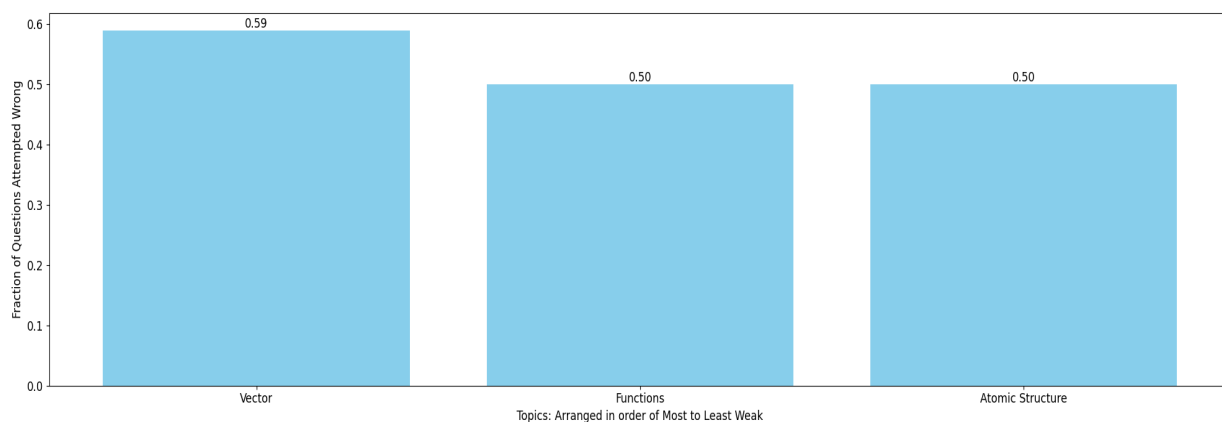


Govind Mohan Awasthi Total MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Vector:

59. Position vectors of the four angular points of a tetrahedron ABCD are A(3, -2, 1); B(3, 1, 5); C(4, 0, 3) and D(1, 0, 0). Acute angle between the plane faces ADC and ABC is
(A) $\tan^{-1}(5/2)$ (B) $\cos^{-1}(2/5)$ (C) $\operatorname{cosec}^{-1}(5/2)$ (D) $\cot^{-1}(3/2)$
60. The volume of the tetrahedron formed by the coterminus edges $\vec{a}, \vec{b}, \vec{c}$ is 3. Then the volume of the parallelepiped formed by the coterminus edges $\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}$ is
(A) 6 (B) 18 (C) 36 (D) 9
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 $|\vec{a} + \vec{b} + \vec{c}|$ is :
(A) $2\sqrt{5}$ (B) $2\sqrt{2}$ (C) $10\sqrt{5}$ (D) $5\sqrt{2}$
3. In the isosceles triangle ABC, $|\overline{AB}| = |\overline{BC}| = 8$, a point E divides AB internally in the ratio 1 : 3, then the cosine of the angle between \overline{CE} and \overline{CA} is (where $|\overline{CA}| = 12$)
(A) $-\frac{3\sqrt{7}}{8}$ (B) $\frac{3\sqrt{8}}{17}$ (C) $\frac{3\sqrt{7}}{8}$ (D) $\frac{-3\sqrt{8}}{17}$
39. Given an equilateral triangle ABC with side length equal to 'a'. Let M and N be two points respectively on the side AB and AC such that $\overline{AN} = K\overline{AC}$ and $\overline{AM} = \frac{\overline{AB}}{3}$. If \overline{BN} and \overline{CM} are orthogonal then the value of K is equal to
(A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

Functions:

22. If $g(x) = x^2 + x - 1$ and $(g \circ f)(x) = 4x^2 - 10x + 5$, then $f\left(\frac{3}{4}\right)$ is equal to: [JEE - Main 2020]

- (A) $-\frac{1}{2}$ (B) $\frac{3}{2}$ (C) $\frac{-3}{2}$ (D) $\frac{1}{2}$

1. Let $f(x) = x^2$ and $g(x) = \sin x$ for all $x \in \mathbb{R}$. Then the set of all x satisfying $(f \circ g \circ g \circ f)(x) = (g \circ g \circ f)(x)$, where $(f \circ g)(x) = f(g(x))$, is- [JEE 2011]

- (A) $\pm\sqrt{n\pi}, n \in \{0, 1, 2, \dots\}$ (B) $\pm\sqrt{n\pi}, n \in \{1, 2, \dots\}$
(C) $\frac{\pi}{2} + 2n\pi, n \in \{\dots, -2, -1, 0, 1, 2, \dots\}$ (D) $2n\pi, n \in \{\dots, -2, -1, 0, 1, 2, \dots\}$

9. Find the sum of all the solutions of the equation $\cot \frac{\pi x}{2} = \log_2 \{x\}$ in $x \in (0, 100)$.

[Note: $\{k\}$ denotes the fractional part function of k .]

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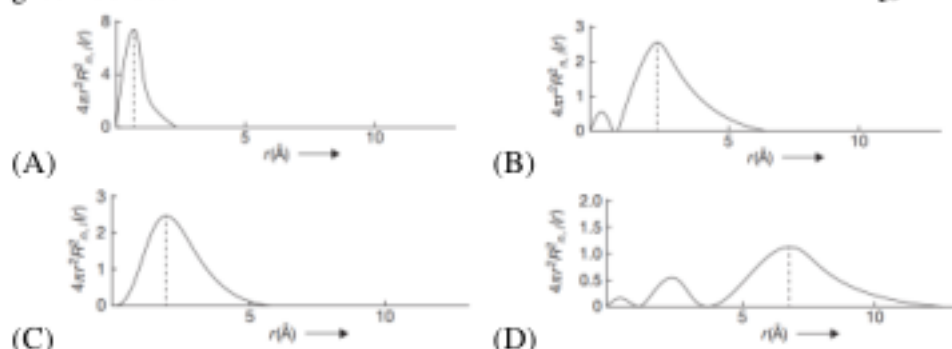
3. If $f(x) = \sqrt[3]{\frac{x}{\log_2(3-2x)}} - 1$ then the value of 'a' which satisfies $f^{-1}(2a - 4) = \frac{1}{2}$, is

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

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 $g(10)$.

Atomic Structure:

50. The plots of radial distribution functions for various orbitals of hydrogen atom against 'r' are given below: [JEE Main (April) 2021]



Ans. A

53. An α -particle is accelerated through a potential difference of V volts from rest. The de-Broglie's wavelength associated with it is

(A) $\sqrt{\frac{150}{V}} \text{ \AA}$ (B) $\frac{0.286}{\sqrt{V}} \text{ \AA}$ (C) $\frac{0.101}{\sqrt{V}} \text{ \AA}$ (D) $\frac{0.983}{\sqrt{V}} \text{ \AA}$

19. For He^+ ion, the only INCORRECT combination is

(A) (II) (ii) (Q)v (B) (I) (i) (S) (C) (I) (i) (R) (D) (I) (iii) (R)

46. The ratio of the shortest wavelength of two special series of hydrogen spectrum is found to be about 9. The spectral series are : [JEE Main (April) 2019]

- (1) Paschen and Pfund (2) Balmer and Brackett
(3) Lyman and Paschen (4) Brackett and Pfund

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)

