1. The point having position vectors $2\hat{i}+3\hat{j}+4\hat{k}$, $3\hat{i}+4\hat{j}+2\hat{k}$ and $4\hat{i}+2\hat{j}+3\hat{k}$ are the vertices of
(1) right-angled triangle
(2) isosceles triangle
(3) equilateral triangle
(4) collinear

2. Given three vectors $\vec{a}=6\hat{i}-3\hat{j}$, $\vec{b}=2\hat{i}-6\hat{j}$ and $\vec{c}=-2\hat{i}+21\hat{j}$ such that $\vec{\alpha}=\vec{a}+\vec{b}+\vec{c}$. Then, the resolution of the vector $\vec{\alpha}$ into components with respect to $\vec{a}$ and $\vec{b}$ is given by
(1) $3\vec{a}-2\vec{b}$
(2) $3\vec{b}-2\vec{a}$
(3) $2\vec{a}-3\vec{b}$
(4) $\vec{a}-2\vec{b}$

3. If $\vec{a}, \vec{b}, \vec{c}$ are three non-zero vectors which are pairwise non-collinear. Also, $\vec{a}+3\vec{b}$ is collinear with $\vec{c}$ and $\vec{b}+2\vec{c}$ is collinear with $\vec{a}$, then $\vec{a}+3\vec{b}+6\vec{c}$ is
(1) $\vec{a}+\vec{c}$
(2) $\vec{a}$
(3) $\vec{c}$
(4) 0

4. Let $A\left(2\hat{i}+3\hat{j}+5\hat{k}\right)$, $B\left(-\hat{i}+3\hat{j}+2\hat{k}\right)$ and $C\left(\lambda\hat{i}+5\hat{j}+\mu\hat{k}\right)$ are vertices of a triangle and its median through A is equally inclined to the positive directions of the axes. The value of $2\lambda-\mu$ is equal to

5. Let $\vec{a}=(1,\ 1,\ -1)$, $\vec{b}=(5,\ -3,\ -3)$ and $\vec{c}=(3,\ -1,\ 2)$. If $\vec{r}$ is collinear with $\vec{c}$ and has length of $\frac{|\vec{a}+\vec{b}|}{2}$, then $\vec{r}$ equals
(1) $\pm 3\vec{c}$
(2) $\pm\frac{3}{2}\vec{c}$
(3) $\pm\vec{c}$
(4) $\pm\frac{2}{3}\vec{c}$

6. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors satisfying the relation $\vec{a}+\vec{b}+\sqrt{3}\vec{c}=0$, then the angle between $\vec{a}$ and $\vec{b}$ is
(1) $\frac{\pi}{6}$
(2) $\frac{\pi}{4}$
(3) $\frac{\pi}{3}$
(4) $\frac{\pi}{2}$

7. If $\left|\vec{A}+\vec{B}\right|=n\left|\vec{A}-\vec{B}\right|$ and $|A|=|B|$ then what is angle between $\vec{A}$ and $\vec{B}$?
(1) $\theta=\cos^{-1}\left(\frac{n^2-1}{n^2+1}\right)$
(2) $\theta=\sin^{-1}\left(\frac{n^2-1}{n^2+1}\right)$
(3) $\theta=\sin^{-1}\left(\frac{n-1}{n+1}\right)$
(4) $\theta=\cos^{-1}\left(\frac{n-1}{n+1}\right)$

8. Let the vectors $\vec{a}, \vec{b}$ and $\vec{c}$ are perpendicular to $\vec{b}+\vec{c}, \vec{c}+\vec{a}$ and $\vec{a}+\vec{b}$ respectively. If $\left|\vec{a}+\vec{b}\right|=6, \left|\vec{b}+\vec{c}\right|=8$ and $\left|\vec{c}+\vec{a}\right|=10$, then the value of $\left|\vec{a}+\vec{b}+\vec{c}\right|$ is equal to
(1) $5\sqrt{5}$
(2) 50
(3) $10\sqrt{2}$
(4) 10

9. The length of longer diagonal of the parallelogram constructed on $5\vec{\mathbf{a}}+2\vec{\mathbf{b}}$ and $\vec{\mathbf{a}}-3\vec{\mathbf{b}}$. If it is given that $\left|\vec{\mathbf{a}}\right|=2\sqrt{2}, \left|\vec{\mathbf{b}}\right|=3$ and angle between $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ is $\frac{\pi}{4}$ is
(1) 15
(2) $\sqrt{113}$
(3) $\sqrt{593}$
(4) $\sqrt{369}$

10. If vector $\vec{a}=2\hat{i}-3\hat{j}+6\hat{k}$ and vector $\vec{b}=-2\hat{i}+2\hat{j}-\hat{k}$, then $\frac{\text{Projection of vector } \vec{a} \text{ on vector } \vec{b}}{\text{Projection of vector } \vec{b} \text{ on vector } \vec{a}}=$
(1) $\frac{3}{7}$
(2) $\frac{7}{3}$
(3) 3
(4) 7