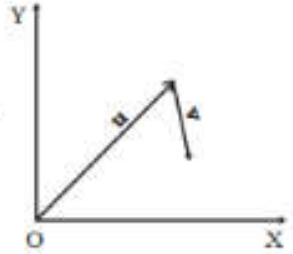
2. Figure shows the orientation of two vectors u and v in the XY plane.

If $u = a\hat{i} + b\hat{j}$ and $v = p\hat{i} + q\hat{j}$



Which of the following is correct?

1) a, b, p and q are all positive.
2) s and p are positive while b and q are negative.
3) a, q and b are positive while p is negative.
4) a, p and b are positive while q is negative.

Sol. 4) a, p and b are positive while q is negative.

Main concept used: Sign of a, b, p and q are the sign of their resolving components in the XY direction.

Explanation: Components along X and Y axis of the vector $\bar{u}$ are both +X and Y direction, so a, b are positive.

Now if we resolve $\bar{v}$ its X component is in the +ve X direction but Y component will be in -ve Y direction.

Hence, a, b and p are positive but q is negative.