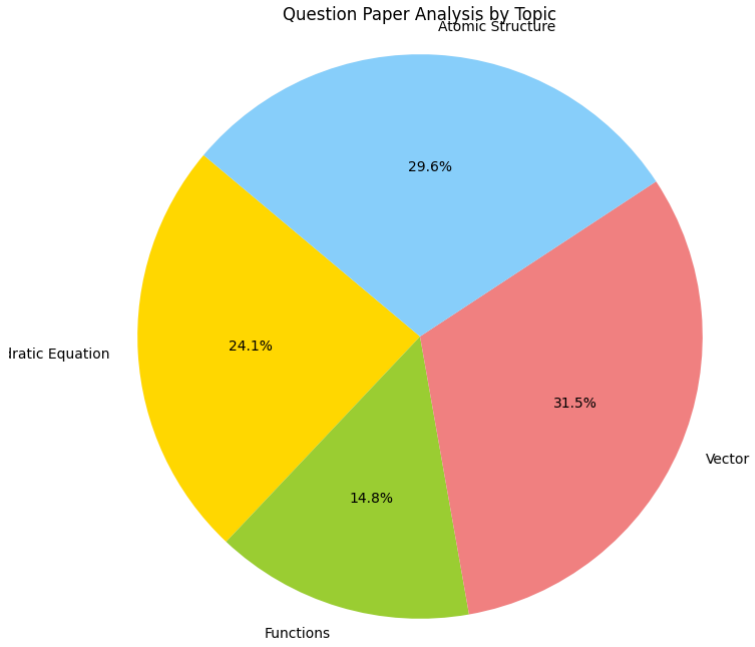
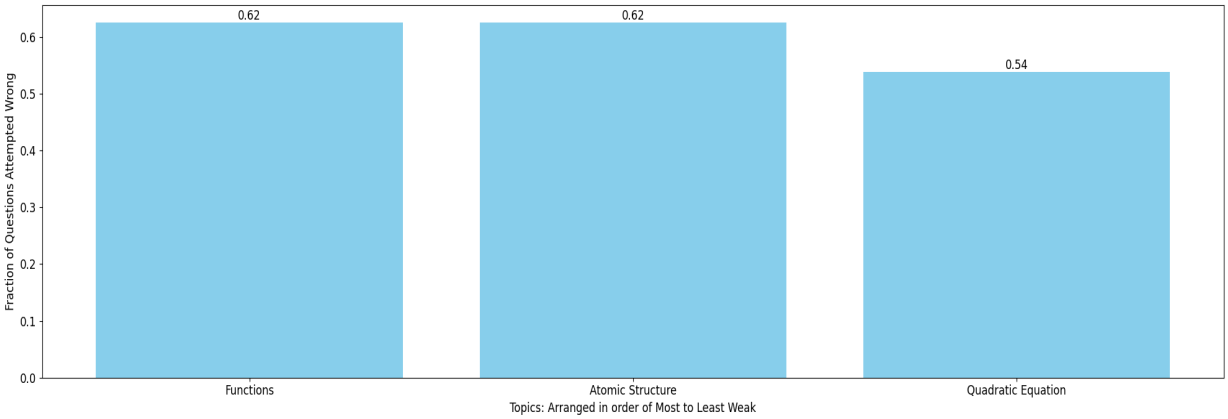
Aakash sharma Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

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

10. The number of elements in the range of $f(x) = [x] + [2x] + \left[\frac{2}{3}x\right] + [3x] + [4x] + [5x]$ for $0 \leq x < 3$ is

30. The real valued function $f(x) = \frac{\operatorname{cosec} x}{\sqrt{x-[x]}}$, where [x] denotes the greatest integer less than or equal to x, is defined for all x belonging to **[JEE - Main 2021]**

(A) all reals except integers (B) all non-integers except the interval [−1, 1]

(C) all integers except 0, −1, 1 (D) all reals except the Interval [−1, 1]

17. Let a function $f: (0, \infty) \longrightarrow (0, \infty)$ 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

11. For $x \in \left(0, \frac{3}{2}\right)$, let $f(x) = \sqrt{x}, g(x) = \tan x$ and $h(x) = \frac{1-x}{1+x^2}$ If $\phi(x) = (hof) \circ g)(x)$, then $\phi\left(\frac{\pi}{3}\right)$ is equal to **[JEE - Main 2019]**

(A) $\tan\frac{\pi}{12}$ (B) $\tan\frac{11\pi}{12}$ (C) $\tan\frac{7\pi}{12}$ (D) $\tan\frac{5\pi}{12}$

Atomic Structure:

16. The energy of H–atom in n^{th} orbit is E_n then energy in n^{th} orbit of singly ionized helium atom will be:

(A) $4E_n$ (B) $E_n/4$ (C) $2E_n$ (D) $E_n/2$

33. An atom has x energy level, then total number of lines in its spectrum are:-

(A) 1 + 2 + 3 .....(x + 1) (B) 1 + 2 + 3 ..... (x^2)

(C) 1 + 2 + 3 ..... (x - 1) (D) (x + 1) (x + 2) (x + 4)

34. Which of the following combination of statements is true regarding the interpretation of the atomic orbitals ? **[JEE Main (Jan.) 2019]**

(a) An electron in an orbital of high angular momentum stays away from the nucleus than an electron in the orbital of lower angular momentum.

(b) For a given value of the principal quantum number, the size of the orbit is inversely proportional to the azimuthal quantum number.

(c) According to wave mechanics, the ground state angular momentum is equal to $\frac{h}{2\pi}$.

(d) The plot of ψ Vs r for various azimuthal quantum numbers, shows peak shifting towards higher r value.

(1) (a), (c) (2) (a), (d) (3) (b), (c) (4) (a), (b)

46. An electron has kinetic energy 2.8×10^{-23} J. de-Broglie wavelength will be nearly :-

($m_e = 9.1 \times 10^{-31}$ kg)

(A) 9.28×10^{-24} m (B) 9.28×10^{-7} m (C) 9.28×10^{-8} m (D) 9.28×10^{-10} m

2. Rutherford's experiment , which established the nuclear model of atom, used a beam of :–

(A) β - particles, which impinged on a metal foil and get absorbed. **[JEE 2002]**

(B) γ - rays, which impinged on a metal foil and ejected electron.

(C) Helium atoms, which impinged on a metal foil and got scattered.

(D) Helium nuclei, which impinged on a metal foil and got scattered.

Quadratic Equation:

29. Find the complete set of real values of ' a ' for which both roots of the quadratic equation $(a^2 - 6a + 5)x^2 - \sqrt{a^2 + 2a}x + (6a - a^2 - 8) = 0$ lie on either side of the origin.

6. If a & b are positive numbers, prove that the equation $\frac{1}{x} + \frac{1}{x-a} + \frac{1}{x+b} = 0$ has two real roots, one between a/3&2a/3 and the other between $-2b/3\& - b/3$.

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 .

1. The graph of curve $x^2 = 3x - y - 2$ is strictly below the line $y = k$, then -

(A) $-2 < k < 4$ (B) $k > \frac{1}{4}$ (C) $k = \frac{1}{4}$ (D) $k < -1$ or $k > 0$

10. If roots of the equation $(x - \alpha)(x - 4 + \beta) + (x - 2 + \alpha)(x + 2 - \beta) = 0$ are p and q then find the absolute value of the sum of the roots of the equations $2(x - p)(x - q) - (x - \alpha)(x - 4 + \beta) = 0$ and $2(x - p)(x - q) - (x - 2 + \alpha)(x + 2 - \beta) = 0$.