Ques1.

If $\vec{A} = 2yz\hat{i} - x^2y\hat{j}$ and $\phi = 2xyz^2$, the value of $(\vec{A} \times \vec{\nabla})\phi$ is

- $-4xy^2z^2\hat{j} + (4xyz^3 + 4x^2y^2z^2)\hat{k}$
- $-4xy^2z^2\hat{j} + (4xyz^3 + 4x^2y^2z^2)\hat{k}$
- $-2x^3y^2z\hat{i} - 4xy^2z^2\hat{j} + (2xyz^3 + 2x^2y^2z^2)\hat{k}$
- $-4x^3y^2z^2\hat{i} + (4xyz^3 + 4x^2y^2z^2)\hat{k}$
- $-4x^3y^2z\hat{i} - 8xy^2z^2\hat{j} + (4xyz^3 + 2x^2y^2z^2)\hat{k}$
- $4x^3y^2z\hat{i} - 8xy^2z^2\hat{j} + (4xyz^2 + 2x^2y^2z^2)\hat{k}$
- $-4x^3y^2z\hat{i} - 8xy^2z^2\hat{j} + (4xyz^2 + 2x^2y^2z^2)\hat{k}$
- $4x^3y^2z\hat{i} - 8xy^2z^2\hat{j} + (4xyz^3 + 2x^2y^2z^2)\hat{k}$

Ques2.

If $\vec{A} = 2yz\hat{i} - x^2y\hat{j}$ and $\vec{B} = yz\hat{j} - xy\hat{k}$, the value of $(\vec{B} \cdot \vec{\nabla})\vec{A}$ is:

- $2yz^2\hat{i} - x^2yz\hat{j}$
- $(2yz^2 - 2xy^2)\hat{i} - x^2yz\hat{j}$
- $(2yz^2 - 2xy^2)\hat{i} + x^2yz^2\hat{j}$
- $(2y^2z^2 + 2xy^2)\hat{i} - x^2yz\hat{j}$
- $(2yz^2 - 2xy^2)\hat{i} - x^2yz\hat{j}$
- $(2yz^2 - 2xy^2)\hat{i} + 4x^2yz^2\hat{j}$
- 0
- $(2yz^2 + 2xy^2)\hat{i} - 4x^2yz\hat{j}$

Ques3.

For $\vec{A} = \frac{\vec{r}}{r}$, the value of $\vec{\nabla}(\vec{\nabla} \cdot \vec{A})$ can be written as $nr^m \vec{r}$. Then n = [-2] and m = [-3]. Write only integers in the answer boxes.

Ques4.

The angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at a point $(2, -1, 2)$ is [ ]

Expected Solutions: 54 126 1 . Round off the answer to the nearest integer.

Ques5.

If $\phi = -4x^2z$, the value of $\vec{\nabla} \times (\phi\, \vec{\nabla}\phi)$ is [0].
