Following short questions are selected from previous 5 years papers of different boards. Solve these at your own to perform well in annual exams.

1. If $\vec{v} = 3\hat{i} - 2\hat{j} + 2\hat{k}$ and $\vec{w} = 5\hat{i} - \hat{j} + 3\hat{k}$, find $|3\vec{v} + \vec{w}|$.
2. Find α so that $|\alpha\hat{i} + (\alpha + 1)\hat{j} + 2\hat{k}| = 3$.
3. Find a unit vector in the direction of vector $\vec{v} = \frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}$.
4. Prove that the vectors $\hat{i} - 2\hat{j} + 3\hat{k}$, $-2\hat{i} + 3\hat{j} - 4\hat{k}$ and $\hat{i} - 3\hat{j} + 5\hat{k}$ are coplanar.
5. Find the direction cosines for $\vec{PQ}$, where $P(2, 1, 5)$ and $Q(1, 3, 1)$.
6. Calculate the projection of $\vec{b}$ along $\vec{a}$ where $\vec{a} = 3\hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = -2\hat{i} - \hat{j} + \hat{k}$.
7. Define Dot Product of two vectors.
8. Write any two properties of dot product.
9. Find the angle between vectors $\vec{u} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{v} = -\hat{i} + \hat{j}$.
10. If $\vec{a} \times \vec{b} = \vec{0}$ and $\vec{a} \cdot \vec{b} = 0$, what conclusion can be drawn about $\vec{a}$ and $\vec{b}$?
11. Prove that $\vec{a} \times (\vec{b} + \vec{c}) + \vec{b} \times (\vec{c} + \vec{a}) + \vec{c} \times (\vec{a} + \vec{b}) = 0$.
12. If the vectors $2\hat{i} + 4\hat{j} - 7\hat{k}$ and $2\hat{i} + 6\hat{j} + x\hat{k}$ are perpendicular to each other, find the value of x.
13. If $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, prove that $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a}$.
14. Find the direction cosines of $\vec{v} = 2\hat{i} - \hat{j} + 2\hat{k}$.
15. Find a vector of length 5 in the direction opposite that of $\vec{v} = -2\hat{i} - 2\hat{j} + 3\hat{k}$.
16. Find the value of α so that the vectors $\vec{v} = \hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{w} = \alpha\hat{i} + 6\hat{j} - 9\hat{k}$ are parallel.
17. Find the value of α so that the vectors $2\hat{i} + \alpha\hat{j} + 5\hat{k}$ and $3\hat{i} + \hat{j} + \alpha\hat{k}$ are perpendicular.
18. Find the value of α so that the vectors $\alpha\hat{i} + \hat{j}$, $2\hat{i} + \hat{j} - 2\hat{k}$ and $\hat{i} + \hat{j} + 3\hat{k}$ are coplanar.
19. Find the volume of tetrahedron whose vertices are $A(2, 1, 8)$, $B(3, 2, 9)$, $C(2, 1, 4)$ and $D(3, 3, 10)$.
20. Find the area of the triangle with vertices $A(1, -1, 1)$, $B(2, 1, -1)$, $C(-1, 1, 2)$.
21. Find the value of $[\hat{k}\,\hat{i}\,\hat{j}]$.
22. Prove that $sin(\alpha + \beta) = sin\alpha cos\beta + cos\alpha sin\beta$.

Best of Luck