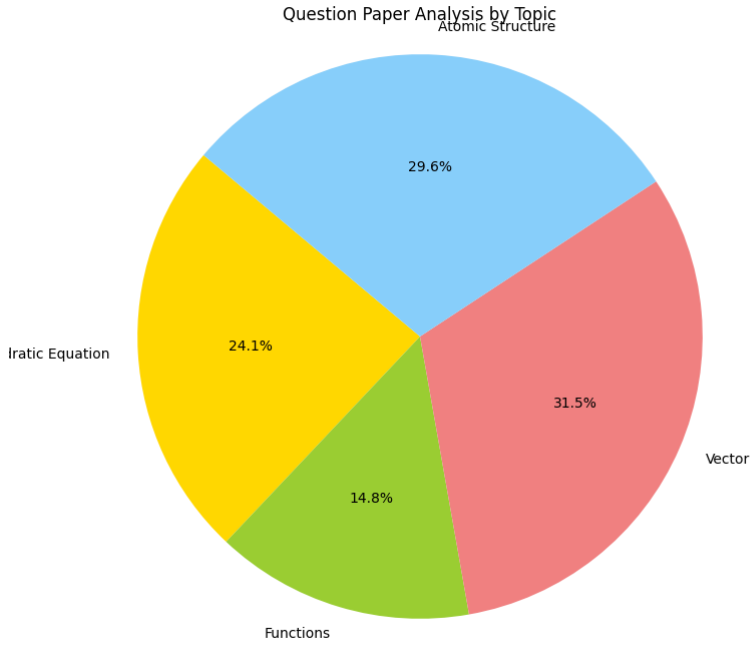
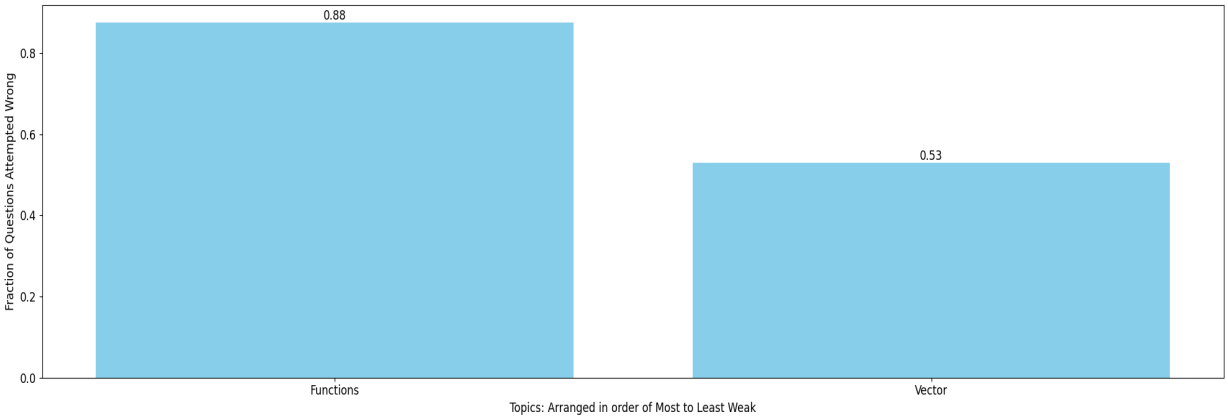
Sarthak Sastare Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

12. Let $S = (0,1) \cup (1,2) \cup (3,4)$ and $T = \{0,1,2,3\}$. Then which of the following statements is(are) true? **[JEE Advanced 2023]**

(A) There are infinitely many functions from S to T

(B) There are infinitely many strictly increasing function from S to T

(C) The number of continuous functions from S to T is at most 120

(D) Every continuous function from S to T is differentiable

9. The domain of the definition of the function $f(x) = \frac{1}{4-x^2} + \log_{10}(x^3 - x)$ is[JEE - Main 2019]

(A) $(-1,0) \cup (1,2) \cup (3,\infty)$ (B) $(-2,-1) \cup (-1,0) \cup (2,\infty)$

(C) $(-1,0) \cup (1,2) \cup (2,\infty)$ (D) $(1,2) \cup (2,\infty)$

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

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

8. Let $f(x) = (x+1)(x+2)(x+3)(x+4) + 5$ where $x \in [-6,6]$. If the range of the function is $[a,b]$ where $a, b \in N$ then find the value of $(a+b)$.

Vector:

24. The set of values of x for which the angle between the vectors $\vec{a} = x\hat{i} - 3\hat{j} - \hat{k}$ and $\vec{b} = 2x\hat{i} + x\hat{j} - \hat{k}$ acute and the angle between the vector $\vec{b}$ and the axis of ordinates is obtuse, is

(A) $1 < x < 2$ (B) $x > 2$ (C) $x < 1$ (D) $x < 0$

25. If a vector $\vec{a}$ of magnitude 50 is collinear with vector $\vec{b} = 6\hat{i} - 8\hat{j} - \frac{15}{2}\hat{k}$ and makes an acute angle with positive z-axis then :

(A) $\vec{a} = 4\vec{b}$ (B) $\vec{a} = -4\vec{b}$ (C) $\vec{b} = 4\vec{a}$ (D) none

23. Let $\vec{a}$ and $\vec{b}$ be two non-zero and non-collinear vectors then which of the following is/are always correct?

(A) $\vec{a} \times \vec{b} = [\vec{a}\,\vec{b}\,\hat{i}]\hat{i} + [\vec{a}\,\vec{b}\,\hat{j}]\hat{j} + [\vec{a}\,\vec{b}\,\hat{k}]\hat{k}$

(B) $\vec{a}.\vec{b} = (\vec{a}.\hat{i})(\vec{b}.\hat{i}) + (\vec{a}.\hat{j})(\vec{b}.\hat{j}) + (\vec{a}.\hat{k})(\vec{b}.\hat{k})$

(C) if $\vec{u} = \hat{a} - (\hat{a}\cdot\hat{b})\hat{b}$ and $\vec{v} = \hat{a} \times \hat{b}$ then $|\vec{u}| = |\vec{v}|$

(D) if $\vec{c} = \vec{a} \times (\vec{a} \times \vec{b})$ and $\vec{d} = \vec{b} \times (\vec{a} \times \vec{b})$ then $\vec{c} + \vec{d} = \vec{0}$

COMPREHENSION TYPE

Paragraph for questions nos. 24 to 26

Consider three vectors $\vec{p} = \hat{i} + \hat{j} + \hat{k}, \vec{q} = 2\hat{i} + 4\hat{j} - \hat{k}$ and $\vec{r} = \hat{i} + \hat{j} + 3\hat{k}$ and let $\vec{s}$ be a unit vector, then

9. Let $\vec{a}, \vec{b}, \vec{c}$ be three non-zero vectors which are pairwise non-collinear. If $\vec{a} + 3\vec{b}$ is collinear with $\vec{c}$ and $\vec{b} + 2\vec{c}$ is collinear with $\vec{a}$, then $\vec{a} + 3\vec{b} + 6\vec{c}$ is : **[AIEEE-2011]**

(1) $\vec{a} + \vec{c}$ (2) $\vec{a}$ (3) $\vec{c}$ (4) $\vec{0}$

18. $\left|\overrightarrow{OX} \times \overrightarrow{OY}\right| =$

(A) sin (Q + R) (B) sin 2R (C) sin (P + R) (D) sin (P + Q)