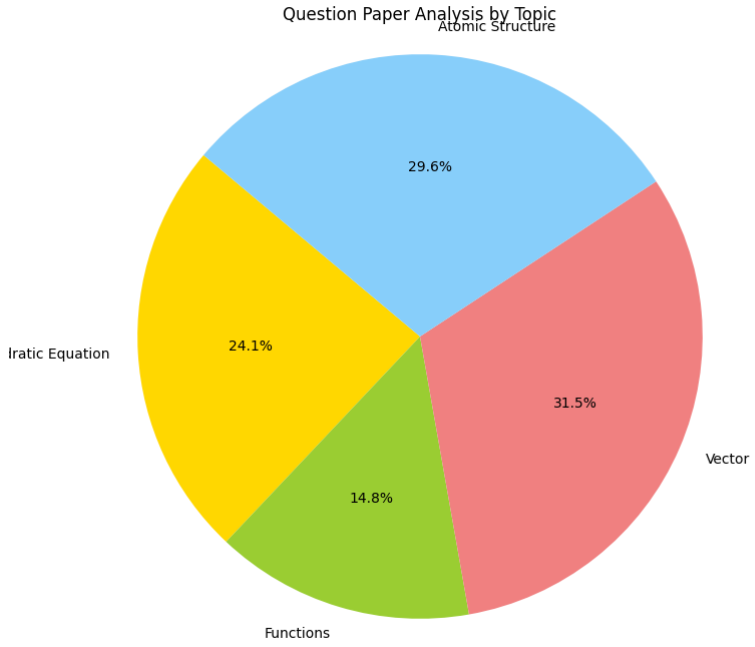
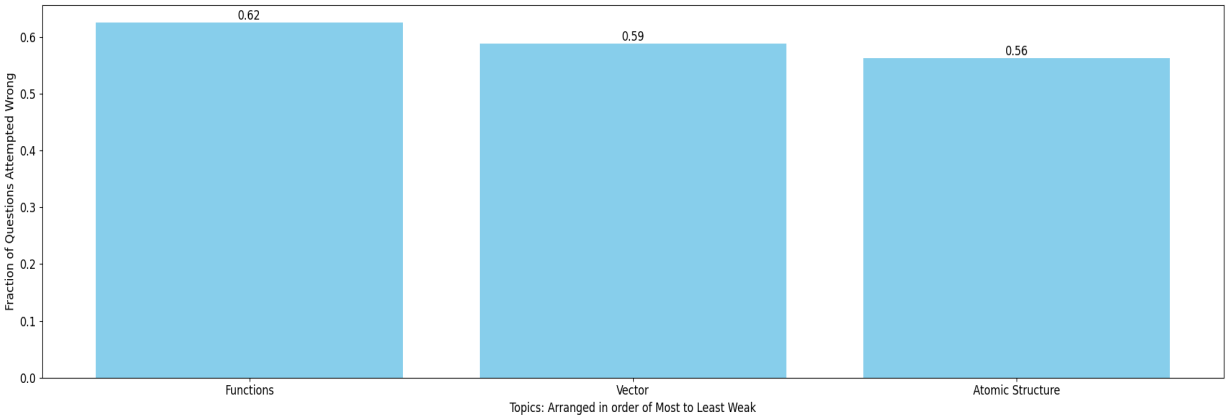
Ayush dhar dubey Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

13. Compute the inverse of the functions:

(a) $f(x) = \ln\left(x + \sqrt{x^2 + 1}\right)$

(b) $f(x) = 2^{\frac{x}{x-1}}$

(c) $y = \frac{10^x - 10^{-x}}{10^x + 10^{-x}}$

1. If $f(x) = 4x^3 - x^2 - 2x + 1$ and $g(x) = \begin{cases} \text{Min.}\{f(t): 0 \le t \le x\} & ; 0 \le x \le 1 \\ 3 - x & ; 1 < x \le 2 \end{cases}$ then find the value of λ if $2\lambda = g(1/4) + g(3/4) + g(5/4)$

8. Let ' f ' be a function defined in $[-2,3]$ given as $f(x) = \begin{cases} -(x-1)^2, & 0 \le x < 1 \\ 2(x-1)^2, & 1 \le x < 2 \\ -x^2 + 4x - 3, & 2 \le x \le 3 \end{cases}$

List-I	**List-II**
(P) The number of integers in the range of f(x) is	(1) 2
(Q) The number of integral values of x which are in the domain of $f(1 - \lvert x \rvert)$, is	(2) 4
(R) The number of integers in the range of $\lvert f(-\lvert x \rvert) \rvert$, is	(3) 6
(S) The number of integral values of k for which the equation $f(\lvert x \rvert) = k$ has exactly four distinct solutions is	(4) 7

Code :

(A) P-3, Q-3, R-2, S-1

(B) P-4, Q-4, R-2, S-1

(C) P-3, Q-4, R-2, S-1

(D) P-3, Q-4, R-2, S-2

14. The period of the function

$$f(x) = \left(\sec^2\left(\frac{\pi x}{10}\right) - \tan^2\left(\frac{\pi x}{10}\right)\right)^{\cos^4 4\pi x + 100\{x\}}$$

(where {.}denotesfractionalpartfunction)isλ, then (λ/2) is equal to

36. For p, q ∈ R, consider the real valued function $f(x) = (x - p)^2 - q$, $x \in R$ and $q > 0$. Let a_1, a_2, a_3 and a_4 be in an arithmetic progression with mean p and positive common difference. If $|f(a_i)| = 500$ for all I = 1, 2, 3, 4, then the absolute difference between the roots of f(x) = 0 is: **[JEE - Main 2022]**

Vector:

23. Let $\vec{a}, \vec{b}, \vec{c}$ be vectors of length 3, 4, 5 respectively. Let $\vec{a}$ be perpendicular to $\vec{b} + \vec{c}, \vec{b}$ to $\vec{c} + \vec{a}$ and $\vec{c}$ to $\vec{a} + \vec{b}$. Then $\left|\vec{a} + \vec{b} + \vec{c}\right|$ is :

(A) $2\sqrt{5}$ (B) $2\sqrt{2}$ (C) $10\sqrt{5}$ (D) $5\sqrt{2}$

58. If A (– 4, 0, 3) ; B (14, 2, –5) then which one of the following points lie on the bisector of the angle between $\overrightarrow{OA}$ and $\overrightarrow{OB}$ ('O' is the origin of reference)

(A) (2, 1, –1) (B) (2, 11, 5) (C) (10, 2, –2) (D) (1, 1, 2)

6. **(a)** Two adjacent sides of a parallelogram ABCD are given by $\overrightarrow{AB} = 2\hat{i} + 10\hat{j} + 11\hat{k}$ and $\overrightarrow{AD} = -\hat{i} + 2\hat{j} + 2\hat{k}$. The side AD is rotated by an acute angle α in the plane of the parallelogram so that AD becomes AD'. If AD' makes a right angle with the side AB then the cosine of the angle α is given by –

(A) $\frac{8}{9}$ (B) $\frac{\sqrt{17}}{9}$ (C) $\frac{1}{9}$ (D) $\frac{4\sqrt{5}}{9}$

(b) If $\vec{a}$ and $\vec{b}$ are vectors in space given by $\vec{a} = \frac{\hat{i} - 2\hat{j}}{\sqrt{5}}$ and $\vec{b} = \frac{2\hat{i} + \hat{j} + 3\hat{k}}{\sqrt{14}}$, then the value of $\left(2\vec{a} + \vec{b}\right).\left[\left(\vec{a} \times \vec{b}\right) \times \left(\vec{a} - 2\vec{b}\right)\right]$ is **[JEE 2010, 5 + 3]**

26. A, B, C & D are four points in a plane with pv's $\vec{a}, \vec{b}, \vec{c}$ & $\vec{d}$ respectively such that $(\vec{a}-\vec{d})\cdot(\vec{b}-\vec{c}) = (\vec{b}-\vec{d})\cdot(\vec{c}-\vec{a}) = 0$. Then for the triangle ABC, D is its

(A) incentre (B) circumcentre (C) orthocentre (D) centroid

40. Let the volume of a paralleleopiped whose coterminous edges are given by $\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}$ $\vec{v} = \hat{i} + \hat{j} + 3\hat{k}$ and $\vec{w} = 2\hat{i} + \hat{j} + \hat{k}$ be 1 cu. unit. If θ be the angle between the edge $\vec{u}$ and $\vec{w}$, then $\cos\theta$ can be : **[JEE (Main)-2020]**

(1) $\frac{7}{6\sqrt{6}}$ (2) $\frac{5}{3\sqrt{3}}$ (3) $\frac{7}{6\sqrt{3}}$ (4) $\frac{5}{7}$

Atomic Structure:

8. Which of the following sets of quantum number is correct for an electron in 4f orbital ? **[AIEEE-2004]**

(1) $n = 3, l = 2, m = -2, s = +\frac{1}{2}$ (2) $n = 4, l = 4, m = -4, s = -\frac{1}{2}$

(3) $n = 4, l = 3, m = +1, s = +\frac{1}{2}$ (4) $n = 4, l = 3, m = +4, s = +\frac{1}{2}$

17. Statement-1: Energy emitted when an electron jump from $5 \rightarrow 2$ (energy level) is less than when an electron jump from $2 \rightarrow 1$ in all 'H' like atom.

Statement-2: The |total energy difference| between 1st & 2nd energy level is greater than that of any two energy level provided level '1' is not part of those two energy levels.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

36. The ground state energy of hydrogen atom is –13.6 eV. The energy of second excited state He^+ ion in eV is : **[JEE Main (Jan.) 2019]**

(1) –54.4 (2) –6.04 (3) –3.4 (4) –27. 2

21. In an atom, two electrons move round the nucleus in circular orbits of radii R and 4R. The ratio of the time taken by them to complete one revolution is: (Consider Bohr model to be valid)

(A) 1 : 4 (B) 4 : 1 (C) 1 : 8 (D) 8 : 1

11. Select the correct curve(s):

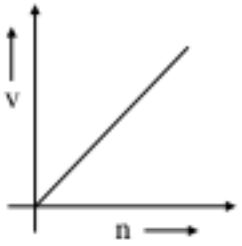
If v = velocity of electron in Bohr's orbit

r = Radius of electron in Bohr's orbit

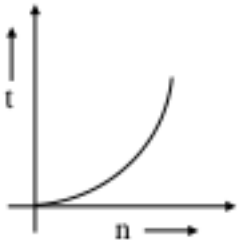
P.E. = Potential energy of electron in Bohr's orbit

K.E. = Kinetic energy of electron in Bohr's orbit

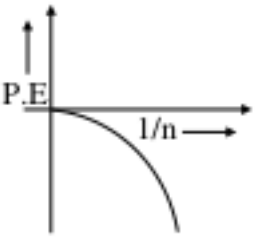
(A)



(B)



(C)



(D)