

MATHS

BOOKS - CENGAGE MATHS (ENGLISH)

EQUATION OF PLANE AND ITS APPLICATIONS -

Dpp 3 3

1. Equation of the passing through the origin and perpendicular to the planes x+2y+z=1, 3x-4y+z=5 is

A. x + 2y - 5z = 0

B.
$$x - 2y - 3z = 0$$

C.
$$x-2y+5z=0$$

D.
$$3x+y-5z=0$$

Answer: D

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2. A vector \overrightarrow{n} is inclined to *x*-axis at 45° , to y-axis at 60° and at an angle to z-axis. If \overrightarrow{n} is a normal to the plane passing through the point $(\sqrt{2}, -1, 1)$, then the equation of plane is

A.
$$3\sqrt{2}x-4y-3z=7$$

B.
$$4\sqrt{2}x+7y+z=2$$

C.
$$\sqrt{2}x+y+z=2$$

D.
$$\sqrt{2}x - y - z = 2$$

Answer: C

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3. If the perpendicular distance of a point A, other than the origin from the plane x + y + z = p is equal to the distance of the plane from the origin, then the coordinates of p are

A. (p, 2p, 0)

- B. (0, 2p, -p)
- $\mathsf{C.}\left(2p,\,p,\,-p\right)$

D.
$$(2p, -p, 2p)$$

Answer: C

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A. 10

B. 8

C. 21

D. 13

Answer: D



5. The value of k for which the planes kx + 4y + z = 0, 4x + ky + 2z = 0nd2x + 2y + z = 0 intersect in a straighat line is

A. -2

B. 4

C. 6

D. -8

Answer: b



6. Let $P = -(1, 7, \sqrt{2})$ be a point and line L is $2\sqrt{2}(x-1) = y-2, z = 0$. If PQ is the distance of plane $\sqrt{2}x + y - z = 1$ from point P measured along a line inclined at an angle of 45° with the line L and is minimum then the value of PQ is

A. 3

B. 4

C. 6

D. 8

Answer: A

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7. Angle between the two planes of which one plane is 4x + y + 2z = 0 and another plane containing the lines $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z-1}{\lambda}, \frac{x-2}{3} = \frac{y-3}{2} = \frac{z-2}{3}$ A. $\frac{\pi}{3}$ B. $\frac{\pi}{2}$ C. $\frac{\pi}{6}$ D. $\frac{2\pi}{3}$

Answer: B

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8. Find the distance of the point (1, -2, 3) from the plane x - y + z = 5 measured parallel to the line $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$.

A.1 unit

B. 2 unit

C. 3 units

D. none of these

Answer: A



9. The angle between the pair of planes represented by equation $2x^2 - 2y^2 + 4z^2 + 6xz + 2yz + 3xy = 0$ is

A.
$$\cos^{-1}\left(\frac{1}{3}\right)$$

B. $\cos^{-1}\left(\frac{4}{21}\right)$
C. $\cos^{-1}\left(\frac{4}{9}\right)$
D. $\cos^{-1}(7\sqrt{84})$

Answer: C



10. The Cartesian equation of the plane

 $\overrightarrow{r} = (1+\lambda-\mu)\hat{i} + (2-\lambda)\hat{j} + (3-2\lambda+2\mu)\hat{k}$ is

A. 2x + y = 5

B. 2x - y = 5

C. 2x + z = 5

D. 2x - z = 5

Answer: C

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11. The locus represented by xy + yz = 0 is a pair of

A. perpendicular lines

B. parallel lines

C. parallel lines

D. perpendicular planes

Answer: D

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12. Equation of line passing through A(1,0,3), intersecting the line $\left(\frac{x}{2} = \frac{y-1}{3} = \frac{z-2}{1}\right)$ and parallel to the plane x + y + z = 2 is

A.
$$\frac{3x-1}{2} = \frac{2y-3}{3} = \frac{2z-5}{-1}$$

B. $\frac{x-1}{2} = \frac{y-0}{3} = \frac{z-3}{-1}$
C. $\frac{x-(2/3)}{1} = \frac{y-(3/2)}{0} = \frac{z+(1/2)}{3}$
D. $\frac{3x-1}{2} = \frac{2y-3}{-3} = \frac{6z-13}{5}$

Answer: D



13. If $P(\alpha, \beta, \lambda)$ is a vertex of an equilateral triangle PQR where vertex Q and R are (-1, 0, 1) and (1, 0, -1)respectively, then P can lie on the plane

A.
$$x+y+z+6=0$$

B.
$$2x + 4y + 3z + 20 = 0$$

 $\mathsf{C}.\,x-y+z+12=0$

D.
$$x+y+z+3\sqrt{2}=0$$

Answer: D

14. The variable plane $x+3y+z-4+\lambda(2x-y)=0$ always passes through the line

A.
$$\frac{x}{0} = \frac{y}{0} = \frac{z-4}{1}$$

B. $\frac{x}{1} = \frac{y}{2} = \frac{z-4}{-3}$
C. $\frac{x}{1} = \frac{y}{1} = \frac{z-4}{-7}$
D. $\frac{x}{1} = \frac{y}{2} = \frac{z-4}{-7}$

Answer: D



$$\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}, \overrightarrow{b} = -\hat{i} + \hat{j} + \hat{k}, \overrightarrow{c} = \hat{i} - \hat{j} + \hat{k}$$

and $\overrightarrow{d} = \hat{i} + \hat{j} - \hat{k}$. Then, the line of intersection of
planes one determined by $\overrightarrow{a}, \overrightarrow{b}$ and other determined
by $\overrightarrow{c}, \overrightarrow{d}$ is perpendicular to

A. x-axis

B. y-axis

C. z-axis

D. none of these

Answer: D



16. Consider the equation

$$egin{aligned} E_1\colon \overrightarrow{r} imes \left(2\hat{i}-\hat{j}+3\hat{k}
ight) &=3\hat{i}+\hat{k} & ext{and} \ E_2\colon \overrightarrow{r} imes \left(\hat{i}+2\hat{j}-3\hat{k}
ight) &=2\hat{i}-\hat{j}, ext{then} \end{aligned}$$

A. E_1 represents a line

B. E_1 represents two parallel lines

- C. E_2 represents a line
- D. E_2 represents two parallel planes

Answer: B::C::D



17. The equation of a plane is 2x - y - 3z = 5 and A(1, 1, 1), B(2, 1, -3), C(1, -2, -2) and D(-3, 1, 2) are four points, which of the following line segment are interesect by the plane?

A. AD

B. AB

C. AC

D. BC

Answer: B::C::D

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18. Let P denotes the plane consisting of all points that are equidistant from the points A(-4,2,1) and B(2, -4, 3) and Q be the plane, x - y + cz = 1 where $c \in R$.

If the angle between the planes P and Q is 45° then the product of all possible values of c is

A. for no value of c

B. if c=3

C. if c = 1/3

D. if c=1

Answer: C



19. Let P denotes the plane consisting of all points that are equidistant from the points A(-4,2,1) and B(2, -4,3) and Q be the plane, x-y+cz=1 where $c\in R.$

If the angle between the planes P and Q is 45° then the product of all possible values of c is

A. −17 B. −2

C. 17

D. 24/27

Answer: B



20. A line L_1 with direction ratios -3, 2, 4 passes through the point A(7,6,2) and a line L_2 with directions ratios 2,1,3 passes through the point B(5,3,4). A line L_3 with direction ratios 2, -2, -1 intersects L_1 and L_2 at C and D, resectively.

The lenth CD is equal to

A. 4

B. 6

C. 9

D. 11

Answer: C



21. A line L_1 with direction ratios -3, 2, 4 passes through the point A(7,6,2) and a line L_2 with directions ratios 2,1,3 passes through the point B(5,3,4). A line L_3 with direction ratios 2, -2, -1 intersects L_1 and L_3 at C and D, resectively. The equation of the plane parallel to line L_1 and containing line L_2 is equal to

A.
$$x+3y+4z=30$$

- B. x + 2y + z = 15
- C. 2x y + z = 11
- D. 2x + 17y 7z = 33

Answer: D



22. A line L_1 with direction ratios -3, 2, 4 passes through the point A(7,6,2) and a line L_2 with directions ratios 2,1,3 passes through the point B(5,3,4). A line L_3 with direction ratios 2, -2, -1 intersects L_1 and L_3 at C and D, resectively.

The volume of parallelopiped formed by $\overrightarrow{AB}, \overrightarrow{AC}$ and \overrightarrow{AD} is equal to

A. 140

B. 138

C. 134

D. 130

Answer: B

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