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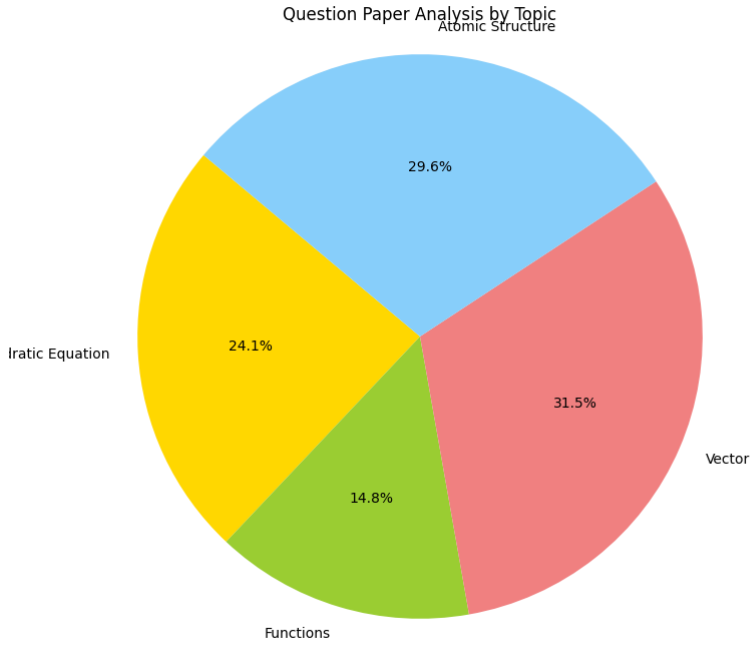
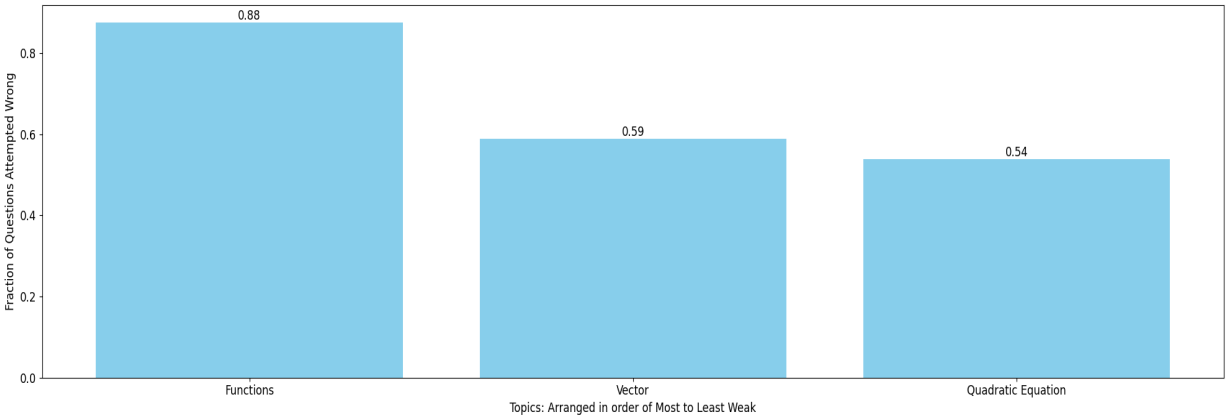
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

17. Let a function f: $(0, \infty) \rightarrow (0, \infty)$ be defined by $f(x) = \left|1 - \frac{1}{x}\right|$. Then, f is **[JEE - Main 2019]**

(A) injective only
(B) both injective as well as surjective
(C) not injective but it is surjective
(D) neither injective nor surjective

5. If the range of function $f(x) = \frac{x^2+7x+c}{x^2+2x+c}, x \in R$ is $\left[\frac{3}{6}, \frac{3}{2}\right]$ then c is equal to

(A) -4 (B) 3 (C) 4 (D) 5

5. Let f: $(-\infty, 2] \rightarrow [6, \infty)$ be defined as $f(x) = 4x^2 - 16x + 22$ and g(x) is a function such that graphs of f(x) and g(x) are mirror image of each other with respect to line $x - y = 0$, then g(10) is equal to

(A) 1 (B) 2 (C) 3 (D) 4

39. The relation R={(a, b) : gcd(a, b) = 1, 2a ≠ b, a, b ∈ Z} is : **[JEE - Main 2023]**

(A) Reflexive but not symmetric
(B) Transitive but not reflexive
(C) Symmetric but not transitive
(D) Neither symmetric nor transitive

5. Let $f(x) = x^{135} + x^{125} - x^{115} + x^5 + 1$. If f(x) is divided by $x^3 - x$ then the remainder is some function of x say g(x). Find the value of g(10).

Vector:

31. Let $\vec{a}=2\hat{i}+\lambda_1\hat{j}+3\hat{k}$, $\vec{b}=4\hat{i}+(3-\lambda_2)\hat{j}+6\hat{k}$ and $\vec{c}=3\hat{i}+6\hat{j}+(\lambda_3-1)\hat{k}$ be three vectors such that $\vec{b}=2\vec{a}$ and $\vec{a}$ is perpendicular to $\vec{c}$. Then a possible value of $(\lambda_1, \lambda_2, \lambda_3)$ is: **[JEE (Main)-2019]**

(1) $\left(\frac{1}{2},4,-2\right)$ (2) (1, 5, 1) (3) $\left(-\frac{1}{2},4,0\right)$ (4) (1, 3, 1)

3. Let $(\vec{p}\times\vec{q})\times\vec{r}+(\vec{q}\cdot\vec{r})\,\vec{q}=(x^2+y^2)\,\vec{q}+(14-4x-6y)\,\vec{p}$ and $(\vec{r}\cdot\vec{r})\,\vec{p}=\vec{r}$ where $\vec{p}$ and $\vec{q}$ are two non-zero non-collinear vectors and x and y are scalars. Find the value of (x + y).

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25. The distance of the point having position vector $-\hat{i}+2\hat{j}+6\hat{k}$ from the straight line passing through the point (2, 3, –4) and parallel to the vector, $6\hat{i}+3\hat{j}-4\hat{k}$ is : **[JEE (Main)-2019]**

(1) 6 (2) $2\sqrt{13}$ (3) 7 (4) $4\sqrt{3}$

26 If the volume of parallelopiped formed by the vectors $\hat{i}+\lambda\hat{j}+\hat{k}$, $\hat{j}+\lambda\hat{k}$ and $\lambda\hat{i}+\hat{k}$ is minimum, then λ is equal to **[JEE (Main)-2019]**

(1) $-\sqrt{3}$ (2) $\frac{1}{\sqrt{3}}$ (3) $-\frac{1}{\sqrt{3}}$ (4) $\sqrt{3}$

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) $3(\beta+\gamma)=-71$

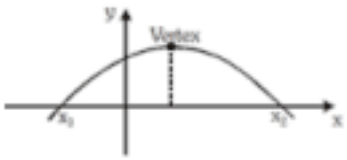
(C) $3(\gamma+\alpha)=-86$ (D) $3(\alpha+\beta+\gamma)=-121$

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

Quadratic Equation:

18. The adjoining figure shows the graph of $y = ax^2 + bx + c$. Then -



(A) $a > 0$ (B) $b > 0, c > 0$ (C) $c > 0, b < 0$ (D) $b^2 < 4ac$

3. Let $P(x) = 4x^2 + 6x + 4$ and $Q(y) = 4y^2 - 12y + 25$. Find the unique pair of real numbers (x, y) that satisfy $P(x) \cdot Q(y) = 28$.

7. If the difference between the roots of the equation $x^2 + ax + 1 = 0$ is less than $\sqrt{5}$, then the setoff possible values of a is **[AIEEE-2007]**

(A) $(-3, \infty)$ (B)$(3, \infty)$ (C) $(-\infty, -3)$ (D) $(-3,3)$

27. The sum of all the roots of the equation $|x^2 - 8x + 15| - 2x + 7 = 0$ is:

[JEE-MAIN-2023]

(A) $11-\sqrt{3}$ (B) $9-\sqrt{3}$ (C) $9+\sqrt{3}$ (D) $11\sqrt{3}$

EXERCISE – 4

3. If α, β are roots of the equation $ax^2 - bx - c = 0$, then $\alpha^2 - \alpha\beta + \beta^2$ is equal to-

(A) $\frac{b^2+3ac}{a^2}$ (B) $\frac{b^2-3ac}{a^2}$ (C) $\frac{b^2+2ac}{a^2}$ (D) $\frac{b^2-2ac}{a^2}$