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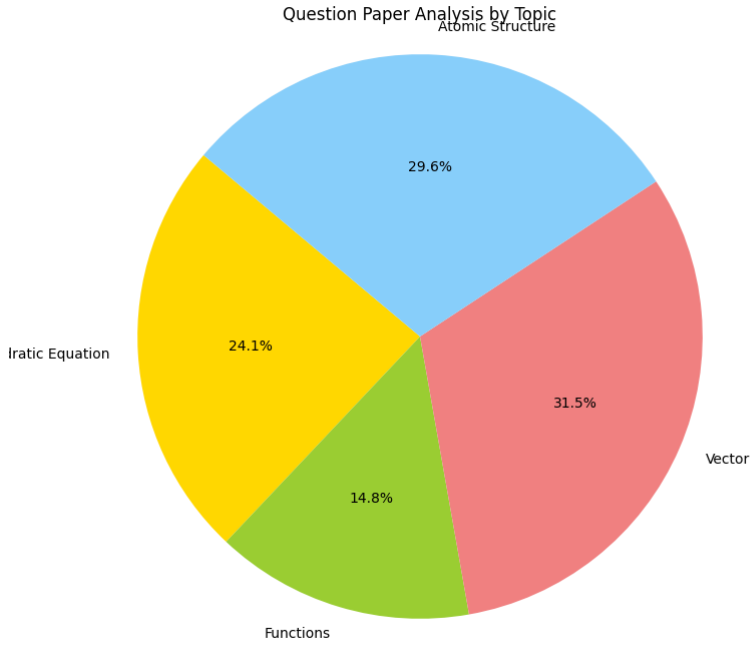
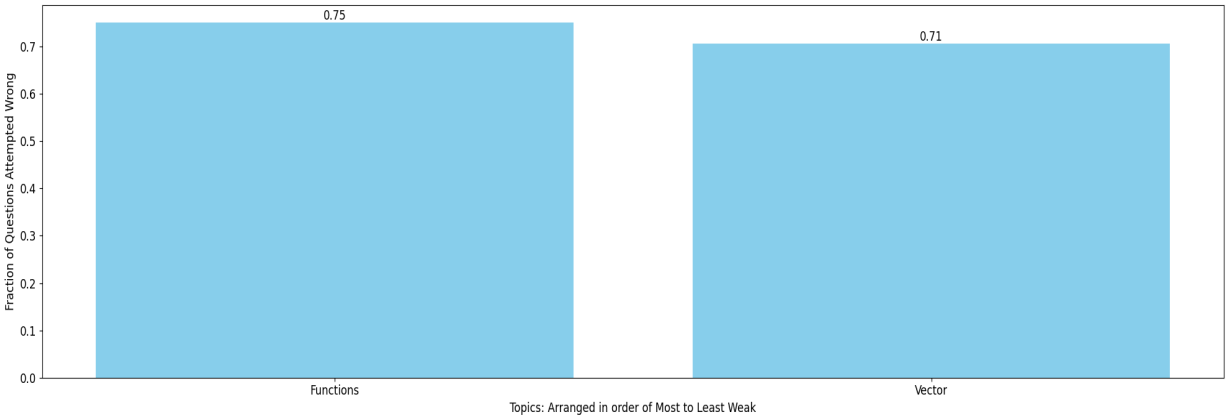
Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

10. If $h(x) = Ax^5 + B\sin x + C\ln\left(\frac{1+x}{1-x}\right) + 7$, where A, B, C are non-zero real constants and $h\left(\frac{-1}{2}\right) = 6$, then find the vale of $h\left(\frac{\text{sgn}\,(e^{-x})}{2}\right)$.

Daily Work Sheet-4

SINGLE CORRECTTYPE

34. It the minimum value of $f(x) = \frac{5x}{2} + \frac{\alpha}{x^5}, x > 0$ is 14, then the value of α is equal to: **[JEE - Main 2022]**

(A) 32 (B) 64 (C) 128 (D) 256

7. Let $f(x) = \sin\left(\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)\right)$ for all $x \in R$ and $g(x) = \frac{\pi}{2}\sin x$ for all $x \in R$.

Let (fog)(x) denote f(g(x)) and (gof) (x) denote g(f(x)). Then which of the following is (are) true?

[JEE Ad. 2015]

(A) Range of f is $\left[-\frac{1}{2}, \frac{1}{2}\right]$ (B) Range of fog is $\left[-\frac{1}{2}, \frac{1}{2}\right]$

(C) $\text{Lim}_{x\to 0}\frac{f(x)}{g(x)} = \frac{\pi}{6}$ (D) There is an $x \in R$ such that (gof) $(x) = 1$

6. If $x = \frac{4t}{1+t^2}$ and $y = \frac{2-2t^2}{1+t^2}$ where ' t ' is a parameter and range of $f(x, y) = x^2 - xy + y^2$ is [a, b] then (a + b) is equal to

(A) 4 (B) 6 (C) 8 (D) 12

1. Let $f(x) = x^2$ and $g(x) = \sin x$ for all $x \in R$. Then the set of all x satisfying (fogogof)(x) = (gogof)(x), where (fog) (x) = f(g(x)), is- **[JEE 2011]**

(A) $\pm\sqrt{n\pi}, n \in \{0,1,2, \ldots$ (B) $\pm\sqrt{n\pi}, n \in \{1,2, \ldots\}$

(C) $\frac{\pi}{2} + 2n\pi, n \in \{\ldots, -2, -1,0,1,2, \ldots$ (D) $2n\pi, n \in \{\ldots, -2, -1,0,1,2, \ldots$

Vector:

66. If A(0, 1, 0), B(0, 0, 0), C(1, 0, 1) are the vertices of a ΔABC. Match the entries of **column-I** with **column-II**.

Column-I		**Column-II**	
(A)	Orthocentre of ΔABC.	(P)	$\frac{\sqrt{2}}{2}$
(B)	Circumcentre of ΔABC.	(Q)	$\frac{\sqrt{3}}{2}$
(C)	Area (ΔABC).	(R)	$\frac{\sqrt{3}}{3}$
(D)	Distance between orthocentre and centroid.	(S)	$\frac{\sqrt{3}}{6}$
(E)	Distance between orthocentre and circumcentre.	(T)	(0, 0, 0)

29. Let S be the reflection of a point Q with respect to the plane given by $\vec{r} = -(t+p)\hat{i} + t\hat{j} + (1+p)\hat{k}$ where t, p are real parameters and $\hat{i}, \hat{j}, \hat{k}$ are the unit vectors along the three positive coordinate axes. If the position vectors of Q and S are $10\hat{i} + 15\hat{j} + 20\hat{k}$ and $\alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$ respectively, then which of the following is/are TRUE ? **[JEE (Advanced)-2022]**

(A) $3(\alpha + \beta) = -101$ (B) $3(\beta + \gamma) = -71$

(C) $3(\gamma + \alpha) = -86$ (D) $3(\alpha + \beta + \gamma) = -121$

7. **(a)** Let $\vec{a} = \hat{i}+\hat{j}+\hat{k}$, $\vec{b} = \hat{i}-\hat{j}+\hat{k}$ and $\vec{c} = \hat{i}-\hat{j}-\hat{k}$ be three vectors. A vector $\vec{v}$ in the plane of $\vec{a}$ and $\vec{b}$, whose projection on $\vec{c}$ is $\frac{1}{\sqrt{3}}$, is given by

(A) $\hat{i}-3\hat{j}+3\hat{k}$ (B) $-3\hat{i}-3\hat{j}-\hat{k}$ (C) $3\hat{i}-\hat{j}+3\hat{k}$ (D) $\hat{i}+3\hat{j}-3\hat{k}$

(b) The vector(s) which is/are coplanar with vectors $\hat{i}+\hat{j}+2\hat{k}$ and $\hat{i}+2\hat{j}+\hat{k}$, and perpendicular to the vector $\hat{i}+\hat{j}+\hat{k}$ is/are

(A) $\hat{j}-\hat{k}$ (B) $-\hat{i}+\hat{j}$ (C) $\hat{i}-\hat{j}$ (D) $-\hat{j}+\hat{k}$

(c) Let $\vec{a} = -\hat{i}-\hat{k}, \vec{b} = -\hat{i}+\hat{j}$ and $\vec{c} = \hat{i}+2\hat{j}+3\hat{k}$ be three given vectors. If $\vec{r}$ is a vector such that $\vec{r}\times\vec{b} = \vec{c}\times\vec{b}$ and $\vec{r}.\vec{a} = 0$, then the value of $\vec{r}.\vec{b}$ is **[JEE 2011, 3+4+4]**

41. If $\vec{u}$ and $\vec{v}$ are two vectors such that $|\vec{u}| = 3$; $|\vec{v}| = 2$ and $|\vec{u}\times\vec{v}| = 6$ then the correct statement is

(A) $\vec{u} \wedge \vec{v} \in (0, 90°)$ (B) $\vec{u} \wedge \vec{v} \in (90°, 180°)$ (C) $\vec{u} \wedge \vec{v} = 90°$ (D) $(\vec{u}\times\vec{v})\times\vec{u} = 6\vec{v}$

17. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three unit vectors such that $\vec{a}\times(\vec{b}\times\vec{c}) = \frac{\sqrt{3}}{2}(\vec{b}+\vec{c})$. If $\vec{b}$ is not parallel to $\vec{c}$, then the angle between $\vec{a}$ and $\vec{b}$ is :- **[JEE(Main)-2016]**

(1) $\frac{5\pi}{6}$ (2) $\frac{3\pi}{4}$ (3) $\frac{\pi}{2}$ (4) $\frac{2\pi}{3}$