

THE O.P. GUPTA

ADVANCED MATH CLASSES

Class XII - Mathematics (041)

Topics - 3 Dimensional Geometry

Alpha Test Series-11

(For Academic session 2025-26)

Max. Marks - 30

Time - 60 Minutes

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Followings are of 2 Marks each (Q01-05).

Q01. Determine the values of 'p' such that the lines

$$\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2} \text{ and, } \frac{7-7x}{3p} = y-5 = \frac{6-z}{5}$$

are perpendicular to each other.

Q02. Write the direction cosines of a line parallel to the line $6-2x = -3y-6 = z+2$.

Q03. A line passes through the points A(5, 0, -2) and B(3, 4, -4).

If a point P lies on line AB such that, its x coordinate is 7 then, write its y and z coordinates.

Q04. Find the values of 'a' so that the following two lines

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-a}{4} \text{ and, } \frac{x-4}{5} = \frac{y-1}{2} = z$$

are skew lines.

Q05. Find the acute angle between the lines whose vector equations are given by

$$\vec{r} = (1-t)\hat{i} + (t-2)\hat{j} + (3-2t)\hat{k} \text{ and,}$$

$$\vec{r} = (p+1)\hat{i} + (2p-1)\hat{j} - (2p+1)\hat{k}.$$

[2×5 = 10]

Followings are of 3 Marks each (Q06-07).

Q06. Find the vector and Cartesian equation of the line passing through the point (2, -1, 1) and parallel to the line joining the points (-1, 4, 1) and (1, 2, 2).

Q07. Find the equations of the line joining the given pair of points A(0, 0, 0) and B(1, 0, 2); P(1, 3, 0) and Q(0, 3, 0). Hence, find the S.D. between them.

[3×2 = 6]

Following is of 4 Marks (Q08).

Q08. CASE STUDY : The equations of motion of a rocket are given as $x = 2t$, $y = -4t$, $z = 4t$, where the time t is given in seconds, and the coordinates of a moving point in km.

Based on the above information, answer the following :

- Write the vector equation for the given equations of motion of rocket.
- At what distance will the rocket be from the starting point O(0, 0, 0) in 10 seconds?



[2×2 = 4]

Followings are of 5 Marks each (Q09-10).

Q09. Find the reflection of the point (7, 4, -3) in the line $6x = 3y - 3 = 2z - 4$.

OR

Show that the lines $\frac{x-4}{5} = \frac{y-1}{2} = z$ and, $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ intersect each other.

Find their point of intersection.

Q10. Find the equation of a line passing through the point $(1, 2, -4)$ and perpendicular to two lines

$$\vec{r} = (8\hat{i} - 19\hat{j} + 10\hat{k}) + \lambda(3\hat{i} - 16\hat{j} + 7\hat{k}) \text{ and,}$$

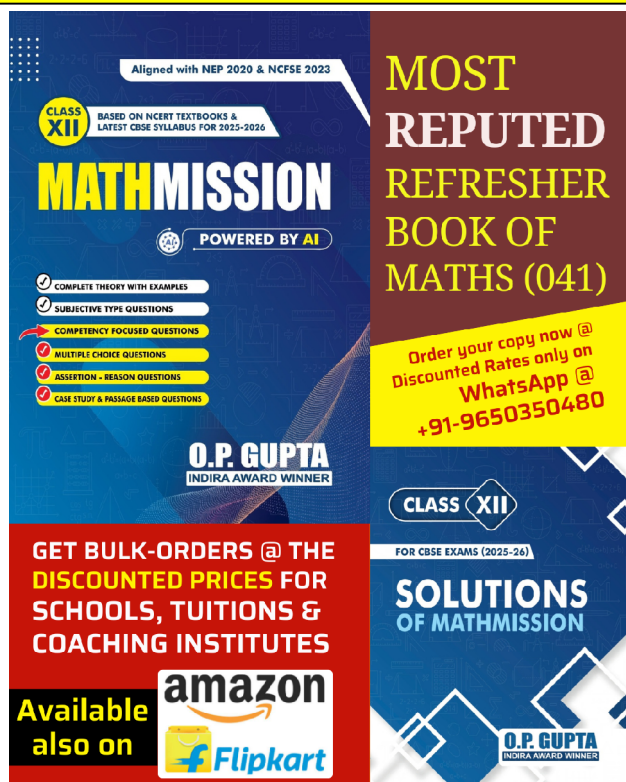
$$\vec{r} = (15\hat{i} + 29\hat{j} + 5\hat{k}) + \mu(3\hat{i} + 8\hat{j} - 5\hat{k}).$$

[5 × 2 = 10]

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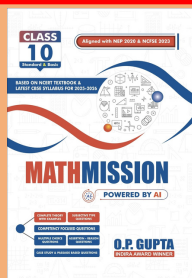
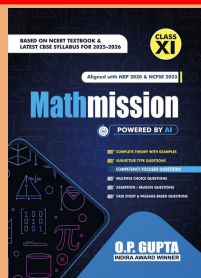
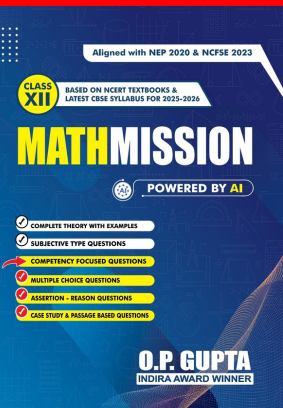
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