SET - II

RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATIONS

MATRIC PRACTICE PAPER (2024)

(Mathematics)

Grade: XII **Marks: 40 marks**
Chapter: Applications Of Vector Algebra **Time: 90 minutes**

SECTION A (10x1=10)

Choose the correct option.

1. Distance from the origin to the plane 3x-6y+2z+7=0 is
   (a) 2 (b) 0 (c) 3 (d) 1

2. If $\vec{a}$ *and* $\vec{b}$ are parallel vectors, then $[\vec{a}, \vec{c}, \vec{b}]$ is equal to
   (a) 1 (b) 2 (c) 0 (d) -1

3. The angle between the lines $\frac{x-4}{2} = \frac{y}{1} = \frac{z+1}{-2}$ *and* $\frac{x-1}{4} = \frac{y+1}{-4} = \frac{z-2}{2}$ is
   (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{2\pi}{3}$ (d) $\frac{\pi}{4}$

4. If the vectors $2\hat{\imath}$-$\hat{\jmath} + 3\hat{k}$; $3\hat{\imath} + 2\hat{\jmath} + \hat{k}$; $\hat{\imath} + m\hat{\jmath} + 4\hat{k}$ *are* coplanar, then the value of m is
   (a) 2 (b) 3 (c) -2 (d) -3

5. The shortest distance between two given straight lines $\vec{r} = (2\hat{\imath}+3\hat{\jmath} + 4\hat{k})$ +t(-$2\hat{\imath}+\hat{\jmath} - 2\hat{k}$) and $\frac{x-3}{2} = \frac{y}{-1} = \frac{z+2}{2}$ is
   (a) $\frac{365}{3}$ (b) $\frac{\sqrt{365}}{3}$ (c) $\frac{365}{4}$ (d) $\frac{365}{\sqrt{3}}$

6. If the line $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$ lies in the plane x+3y-αz+β=0, then (α,β) is
   (a) (-5,5) (b) (-6,7) (c) (5,-5) (d) (6,-7)

7. If the direction cosines of a line are $\frac{1}{c}, \frac{1}{c}, \frac{1}{c}$, then
   (a) c=±3 (b) c=$\pm\sqrt{3}$ (c) c>0 (d) 0<c<1

8. If the direction of the point (1,1,1) from the origin is half of its distance from the plane x+y+z+k=0, then the values of k are
   (a) ±3 (b) ±6 (c) -3,9 (d) 3,-9

Mail: rkvisionkorattur@gmail.com *Ph: 8248951556*

9. If the length of the perpendicular from the origin to the plane 2x+3y+λz=1, λ>0 is $\frac{1}{5}$, then the value of λ is

(a)$2\sqrt{3}$ (b) $3\sqrt{2}$ (c) 0 (d) 1

10. The angle between the line $\vec{r} = (\hat{\imath}+2\hat{\jmath} - 3\hat{k}) + t(2\hat{\imath}+\hat{\jmath} - 2\hat{k})$ and the plane $\vec{r}.(\hat{\imath}+\hat{\jmath}) + 4 = 0$ is

(a) 0^o (b) 30^o (c) 45^o (d) 90^o

SECTION B (3x2=6)

Answer the following.

11. Find the angle between the planes $\vec{r}.(\hat{\imath}+\hat{\jmath} - 2\hat{k})$ =3 and 2x-2y+z=2.

12. Show that the vectors $\hat{\imath}+2\hat{\jmath} - 3\hat{k}$; $2\hat{\imath}-\hat{\jmath} + 2\hat{k}$; $3\hat{\imath}+\hat{\jmath} - \hat{k}$ are coplanar.

13. Verify whether the line $\frac{x-3}{-4} = \frac{y-4}{-7} = \frac{z+3}{12}$ lies in the plane 5x-y+z=8.

SECTION C (3x3=9)

Answer the following.

14. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors, prove that $[\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}] = 2[\vec{a}, \vec{b}, \vec{c}]$.

15. With usual notation, in any triangle ABC, prove by vector method that $\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$.

16. Prove by vector method that the area of the quadrilateral ABCD having diagonal AC and BD is $\frac{1}{2}|\overrightarrow{AC} \times \overrightarrow{BD}|$.

Mail: rkvisionkorattur@gmail.com *Ph: 8248951556*

SECTION D (3x5=15)

Answer the following.

17. Find the non-parametric form of vector and cartesian equation of the plane passing through the point (2,3,6) and parallel to the straight lines $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-3}{1}$ *and* $\frac{x+3}{2} = \frac{y-3}{-5} = \frac{z+1}{-3}$.

18. Find the vector equation and cartesian equation of a plane passing through the points (2,2,1), (9,3,6) and perpendicular to the plane 2x+6y+6z=9.

19. Prove by vector method: sin(A+B) = sinAcosB + cosAsinB.

Mail: rkvisionkorattur@gmail.com *Ph: 8248951556*