INTERNATIONAL INDIAN SCHOOL BURAIADAH
WORK SHEET-2025-26
SUBJECT: MATHS
CHAPTER: VECTORS ALGEBRA

MCQ

1-The Area of triangle formed by the vectors O,A ,B where $\overrightarrow{OA} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ and $\overrightarrow{OB} = -3\hat{\imath} - 2\hat{\jmath} + \hat{k}$

(a) $3\sqrt{5}$ sq unit (b) $5\sqrt{5}$ sq unit (c) $6\sqrt{5}$ sq unit (d) 4 sq unit

2-The position vector of the point which divides the joining of points $2\vec{a} - 3\vec{b}$ and $\vec{a} + \vec{b}$ in the ratio 3 :1 is

(a) $(3\vec{a} - 2\overrightarrow{b})/2$ (b) $(7\vec{a} - 8\overrightarrow{b})/4$ (c) $3\vec{a}/4$ (d) $5\vec{a}/4$

3-The direction cosine of the vector $\overrightarrow{BA}$ =,where coordinates of A and B are (1,2,-1) and (3,4,0)

(a) -2 ,-2,-1 (b) -2/3 , -2/3 ,-1/3 (c) 2,2 ,1 (d) 2/3 , 2/3 ,1/3

4-The value of p for which the vectors = $2\hat{\imath} + p\hat{\jmath} + \hat{k}$ and = $-4\hat{\imath} - 6\hat{\jmath} + 26\hat{k}$ are perpendiculat to each other is ,

(a) 3 (b) -3 (c) -17/3 (d) 17/3

5- $\vec{a}$ and $\vec{b}$ are two vectors such that the projection of $\vec{a}$ on $\vec{b}$ is 0.The angle between $\vec{a}$ and $\vec{b}$ is

(a) $\frac{\pi}{2}$ (b) π (c) $\frac{\pi}{2}$ (d) $\frac{5\pi}{2}$

6- In ΔABC , $\overrightarrow{AB} = \hat{\imath} + \hat{\jmath} + 2\hat{k}$ and $\overrightarrow{AC} = 3\hat{\imath} - j + 4\hat{k}$. If D is midpoint of BC ,then vector $\overrightarrow{AD}$ is equal to

(a) $4\hat{\imath} + 6\hat{k}$ (b) $2\hat{\imath} - 2\hat{\jmath} + 2\hat{k}$ (c) $\hat{\imath} - \hat{\jmath} + \hat{k}$ (d) $2\hat{\imath} + 3\hat{k}$

7-Two vectors $\vec{a} = a_1\hat{\imath} + a_2\hat{\jmath} + a_3\hat{k}$ and $\vec{b} = b_1\hat{\imath} + b_2\hat{\jmath} + b_3\hat{k}$ are collinear if

(a) $a_1b_1 - a_2b_2 + a_3b_3 = 0$ (b) $a_1/b_1 = a_2/b_2 = a_3/b_3$

(c) $a_1 = b_1$, $a_2 = b_2$, $a_3 = b_3$ (d) $a_1 + a_2 + a_3 = b_1 + b_2 + b_3$

8-Unit vector along $\overrightarrow{PQ}$, where coordinate of P and Q respectively are (2 ,-1 ,-1) and (4, 4 ,-7)

(a) $2\hat{\imath} + 3\hat{\jmath} - 6\hat{k}$ (b) $-2\hat{\imath} - 3\hat{\jmath} + 6\hat{k}$ (c) $-\frac{2\hat{\imath}}{7} - \frac{3\hat{\jmath}}{7} + \frac{6\hat{k}}{7}$ (d)) $\frac{2\hat{\imath}}{7} + \frac{3\hat{\jmath}}{7} - \frac{6\hat{k}}{7}$

Assertion -Reason Questions

The following questions consist of two statements -Assertion (A) and Reason(R) .Answer these questions selecting the appropriate option given below :

(a) Both A and R true and R is the correct explanation for A.

(b) Both A and R are true but R is not the correct explanation for A
(c) A is true but R is false.
(d) A is false but R is true .

1-Assertion (A) : Direction cosines of vector $\vec{a} = \hat{\imath} + \hat{\jmath} - 2\hat{k}$ are $\frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{-2}{\sqrt{6}}$.

Reason (R) : If vector $\vec{r} = a\hat{\imath} + b\hat{\jmath} + c\hat{k}$ then its direction cosines are $\frac{a}{|\vec{r}|}, \frac{b}{|\vec{r}|}, , \frac{c}{|\vec{r}|}$

Where $|\vec{r}| = \sqrt{a^2 + b^2 + c^2}$

2-Assertion (A) If $|\vec{a} X\vec{b}| = 1$ and $|\vec{a} . \vec{b}| = \sqrt{3}$ then angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$

Reason (R) : $|\vec{a} X\vec{b}| = |\vec{a}||\vec{b}| \sin\theta$ and $|\vec{a} . \vec{b}| = |\vec{a}||\vec{b}| \cos\theta$.

Subjective Questions :

1-Show that for any two non-zero vectors $\vec{a}$ and $\vec{b}$, $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ iff $\vec{a}$ and $\vec{b}$ are perpendicular vectors . (CBSE-2020)

2-If $\vec{r} = 3\hat{\imath} - 2\hat{\jmath} + 6\hat{k}$, find the value of ($\vec{r}$ X j).($\vec{r}$ X $\hat{k}$)-12 (CBSE-2023)

3-X ad Y are two points with position vectors $3\vec{a} + \vec{b}$ and $\vec{a} - 3\vec{b}$ respectively.write the position vectorof a point Zwhich divides the line segment XY in the ratio 2:1externally. (CBSE-2019)

4-Let $\vec{a} = \hat{\imath} + 2\hat{\jmath} - 3\hat{k}$ and $\vec{b} = 3\hat{\imath} - \hat{\jmath} + 2\hat{k}$ be two vectors .Show that vectors ($\vec{a} + \vec{b}$) and ($\vec{a} - \vec{b}$) are perpendicular to each other.(CBSE-2019)

5-If the vectors $\vec{a}$ and $\vec{b}$ are such that $|\vec{a}| = 3$, $|\vec{b}| = 2/3$ and $\vec{a}$ X $\vec{b}$ is a unit vector ,then find the angle between $\vec{a}$ and $\vec{b}$.(CBSE-2023)

6-Find the Area of a parallelogram whose adjacent sides are determined by the vectors $\vec{a} = \hat{\imath} - \hat{\jmath} + 3\hat{k}$ and $\vec{b} = 2\hat{\imath} - 7\hat{\jmath} + \hat{k}$ (CBSE-2023)

7-If $\vec{a}$, $\vec{b}$, $\vec{c}$ are three non -zero unequal vectors such that $\vec{a}.\vec{b} = \vec{a}.\vec{c}$ then find the angle between $\vec{a}$ and $\vec{b} - \vec{c}$ (CBSE-2023)

8-Write the projection of the vectors ($\vec{b} + \vec{c}$) on the vector $\vec{a}$, where $\vec{a} = 2\hat{\imath} - 2\hat{\jmath} + \hat{k}$, $\vec{b} = \hat{\imath} + 2\hat{\jmath} - 2\hat{k}$ and $\vec{c} = 2\hat{\imath} - \hat{\jmath} + 4\hat{k}$ (CBSE-2022)

9-The scalar product of the vector $\vec{a} = \hat{\imath} + \hat{\jmath} + \hat{k}$ with a unit vector along the sum of the vectors $\vec{b} = 2\hat{\imath} + 4\hat{\jmath} - 5\hat{k}$ and $\vec{c} = \lambda\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ is equal to 1 .Find the value of λ and hence find the the unit vector along $\vec{b} + \vec{c}$ (CBSE-2019)

10-The two adjacent sides of parallelogram are represented by $2\hat{\imath} - 4\hat{\jmath} - 5\hat{k}$ and $2\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$.Find the unit vectors parallel to its diagonals.Using the diagonal vectors ,find the area of the parallelogram also.(CBSE-2022)

11-Let $\vec{a}$, $\overrightarrow{b}$, and $\overrightarrow{c}$ be three vectors such that $|\vec{a}|$ =1, $|\vec{b}|$ = 2 and $|\vec{c}|$ = 3 If the projection of $\overrightarrow{b}$ along $\vec{a}$ is equal to the projection of $\overrightarrow{c}$ along $\vec{a}$ and $\overrightarrow{b}$, $\overrightarrow{c}$ are perpendicular to each other ,then find $|3\vec{a} - 2\overrightarrow{b} + 2\overrightarrow{c}|$ (CBSE-2019)

12-If $\vec{a}$= $\hat{\imath} + \widehat{2j}$ + $\widehat{3k}$, $\overrightarrow{b}$ =2 $\hat{\imath} + 4\hat{\jmath}$ -5 $\hat{k}$ represent two adjacent sides of a paraleelogram find unit vector parallel to the diagonals of the parallelogram .(CBSE-2020)

13-Find the unit vector perpendicular to each of the vectors $\vec{a}$= $4\hat{\imath}$ +3$\hat{\jmath}$ +$\hat{k}$, $\overrightarrow{b}$ =2 $\hat{\imath} - \hat{\jmath}$ + 2$\hat{k}$ (CBSE-2020)

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