of two types of metal ions with the oxide ions arranged in CCP pattern. The normal spinel has one-eight of the tetrahedral holes occupied by one type of metal ion and one half of the octahedral hole occupied by another type of metal ion. Such a spinel is formed by Zn^{2+}, Al^{3+} and O^{2-}, with Zn^{2+} in the tetrahedral holes. Give the formulae of spinel.

PROBLEMS BASED ON NaCl STRUCTURE

35. The radius of a calcium ion is 94 pm and of the oxide ion is 146 pm. The possible crystal structure of calcium oxide will be **[Jee-Main (online)-12]**

(A) Octahedral (B) Tetrahedral (C) Pyramidal (D) Trigonal

15. Prove that void space in fluorite structure per unit volume of unit cell is 0.374.

8. Match items of List–I with those of List–II : **[JEE Main, Aug. 2021]**

	List–I (Property)		**List–II (Example)**
(a)	Diamagnetism	(i)	MnO
(b)	Ferrimagnetism	(ii)	O_2
(c)	Paramagnetism	(iii)	NaCl
(d)	Antiferromagnetism	(iv)	Fe_3O_4

Choose the most appropriate answer from the options given below:

(A) (a)–(ii), (b)–(i), (c)–(iii), (d)–(iv)

(B) (a)–(i), (b)–(iii), (c)–(iv), (d)–(ii)

(C) (a)–(iii), (b)–(iv), (c)–(ii), (d)–(i)

(D) (a)–(iv), (b)–(ii), (c)–(i), (d)–(iii)