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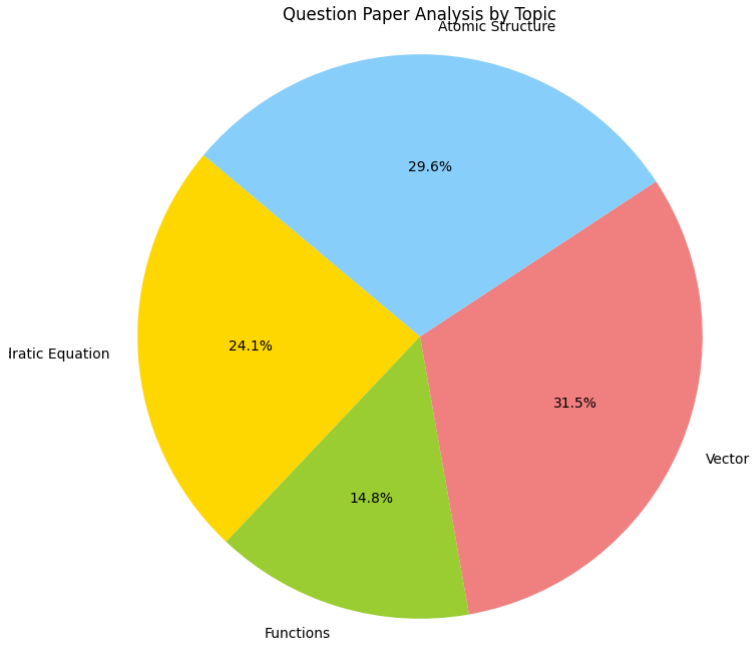
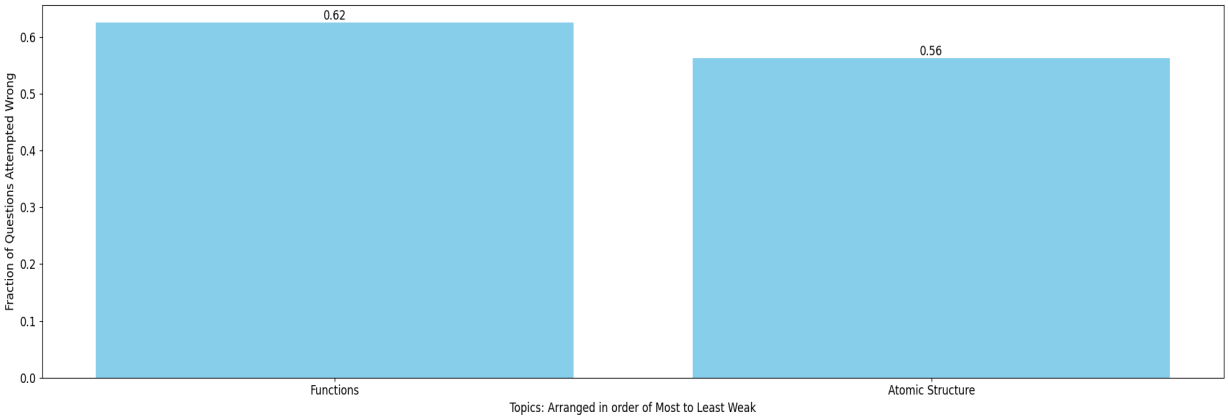
Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

4. Classify the following functions f(x) definzed in R → 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) $f(x) = (x^2 + x + 5)(x^2 + x - 3)$

23. Let $f : (1, 3) \to R$ be a function defined by $f(x) = \frac{x[x]}{1+x^2}$ where [x] denotes the greatest integer ≤ x. Then the range of f is: **[JEE - Main 2020]**

(A) $\left(\frac{2}{5}, \frac{1}{2}\right) \cup \left(\frac{3}{5}, \frac{4}{5}\right]$ (B) $\left(\frac{2}{5}, \frac{4}{5}\right]$ (C) $\left(\frac{3}{5}, \frac{4}{5}\right)$ (D) $\left(\frac{2}{5}, \frac{3}{5}\right] \cup \left(\frac{3}{4}, \frac{4}{5}\right)$

5. If $f(g(x)) = g(f(x)) = x$ for all real numbers x, and $f(2) = 5$ and $f(5) = 3$, then the value of $g(3) + g(f(2))$ is

(A) 7 (B) 5 (C) 3 (D) 2

4. For every pair of continuous functions f, g: [0,1] → R such that **[JEE Ad. 2014]**

max{f(x): x ∈ [0,1]} = max{g(x): x ∈ [0,1]}, the correct statement(s) is (are) :

(A) $(f(c))^2 + 3f(c) = (g(c))^2 + 3\,g(c)$ for some c ∈ [0,1]

(B) $(f(c))^2 + f(c) = (g(c))^2 + 3\,g(c)$ for some c ∈ [0,1]

(C) $(f(c))^2 + 3f(c) = (g(c))^2 + g(c)$ for some c ∈ [0,1]

(D) $(f(c))^2 = (g(c))^2$ for some c ∈ [0,1]

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

Atomic Structure:

1. The approximate size of the nucleus of $^{64}_{28}Ni$ is :

(A) 3 fm (B) 4 fm (C) 5 fm (D) 2 fm

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

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

34. In a sample of H–atoms, electron transits from 6th orbit to 2nd orbit in multi step. Then total spectral lines (without Balmer series) will be :

(A) 6 (B) 10 (C) 4 (D) 0

20.

Column-I		**Column-I**
(A) Electron moving in 2^{nd} orbit in He^+ ion	(P)	Radius of orbit in which electron is moving is 0.529 Å
(B) Electron moving in 3^{rd} orbit in H-atom	(Q)	Total energy of electron is $(-)13.6 \times 9eV$
(C) Electron moving in 1^{st} orbit in Li^{+2} ion	(R)	Velocity of electron is

18. For the given orbital in Column 1, the only CORRECT combination for any hydrogen- like species is

(A) (IV) (iv) (R) (B) (II) (ii) (P) (C) (III) (iii) (P) (D) (I) (ii) (S)