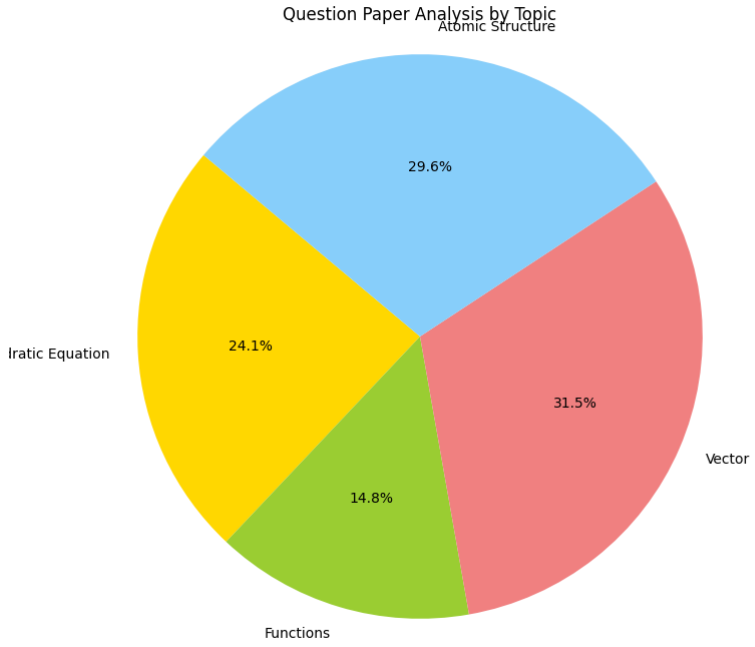
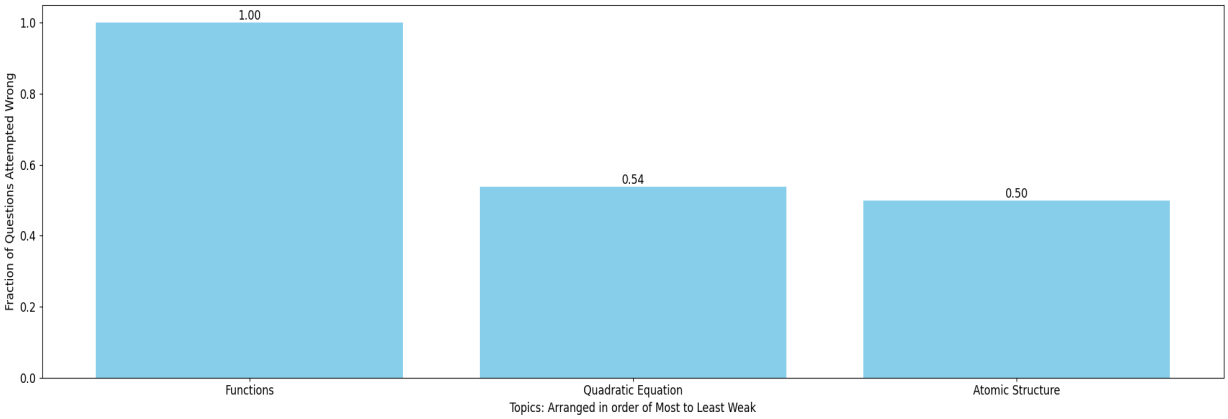
Aditya Total
MLAssist - Personalised DPP

## Question Paper Analysis:




## Weak Topic Analysis:



## Practice Questions:

### Functions:

**5.** Find the period of $f(x) = \sin \frac{\pi}{4}[x] + \cos \frac{\pi x}{2}$, where [.] denotes greatest integer function.

**4.** Classify the following functions f(x) definzed in $R \to R$ as injective, surjective, both or none .

(a) $f(x) = \frac{x^2+4x+30}{x^2-8x+18}$

(b) $f(x) = x^3 - 6x^2 + 11x - 6$

(c) $f(x) = (x^2 + x + 5)(x^2 + x - 3)$

**9.** Let f be a one-one function with domain {x, y, z} and range {1,2,3}. It is given that exactly one of the following statements is true and the remaining two are false.

$f(x) = 1; f(y) \neq 1; f(z) \neq 2$. Determine $f^{-1}(1)$

$\{1 - x \quad \text{if } x < 0$

**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

$d^2 f$

**5.** Consider, $f(x) = (x^2 - 1)^{1/3}$ for $x < 0$, $g(x) = -(x^3 + 1)^{1/2}$ for $x > -1$

Identify which of the following statement(s) is(are) correct.

(A) The range of f(f(x)) is $(-1,0)$.

(B) The domain of g(g(x)) is $(-1,0)$.

(C) $f^{-1}og^{-1}(x) = x \forall x \in (-\infty, 0)$.

(D) $g^{-1}of^{-1}(x) = x \forall x \in (-1, \infty)$.

## Quadratic Equation:

**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) $(-3,3)$

**7.** For what values of p does the vertex of the parabola $y = x^2 + 2px + 13$ lie at a distance of 5 from the origin?

**28.** If x and y are two real quantities connected by the equation $9x^2 + 2xy + y^2 - 92x - 20y + 244 = 0$, then will x lie between 3 and 6 and y between 1 and 10 .

**8.** If $x_1, x_2$ are the roots of $ax^2 + bx + c = 0$, then find the value of

(i) $(ax_1 + b)^{-2} + (ax_2 + b)^{-2}$ (ii) $(ax_1 + b)^{-3} + (ax_2 + b)^{-3}$.

**4.** All the values of m for which both roots of the equation $x^2 - 2mx + m^2 - 1 = 0$ are greater than2 but less than 4 , lie in the interval- **[AIEEE-2006]**

(A) $-1 < m < 3$ (B) $1 < m < 4$ (C) $-2 < m < 0$ (D) $m > 3$

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## Atomic Structure:

**25.** Three energy levels P, Q, R of a certain atom are such that $E_P < E_Q < E_R$. If $\lambda_1$, $\lambda_2$ and $\lambda_3$ are the wave length of radiation corresponding to transition $R \rightarrow Q$ ; $Q \rightarrow P$ and $R \rightarrow P$ respectively. The correct relationship between $\lambda_1$, $\lambda_2$ and $\lambda_3$ is

(A) $\lambda_1 + \lambda_2 = \lambda_3$ (B) $\frac{1}{\lambda_3} = \frac{1}{\lambda_1} + \frac{1}{\lambda_2}$ (C) $\lambda_3 = \sqrt{\lambda_1 \lambda_2}$ (D) $\frac{2}{\lambda_3} = \frac{1}{\lambda_1} + \frac{1}{\lambda_2}$

**40.** A beam of white light is dispersed into its wavelength components by a Quartz prism and falls on a thin sheet of potassium metal. What is the correct decreasing order of maximum kinetic energy of the electron emitted by the different light component.

(A) blue > green > orange > yellow (B) violet > blue > orange > red

(C) yellow > green > blue > violet (D) orange > yellow > blue > violet

**38.** The de Broglie wavelength ($\lambda$) associated with a photoelectron varies with the frequency ($\nu$) of the incident radiation as, [$\nu_0$ is threshold frequency] : **[JEE Main (Jan.) 2019]**

(1) $\lambda \propto \frac{1}{(\nu-\nu_0)^{\frac{1}{2}}}$ (2) $\lambda \propto \frac{1}{(\nu-\nu_0)^{\frac{1}{4}}}$ (3) $\lambda \propto \frac{1}{(\nu-\nu_0)}$ (4) $\lambda \propto \frac{1}{(\nu-\nu_0)^{\frac{3}{2}}}$

**57.** The magnetic moment of a transition metal compound has been calculated to be 3.87 B.M. The metal ion is **[JEE Main (April) 2023]**

(A) $Cr^{2+}$ (B) $Ti^{2+}$ (C) $V^{2+}$ (D) $Mn^{2+}$

**Ans.** **C**

**47.** What will be de-Broglie wavelength of an electron moving with a velocity of $1.2 \times 10^5$ $ms^{-1}$:

(A) $6.068 \times 10^{-9}$ m (B) $3.133 \times 10^{-37}$ m (C) $6.626 \times 10^{-9}$ m (D) $6.018 \times 10^{-7}$ m