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CBSE Class XII – Mathematics
Multiple Choice Questions

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1. Degree of the differential equation $\sin x + \cos\left(\frac{dy}{dx}\right) = y^2$ is

   (A) 2

   (B) 1

   (C) not defined

   (D) 0

2. The integrating factor of the differential equation $(1-y^2)\frac{dx}{dy}+yx = ay,\ (-1 < y < 1)$ is

   (A) $\frac{1}{y^2-1}$

   (B) $\frac{1}{\sqrt{y^2-1}}$

   (C) $\frac{1}{1-y^2}$

   (D) $\frac{1}{\sqrt{1-y^2}}$

3. Unit vector along $\vec{PQ}$, where $P(2, 1, -1)$ and $Q(4, 4, -7)$ is

   (A) $2\hat{i} + 3\hat{j} - 6\hat{k}$

   (B) $-2\hat{i} - 3\hat{j} + 6\hat{k}$

   (C) $\frac{-2\hat{i}}{7} - \frac{3\hat{j}}{7} + \frac{6\hat{k}}{7}$

   (D) $\frac{2\hat{i}}{7} + \frac{3\hat{j}}{7} - \frac{6\hat{k}}{7}$

4. If in $\triangle ABC$, $\vec{BA} = 2\vec{a}$ and $\vec{BC} = 3\vec{b}$, then $\vec{AC}$ is

   (A) $2\vec{a} + 3\vec{b}$

   (B) $2\vec{a} - 3\vec{b}$

   (C) $3\vec{b} - 2\vec{a}$

   (D) $-2\vec{a} - 3\vec{b}$

5. If $|\vec{a} \times \vec{b}| = \sqrt{3}$ and $\vec{a} \cdot \vec{b} = -3$, then the angle between $\vec{a}$ and $\vec{b}$ is

(A) $\frac{2\pi}{3}$

(B) $\frac{\pi}{6}$

(C) $\frac{\pi}{3}$

(D) $\frac{5\pi}{6}$

6. Equation of the line passing through origin and making $30°, 60°, 90°$ with x, y, z axes respectively is

(A) $\frac{2x}{\sqrt{3}} = \frac{y}{2} = \frac{z}{0}$

(B) $\frac{2x}{\sqrt{3}} = \frac{2y}{1} = \frac{z}{0}$

(C) $2x = \frac{2y}{\sqrt{3}} = \frac{z}{1}$

(D) $\frac{2x}{\sqrt{3}} = \frac{2y}{1} = \frac{z}{1}$

7. If $P(A|B) = 2P(B|A)$ and $P(A) + P(B) = \frac{2}{3}$, then $P(B)$ is

(A) $\frac{2}{9}$

(B) $\frac{7}{9}$

(C) $\frac{4}{9}$

(D) $\frac{5}{9}$

8. Anti-derivative of $\frac{\tan x - 1}{\tan x + 1}$ is

(A) $\sec^2\left(\frac{\pi}{4} - x\right) + c$

(B) $-\sec^2\left(\frac{\pi}{4} - x\right) + c$

(C) $\log\left|\sec\left(\frac{\pi}{4} - x\right)\right| + c$

(D) $-\log\left|\sec\left(\frac{\pi}{4} - x\right)\right| + c$

9. If $(a, b), (c, d), (e, f)$ are vertices of $\triangle ABC$ and Δ is its area, then

$$\left| \begin{pmatrix} a & c & e \\ b & d & f \\ 1 & 1 & 1 \end{pmatrix} \right|^2$$

is equal to

(A) $2\Delta^2$

(B) $4\Delta^2$

(C) 2Δ

(D) 4Δ

10. The function $f(x) = x|x|$ is

    (A) continuous and differentiable at $x = 0$

    (B) continuous but not differentiable at $x = 0$

    (C) differentiable but not continuous at $x = 0$

    (D) neither differentiable nor continuous at $x = 0$