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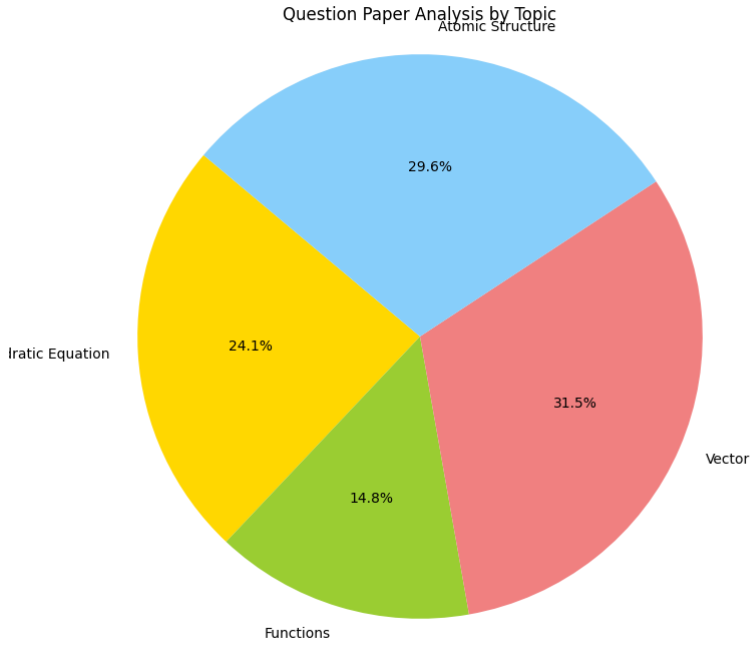
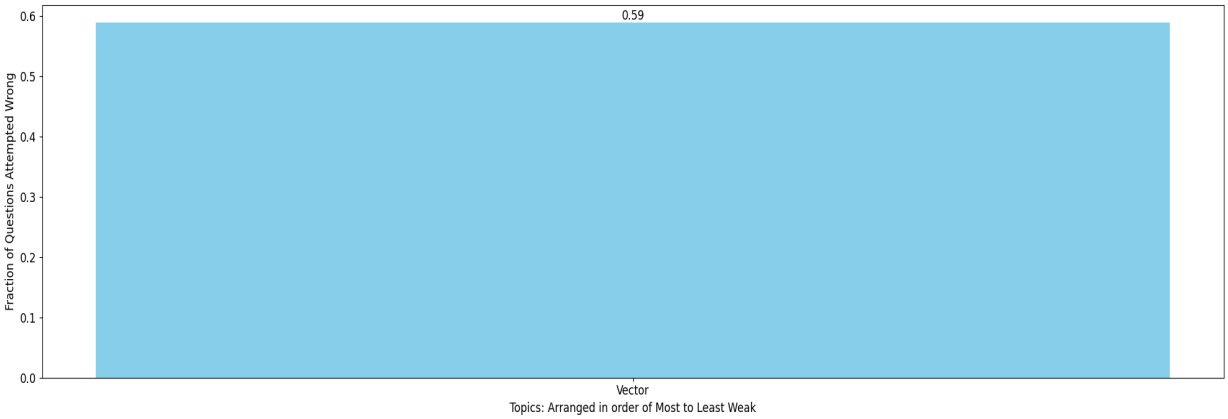
Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Vector:

65. Let P(–2, –1, 1) and $Q\left(\frac{36}{11}, \frac{43}{17}, \frac{111}{17}\right)$ be the vertices of the rhombus PRQS. If the direction ratios of the diagonal RS are α, –1, β where both α and β are integers orf minimum absolute values, then $\alpha^2 + \beta^2$ is equal to : **[JEE (Main)-2022]**

50. Let the vectors $\vec{a}, \vec{b}, \vec{c}$ be such that $|\vec{a}| = 2$, $|\vec{b}| = 4$ and $|\vec{c}| = 4$. If the projection of $\vec{b}$ on $\vec{a}$ is equal to the projection of $\vec{c}$ on $\vec{a}$ and $\vec{b}$ is perpendicular to $\vec{c}$, then the value of $|\vec{a} + \vec{b} - \vec{c}|$ is _____. **[JEE (Main)-2020]**

15. If the line $\vec{r} = 2\hat{i} - \hat{j} + 3\hat{k} + \lambda(\hat{i} + \hat{j} + \sqrt{2}\,\hat{k})$ makes angles α, β, γ with xy, yz and zx planes respectively then which of the following are not possible?

(A) $\sin^2\alpha + \sin^2\beta + \sin^2\gamma = 2$ & $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 1$

(B) $\tan^2\alpha + \tan^2\beta + \tan^2\gamma = 7$ & $\cot^2\alpha + \cot^2\beta + \cot^2\gamma = 5/3$

(C) $\sin^2\alpha + \sin^2\beta + \sin^2\gamma = 1$ & $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 2$

(D) $\sec^2\alpha + \sec^2\beta + \sec^2\gamma = 10$ & $\text{cosec}^2\alpha + \text{cosec}^2\beta + \text{cosec}^2\gamma = 14/3$

55. A vector $\vec{a}$ has components 3p and 1 with respect to a rectangular cartesian system. This system is rotated through a certain angle about the origin in the counter clockwise sense. If, with respect to new system, $\vec{a}$ has components p + 1 and $\sqrt{10}$, then a value of p is equal to

(A) 1 (B) $-\frac{5}{4}$ (C) $\frac{4}{5}$ (D) –1

23. Three lines

$L_1 : \vec{r} = \lambda\hat{i},\ \lambda \in \square$

$L_2 : \vec{r} = \hat{k} + \mu\hat{j}, \mu \in \square$ and

$L_3 : \vec{r} = \hat{i} + \hat{j} + v\hat{k},\ v \in \square$

are given. For which point(s) Q and L_2 can we find a point P on L_1 and a point R on L_3 so that P, Q and R are collinear ? **[JEE (Advanced)-2019]**

(1) $\hat{k} + \frac{1}{2}\hat{j}$ (2) $\hat{k} + \hat{j}$ (3) $\hat{k}$ (4) $\hat{k} - \frac{1}{2}\hat{j}$