MATHS

BOOKS - CENGAGE MATHS (HINGLISH)

EQUATION OF PLANE AND ITS APPLICATIONS -I

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 $\vec{n}$ is inclined to x-axis at 45°, to y-axis at 60° and at an angle to z-axis. If $\vec{n}$ 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) $(0, 2p, -p)$ (C) $(2p, p, -p)$ (D) $(2p, -p, 2p)$

A. $(p, 2p, 0)$

B. $(0, 2p, -p)$

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

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

Answer: C

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4. Show that the disease of the point of intersection of the line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ and the plane $(x - y + z = 5)$ from the point $(-1, -5, -10)$ is 13 units.

A. 10

B. 8

C. 21

D. 13

Answer: D

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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) 1 (B) 2 (C) 3 (D) 4

A. 2

B. 4

C. 6

D. 8

Answer: C

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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. The distance of the point $(1, -2, 3)$ from the plane $x - y + z - 5 = 0$, measured parallel to the line $\frac{x}{2} = \frac{y}{3} = \frac{z-1}{-6}$ is equal to

A. 1 unit

B. 2 unit

C. 3 units

D. none of these

Answer: A

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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. $\cos^{-1}\left(7\sqrt{84}\right)$

Answer: C

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10. The Cartesian equation of the plane

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

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

C. $x - y + z + 12 = 0$

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

Answer: D

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14. The variable plane $(2\lambda + 1)x + (3 - \lambda)y + z = 4$ 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

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

A. x-axis

B. y-axis

C. z-axis

D. none of these

Answer: B::C::D

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16. Consider the equation

$E_1 : \vec{r} \times \left(2\hat{i} - \hat{j} + 3\hat{k}\right) = 3\hat{i} + \hat{k}$ and

$E_2 : \vec{r} \times \left(\hat{i} + 2\hat{j} - 3\hat{k}\right) = 2\hat{i} - \hat{j}$, hten

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

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17. the equationof a plane is $2x - y - 3z = 5$ and $A(1, 1, 1), B(2, 1, -3), C(1, -2, -2)$ and $D($ are four points. Which of the following line segments are intersects by the plane? (A) AD (B) AB (C) AC (D) BC

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 thata are equidistant from the points $A(-4, 2, 1)$ and $B(2, -4, 3)$ and Q be the plane, $x - y + cz = 1$ where $c \in R$.

The planar P is parallel to plane Q

A. for no value of c

B. if c=3

C. if c $= 1/3$

D. if c=1

Answer: C

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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

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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_3

at C and D, resectively.

The lenth CD is equal to

A. 4

B. 6

C. 9

D. 11

Answer: C

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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

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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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