SIR CV RAMAN COACHING CENTRE- IDAPPADI ,

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XI- MATHS CHAPTER 8,9,10 - SLIP TEST QUESTION PAPER – 2024

SECTION – A (15X 5 = 75 M)

1. Find a direction ratio and direction cosines of the following vectors.
   (i) $3\hat{i}+4\hat{j}-6\hat{k}$, (ii) $3\hat{i}-4\hat{k}$.
2. Show that the points whose position vectors are $2\hat{i}+3\hat{j}-5\hat{k}$, $3\hat{i}+\hat{j}-2\hat{k}$ and , $6\hat{i}-5\hat{j}+7\hat{k}$ are collinear
3. If $\vec{a}=2\hat{i}+3\hat{j}-4\hat{k}$, $\vec{b}=3\hat{i}-4\hat{j}-5\hat{k}$, and $\vec{c}=-3\hat{i}+2\hat{j}+3\hat{k}$, find the magnitude and direction cosines of (i) $\vec{a}+\vec{b}+\vec{c}$ (ii) $3\vec{a}-2\vec{b}+5\vec{c}$.
4. Find the value or values of m for which $m(\hat{i}+\hat{j}+\hat{k})$ is a unit vector
5. Find $\vec{a}\cdot\vec{b}$ when
   (i) $\vec{a}=\hat{i}-\hat{j}+5\hat{k}$ and $\vec{b}=3\hat{i}-2\hat{k}$
   (ii) $\vec{a}$ and $\vec{b}$ represent the points (2, 3, – 1) and (– 1, 2, 3).
6. If $\vec{a},\vec{b}$ are unit vectors and θ is the angle between them, show that
   (i) $\sin\frac{\theta}{2}=\frac{1}{2}|\vec{a}-\vec{b}|$ (ii) $\cos\frac{\theta}{2}=\frac{1}{2}|\vec{a}+\vec{b}|$ (iii) $\tan\frac{\theta}{2}=\frac{|\vec{a}-\vec{b}|}{|\vec{a}+\vec{b}|}$.
7. If $\vec{a}=-3\hat{i}+4\hat{j}-7\hat{k}$ and $\vec{b}=6\hat{i}+2\hat{j}-3\hat{k}$,
   verify (i) $\vec{a}$ and $\vec{a}\times\vec{b}$ are perpendicular to each other.
   (ii) $\vec{b}$ and $\vec{a}\times\vec{b}$ are perpendicular to each other.
8. Find the area of the triangle whose vertices are $A(3, -1, 2)$, $B(1, -1, -3)$ and $C(4, -3, 1)$.
9. Calculate $\lim_{x\to 0}|x|$.
10. Check if $\lim_{x\to -5} f(x)$ exists or not, where $f(x)=\begin{cases}\frac{|x+5|}{x+5}, & \text{for } x\neq -5\\ 0, & \text{for } x=-5\end{cases}$
11. Calculate $\lim_{x\to 3}(x^3-2x+6)$.
12. Compute $\lim_{x\to 0}\left[\frac{x^2+x}{x}+4x^3+3\right]$.

13. $\lim_{x\to 1}\frac{x^m-1}{x^n-1}$, m and n are integers.

14. $\lim_{x\to 0}\frac{\sqrt{x^2+1}-1}{\sqrt{x^2+16}-4}$

15. Calculate $\lim_{x\to\infty}\frac{x^3+2x+3}{(5x^2+1)}$.

16. Prove that $\lim_{x\to 0}\sin x = 0$.

17. $\lim_{x\to\infty}\left(\frac{2x^2+3}{2x^2+5}\right)^{8x^2+3}$

18. $\lim_{x\to 0}\frac{\tan 2x}{\sin 5x}$

19. Examine the continuity of the following

(i) $x+\sin x$ (ii) $x^2\cos x$ (iii) $e^x\tan x$

20. Find the derivatives of the following functions using first principle

(i) $f(x)=6$ (ii) $f(x)=-4x+7$ (iii) $f(x)=-x^2+2$

21. Find the derivatives of the following functions with respect to corresponding independent variables:

(1) $f(x)=x-3\sin x$ (2) $y=\sin x+\cos x$

(3) $f(x)=x\sin x$ (4) $y=\cos x-2\tan x$

(5) $g(t)=t^3\cos t$ (6) $g(t)=4\sec t+\tan t$

(7) $y=e^x\sin x$ (8) $y=\frac{\tan x}{x}$

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