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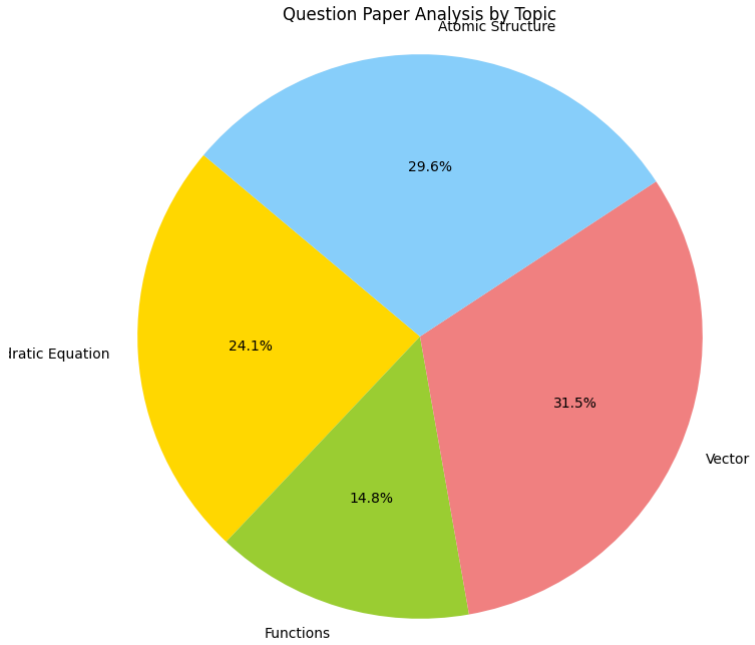
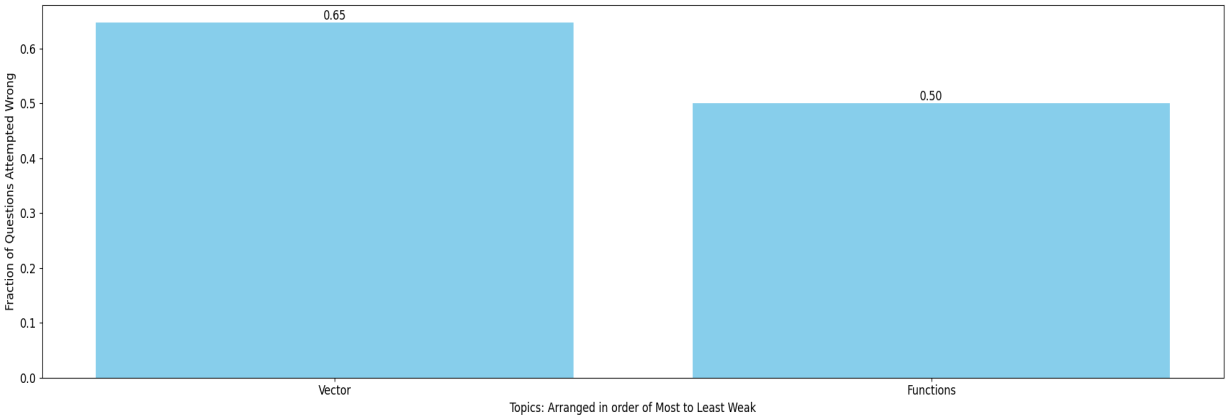
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Vector:

17. Let $\vec{u} = \hat{i} + \hat{j}, \vec{v} = \hat{i} - \hat{j}$ and $\vec{w} = \hat{i} + 2\hat{j} + 3\hat{k}$. If $\hat{n}$ is a unit vector such that $\vec{u}.\hat{n} = 0$ and $\vec{v}.\hat{n} = 0$, then $|\vec{w}.\hat{n}|$ is equal to

(A) 1 (B) 2 (C) 3 (D) 0

39. Given an equilateral triangle ABC with side length equal to 'a'. Let M and N be two points respectively on the side AB and AC such that $\overrightarrow{AN} = K\overrightarrow{AC}$ and $\overrightarrow{AM} = \frac{\overrightarrow{AB}}{3}$. If $\overrightarrow{BN}$ and $\overrightarrow{CM}$ are orthogonal then the value of K is equal to

(A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

51. Let $\vec{a} = \hat{i} + \hat{j}$, $\vec{b} = \hat{j} + \hat{k}$ & $\vec{c} = \alpha\vec{a} + \beta\vec{b}$. If the vectors , $\hat{i} - 2\hat{j} + \hat{k}$, $3\hat{i} + 2\hat{j} - \hat{k}$ and $\vec{c}$ are coplanar then $\frac{\alpha}{\beta}$ is

(A) 1 (B) 2 (C) 3 (D) – 3

12. If the vectors $\overrightarrow{AB} = 3\hat{i} + 4\hat{k}$ and $\overrightarrow{AC} = 5\hat{i} - 2\hat{j} + 4\hat{k}$ are the sides of a triangle ABC, then the length of median through A is :

(1) $\sqrt{18}$ (2) $\sqrt{72}$ (3) $\sqrt{33}$ (4) $\sqrt{45}$

2. Let $\vec{p}$ is the p.v. of the orthocentre & $\vec{g}$ is the p.v. of the centroid of the triangle ABC where circumcentre is the origin. If $\vec{p} = K\vec{g}$, then K =

(A) 3 (B) 2 (C) 1/3 (D) 2/3

Functions:

6. Let f: A → B and g: B → C be two functions and gof : A → C is defined. Then which of the following statement(s) is true?

(A) If gof is onto then f must be onto.

(B) If f is into and g is onto then gof must be onto function.

(C) If gof is one-one then g is not necessarily one-one.

(D) If f is injective and g is surjective then gof must be bijective mapping.

MULTIPLE CORRECT TYPE

$(x^2 - 4$ if $|x| < 3$

35. Let α, β and γ be three positive real numbers, let $f(x) = \alpha x^5 + \beta x^3 + \gamma x$, $x \in R$ and $g : R \to R$ be such that $g(f(x)) = x$ for all $x \in R$. If $a_1, a_2, a_3, \ldots a_n$ be in arithmetic progression with mean zero, then the value of $f\left(g\left(\frac{1}{n}\sum_{i=1}^{n} f(a_i)\right)\right)$ is equal to **[JEE - Main 2022]**

(A) 0 (B) 3 (C) 9 (D) 27

6. The maximum value of the function defined by $f(x) = \min(e^x, 2 + e^2 - x, 8)$ is α then integral value of x satisfying the inequality $\frac{x(x-[\alpha])}{x^2-[\alpha]x+12} < 0$, is

[Note: [k] denotes greatest integer function less than or equal to k.

(A) 1 (B) 3 (C) 5 (D) 6

2. Find the domain & range of the following functions. (Read the symbols [∗] and {∗} as greatest integers and fractional part functions respectively.)

(i) $y = \log_{\sqrt{5}} (\sqrt{2}(\sin x - \cos x) + 3)$

(ii) $y = \frac{2x}{1+x^2}$

(iii) $f(x) = \frac{x^2-3x+2}{x^2+x-6}$

(iv) $f(x) = \frac{x}{1+|x|}$

(v) $y = \sqrt{2-x} + \sqrt{1+x}$

(vi) $f(x) = \frac{\sqrt{x+4}-3}{x-5}$

10. Let $f: R \to R$ and $g: R \to R$ be two non-constant differentiable functions.

If $f'(x) = \left(e^{(f(x))-g(x)}\right)g'(x)$ for all $x \in R$, and $f(1) = g(2) = 1$, then which of the following statement(s) is (are) TRUE ? **[JEE Ad. 2018]**

(A) $f(2) < 1 - \log_e 2$

(B) $f(2) > 1 - \log_e 2$

(C) $g(1) > 1 - \log_e 2$

(D) $g(1) < 1 - \log_e 2$