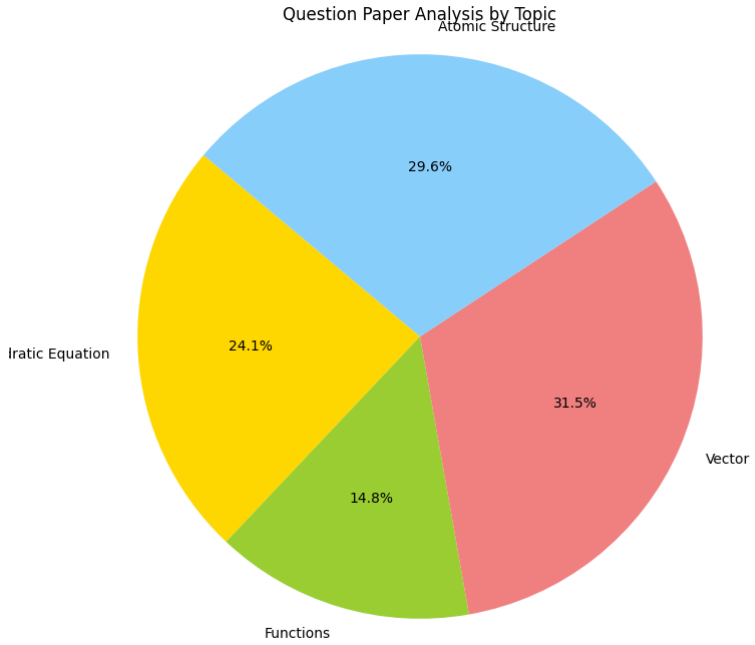
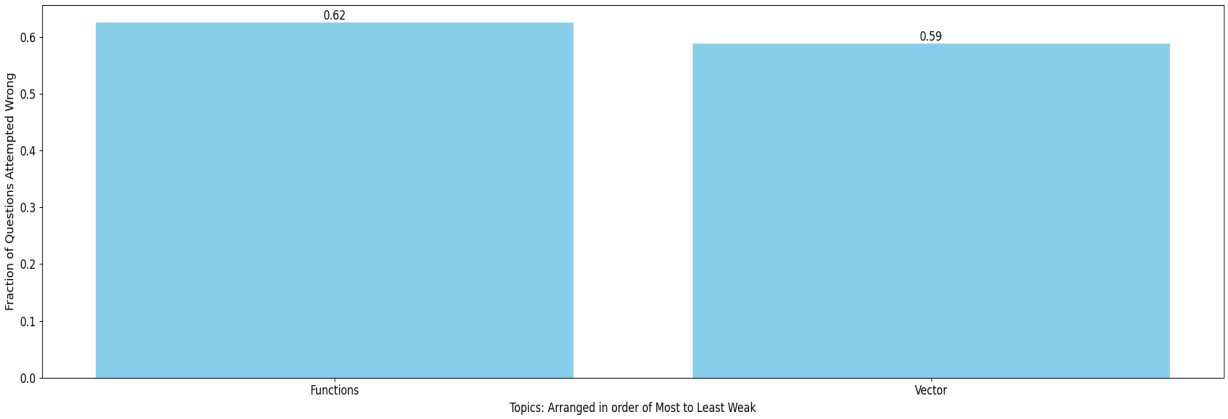
Akhil Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

2. For the function $f(x) = \frac{e^x + 1}{e^x - 1}$, if n(d) denotes the number of integers which are not in its domain and n(r) denotes the number of integers which are not in its range, then n(d) + n(r) is equal to

(A) 2 (B) 3 (C) 4 (D) Infinite

7. A function f: R → R is such that $f\left(\frac{1-x}{1+x}\right) = x$ for all $x \neq -1$. Prove the following.

(a) $f(f(x)) = x$

(b) $f(1/x) = -f(x), x \neq 0$ (c) $f(-x-2) = -f(x) - 2$

41. Let $A = \{\lambda \in R : [x+3] + [x+4] \leq \}$, $B = \left\{x \in R : 3^x \left(\sum_{r=1}^{\infty} \frac{2}{10r} \right) < 3^{-3x} \right\}$, where [t] Denote greatest integer function. Then **[JEE - Main 2023]**

(A) $A \subset B, A \neq B$ (B) $A \cap B = \phi$ (C) $A = B$ (D) $B \subset C, A \neq B$

36. For p, q ∈ R, consider the real valued function $f(x) = (x - p)^2 - q$, x ∈ R and q > 0. Let a_1, a_2, a_3 and a_4 be in an arithmetic progression with mean p and positive common difference. If $|f(a_i)| = 500$ for all I = 1, 2, 3, 4, then the absolute difference between the roots of f(x) = 0 is: **[JEE - Main 2022]**

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

$\frac{2F(n)+1}{}$ F(101)

Vector:

68. Let $\vec{a}=2\hat{i}+3\hat{j}+4k, b=\hat{i}-2\hat{j}-2k$ and $\vec{c}=-\hat{i}+4\hat{j}+3k$. If $\vec{d}$ is a vector perpendicular to both $\vec{b}$ and $\vec{c}$, and $\vec{a}.\vec{d}=18$, then $[\vec{a}\times\vec{d}]^2$ is equal to: **[JEE (Main)-2023]**

(A) 760 (B) 640 (C) 25 (D) 41

22. The pv's of the four angular points of a tetrahedron are $A\left(\hat{j}+2\hat{k}\right)$; $B\left(3\hat{i}+\hat{k}\right)$; $C\left(4\hat{i}+3\hat{j}+6\hat{k}\right)$ & $D\left(2\hat{i}+3\hat{j}+2\hat{k}\right)$. Find :

(i) the perpendicular distance from A to the line BC.
(ii) the volume of the tetrahedron ABCD.
(iii) the perpendicular distance from D to the plane ABC.
(iv) the shortest distance between the lines AB & CD.

1. Given a tetrahedron D-ABC with AB = 12 , CD = 6. If the shortest distance between the skew lines AB and CD is 8 and the angle between them is $\frac{\pi}{6}$, then find the volume of tetrahedron.

---

11. Find out whether the following pairs of lines are parallel, non-parallel & intersecting, or nonparallel and non-intersecting.

(a) $\vec{r}_1=\hat{i}+\hat{j}+2\hat{k}+\lambda(3\hat{i}-2\hat{j}+4\hat{k})$
$\vec{r}_2=2\hat{i}+\hat{j}+3\hat{k}+\mu(-6\hat{i}+4\hat{j}-8\hat{k})$

(b) $\vec{r}_1=\hat{i}-\hat{j}+3\hat{k}+\lambda(\hat{i}-\hat{j}+\hat{k})$
$\vec{r}_2=2\hat{i}+4\hat{j}+6\hat{k}+\mu(2\hat{i}+\hat{j}+3\hat{k})$

(c) $\vec{r}_1=\hat{i}+\hat{k}+\lambda(\hat{i}+3\hat{j}+\hat{k})$
$\vec{r}_2=2\hat{i}+3\hat{j}+\mu(4\hat{i}-\hat{j}+\hat{k})$

3. In the isosceles triangle ABC, $|\overline{AB}| = |\overline{BC}| = 8$, a point E divides AB internally in the ratio 1 : 3, then the cosine of the angle between $\overline{CE}$ and $\overline{CA}$ is (where $|\overline{CA}| = 12$)

(A) $-\frac{3\sqrt{7}}{8}$ (B) $\frac{3\sqrt{8}}{17}$ (C) $\frac{3\sqrt{7}}{8}$ (D) $\frac{-3\sqrt{8}}{17}$