RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII   Marks: 40 marks

Chapter: Vectors Set-1   Time: 90 minutes

SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

1. The lines $\vec{r} = \hat{i}+\hat{j}-\hat{k} + \lambda(2\hat{i}+3\hat{j}-6\hat{k})$ and $\vec{r} = 2\hat{i}-\hat{j}-\hat{k} + \mu(6\hat{i}+9\hat{j}-18\hat{k})$, (where λ and μ are scalars) are

   (a) coincident   (b) skew   (c) intersecting   (d) parallel

2. ABCD is a rhombus whose diagonals intersect at E. Then, $\vec{EA}+\vec{EB}+\vec{EC}+\vec{ED}$ equals to

   (a) $\vec{0}$ (b) $\vec{AD}$ (c) $2\vec{BD}$ (d) $2\vec{AD}$

3. The value of λ for which two vectors $2\hat{i}-\hat{j}+2\hat{k}$ and $3\hat{i} + \lambda\hat{j}+\hat{j}+\hat{k}$ are perpendicular, is

   (a) 2   (b) 4   (c) 6   (d) 8

4. If $\vec{a} = 3\hat{i}+2\hat{j}+5\hat{k}$ and $\vec{b} = 6\hat{i}-\hat{j}-5\hat{k}$, then find $(\vec{a}+\vec{b}) \cdot (\vec{a}-\vec{b})$.

   (a) 24   (b) -24   (c) 18   (d) 10

5. If $\vec{a}$ is a non-zero vector, then $(\vec{a}\cdot\hat{i})\hat{i}+ (\vec{a}\cdot\hat{j})\hat{j} + (\vec{a}\cdot\hat{k})\hat{k}$ equals

   (a) $\vec{a}$ (b) $2\vec{a}$ (c) $3\vec{a}$ (d) $\vec{0}$

6. The direction ratios of the line passing through two points (2, -4, 5) and (0, 1, -1) is

   (a) (-2,-6,5)   (b) (-2,5, -6)   (c) (5, -2,-6)   (d) (-6, -2,5)

7. The projection of the vector $\hat{i}+3\hat{j}+7\hat{k}$ on the vector $2\hat{i}-3\hat{j}+6\hat{k}$ is

   (a) 4   (b) 5   (c) 1   (d) 0

8. The number of vectors of unit length perpendicular to the vectors $\vec{a}= 2\hat{i} + \hat{j} + 2\hat{k}$ and $\vec{a}=\hat{j} + \hat{k}$ is

   (A) one   (B) two   (C) three   (D) infinite

9. If a b c are three vectors such that $\vec{a} + \vec{b} + \vec{c}$ and $|\vec{a}| = 2$, $|\vec{b}|=3$, $|\vec{c}|=5$, then value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a}$ is

   (A) 0   (B) 1   (C) – 19   (D) 38

10. If $|\vec{a}| = 10$, $|\vec{b}| = 2$ and $\vec{a}.\vec{b} = 12$, then value of $|\vec{a} \times \vec{b}|$ is

    (A) 5   (B) 10   (C) 14   (D) 16

SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each.)

11. Find $\vec{a}$ and $\vec{b}$, if $\vec{a} = 2\vec{b}$ and $(\vec{a}+\vec{b}).(\vec{a}-\vec{b}) = 12$.

12. If a line has direction ratios 2, -1, 2, then determine its direction cosines.

13. Find the magnitude of the vector $6\hat{i}+3\hat{j}+2\hat{k}$

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

14. Find the unit vector in the direction of sum of vectors $\vec{a}= 2\hat{i}-\hat{j} + \hat{k}$ and $\vec{b}=2\hat{j} + \hat{k}$

15. Using vectors, find the value of k such that the points (k, – 10, 3), (1, –1, 3) and (3, 5, 3) are collinear.

16 Find the angle between the vectors $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = 3\hat{i} + 2\hat{j} + \hat{k}$.

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

17 If $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$ and $\vec{b} = 2\hat{i} + 4\hat{j} - 5\hat{k}$ represent two adjacent sides of a parallelogram, find unit vectors parallel to the diagonals of the parallelogram.

18 Using vectors, find the area of the ΔABC with vertices A(1, 2, 3), B(2, -1, 4) and C(4, 5, -1).

19 If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{j} - \hat{k}$., find a vector c ρ such that $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a}.\vec{c} = 3$.