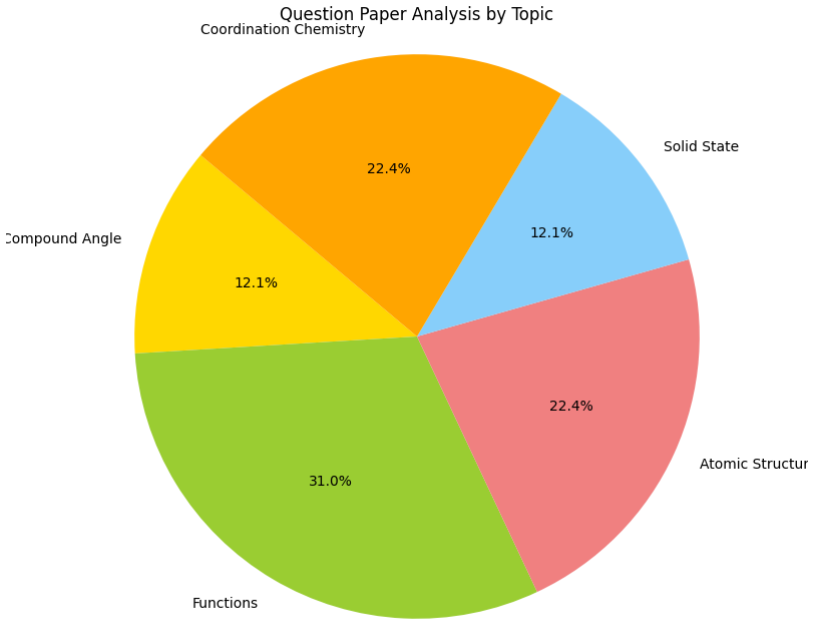
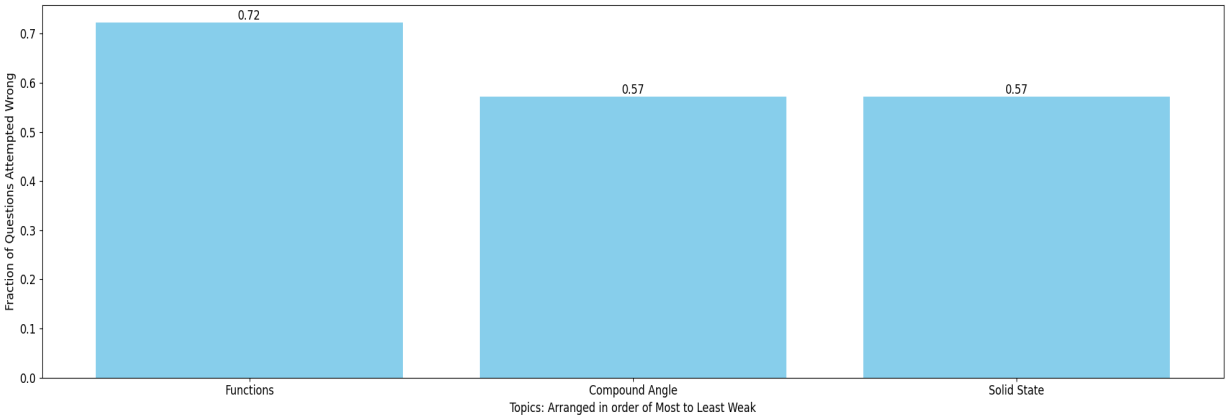
Amrendra Krishna gupta Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

4. Let $f: R \to [1, \infty)$ be defined as

$f(x) = \log_{10}\left(\sqrt{3x^2 - 4x + k + 1} + 10\right)$. If $f(x)$ is surjective, then

(A) $k = \frac{1}{3}$ (B) $k < \frac{1}{3}$ (C) $k > \frac{1}{3}$ (D) $k = 1$

1. Let

$$F(x) = \begin{cases} x|x| & \text{if} \quad x \leq -1 \\ [1+x] + [1-x] & \text{if} \quad -1 < x < 1 \\ -x|x| & \text{if} \quad x \geq 1 \end{cases}$$

where $[x]$ denotes the greatest integer function then $F(x)$ is

(A) even (B) odd

(C) neither odd nor even (D) even as well as odd

8. Let $f(x) = x^2 + \frac{1}{x^2}$ and $g(x) = x - \frac{1}{x}, x \in R - \{-1,0,1\}$.

If $h(x) = \frac{f(x)}{g(x)}$, then the local minimum value of $h(x)$ is **[JEE - Main 2018]**

(A) -3 (B) $-2\sqrt{2}$ (C) $2\sqrt{2}$ (D) 3

4. Let $f: [0, a] \to S$ be a function defined by $f(x) = 3\cos\frac{x}{2}$. If the largest value of a for which $f(x)$ has

38. Let R_1 and R_2 be relations on the set {1, 2.....50} such that
$R_1 = \{(p, p^n) : p$ is a prime and $n \geq 0$ is an integer$\}$ and
$R_2 = \{(p, p^n) : p$ is a prime and $n = 0$ or $1\}$.
Then, the number of elements in $R_1 - R_2$ is _____. **[JEE - Main 2022]**

Compound Angle:

15. If x and y are real number such that $x^2 + 2xy - y^2 = 6$, find the minimum value of $(x^2 + y^2)^2$.

2. If the expression $\cos^2\frac{\pi}{11} + \cos^2\frac{2\pi}{11} + \cos^2\frac{3\pi}{11} + \cos^2\frac{4\pi}{11} + \cos^2\frac{5\pi}{11}$ has the value equal to $\frac{p}{q}$ in its lowest form ; then find $(p + q)$.

$\sqrt{1-\sin\theta}$ [$\sec\theta - \tan\theta$; if $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$

5. If $\cos\alpha + \cos\beta + \cos\gamma = 0$;

then prove that $\cos3\alpha + \cos3\beta + \cos3\gamma = 12\cos\alpha\cos\beta\cos\gamma$

20. (a) If $A + B + C = \pi$; prove that $\tan^2\frac{A}{2} + \tan^2\frac{B}{2} + \tan^2\frac{C}{2} \geq 1$.

(b) Prove that the triangle ABC is equilateral iff , $\cot A + \cot B + \cot C = \sqrt{3}$.

5. Which of the following relations is (are) possible?

(A) $\sin\theta = \frac{\pi}{2}$ (B) $\tan\theta = 2016$

C) $\cos\theta = \frac{1+t^2}{1-t^2} (t \neq 0, \pm1)$ (D) $\sec\theta = \frac{3}{4}$

Solid State:

17. The type of unit cell is:

(A) Simple cubic (B) BCC (C) FCC (D) Edge-centred

2. Calculate the density of diamond from the fact that it has face centered cubic structure with two

19. The edge length of unit cell of a metal having atomic weight 75 g/mol is 5 Å which crystallizes in cubic lattice. If the density is 2 g/cc then find the radius of metal atom. ($N_A = 6 \times 10^{23}$). Give the answer in pm. **[JEE 2006]**

27. If the length of the body diagonal for CsCl which crystallises into a cubic structure with Cl^- ions at the corners and Cs^+ ions at the centre of the unit cells is 7 Å and the radius of the Cs^+ ion is

7. A hard substance melts at high temperature and is an insulator in both solid and in molten state.

This solid is most likely to be a / an : **[JEE Main, Mar. 2021]**

(A) Ionic solid (B) Molecular solid

(C) Metallic solid (D) Covalent solid