# MATHS

## BOOKS - DISHA PUBLICATION MATHS (HINGLISH)

## THREE DIMENSIONAL GEOMETRY

Jee Main 5 Years At A Glance

**1.** The length of the projection of the line segment joining the points (5,-1,4) and (4,-1,3) on the plane x+y+z=7 is

A. $\frac{2}{3}$

B. $\frac{1}{3}$

C. $\sqrt{\frac{2}{3}}$

D. $\frac{2}{\sqrt{3}}$

**Answer: C**

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**2.** If $L_1$ is the line of intersection of the planes $2x - 2y + 3x - 2 = 0$ $x - y + z + 1 = 0$ and $L_2$ is the line of the intersection of the planes $x + 2y - z - 3 = 0\ 3x - y + 2z - 1 = 0$then the distance of the origin from the plane containing the lines $L_1$ and $L_2$ is

A. $\frac{1}{3\sqrt{2}}$

B. $\frac{1}{2\sqrt{2}}$

C. $\frac{1}{\sqrt{2}}$

D. $\frac{1}{4\sqrt{2}}$

**Answer: A**

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**3.** If the angle between the lines, $\frac{x}{2} = \frac{y}{2} = \frac{z}{1}$ and $\frac{5 - x}{-2} = \frac{7y - 14}{p} = \frac{z - 3}{4} is \cos^{-1}\left(\frac{2}{3}\right)$, then P

is equal to

A. $-\frac{7}{4}$

B. $\frac{2}{7}$

C. $-\frac{4}{5}$

D. $\frac{7}{2}$

**Answer: D**

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**4.** The sum of the intercepts on the coordinate axes of the plane passing through the point $(-2, -2, 2)$ and containing the line joining the points $(1, -1, 2)$ and $(1, 1, 1)$, is :

A. 12

B. $-8$

C. $-4$

D. 4

**Answer: C**

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**5.** If the image of the point P(1,-2,3) in the plane, 2x+3y-4z+22=0 mesured parallel to the line, $\frac{x}{1} = \frac{y}{4} = \frac{z}{5}$ is Q, then PQ is equal to

A. $6\sqrt{5}$

B. $3\sqrt{5}$

C. $2\sqrt{42}$

D. $\sqrt{42}$

**Answer: C**

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**6.** The distance of the point $(1, 3, -7)$ from the plane passing through the point $(1, -1, -1)$ having normal perpendicular to both the lines $\frac{x-1}{1} = \frac{y+2}{-2} = \frac{z-4}{3}$ and $\frac{x-2}{2} = \frac{y+1}{-1} = \frac{z+7}{-1}$ is

A. $\frac{10}{\sqrt{74}}$

B. $\frac{20}{\sqrt{74}}$

C. $\frac{10}{\sqrt{83}}$

D. $\frac{5}{\sqrt{83}}$

**Answer: C**

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**7.** The coordinates of the foot of the perpendicular from the point $(1, -2, 1)$ on the plane containing the lines, $\frac{x+1}{6} = \frac{y-1}{7} = \frac{z-3}{8}$ and $\frac{x-1}{3} = \frac{y-2}{5} = \frac{z-3}{7}$ is

A. $(2, -4, 2)$

B. $(-1, 2, -1)$

C. $(0, 0, 0)$

D. $(1, 1, 1)$

**Answer: C**

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**8.** The line of intersection of the planes $\vec{r}.\left(3\hat{i}-\hat{j}+\hat{k}\right)=1$ and $\vec{r}.\left(\hat{i}+4\hat{j}-2\hat{k}\right)=2,$ is (A) $\frac{x-\frac{6}{13}}{2}=\frac{y-\frac{5}{13}}{-7}=\frac{z}{-13}$ (B) $\frac{x-\frac{6}{13}}{2}=\frac{y-\frac{5}{13}}{7}=\frac{z}{-13}$ (C) $\frac{x-\frac{4}{7}}{-2}=\frac{y}{7}=\frac{z-\frac{5}{7}}{13}$ (D) $\frac{x-\frac{4}{7}}{-2}=\frac{y}{-7}=\frac{z+\frac{5}{7}}{13}$

A. $\frac{x-\frac{4}{7}}{-2}=\frac{y}{7}=\frac{z-\frac{5}{7}}{13}$

B. $\frac{x-\frac{4}{7}}{-2}=\frac{y}{-7}=\frac{z+\frac{5}{7}}{13}$

C. $\frac{x-\frac{6}{13}}{2}=\frac{y-\frac{5}{13}}{-7}=\frac{z}{-13}$

D. $\frac{x-\frac{6}{13}}{2}=\frac{y-\frac{5}{13}}{7}=\frac{z}{-13}$

**Answer: C**

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**9.** If the line, $\frac{x-3}{2}=\frac{y+2}{-1}=\frac{z+4}{3}$ lies in the place, $lx+my-z=9$, then $l^2+m^2$ is equal to: (1) 26 (2) 18 (3) 5 (4) 2

A. 5

B. 2

C. 26

D. 18

**Answer: B**

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**10.** The distance of the point (1,-5,9) from the plane x-y+z = 5 measured along the line x = y = z is

A. $\frac{10}{\sqrt{3}}$

B. $\frac{20}{3}$

C. $3\sqrt{10}$

D. $10\sqrt{3}$

**Answer: D**

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**11.** The distance of the point $(1, -2, 4)$ from the plane passing through the point $(1, 2, 2)$ perpendicular to the planes $x - y + 2z = 3$ and $2x - 2y + z + 12 = 0$ is

A. 2

B. $\sqrt{2}$

C. $2\sqrt{2}$

D. $\frac{1}{\sqrt{2}}$

**Answer: C**

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**12.** The shortest distance between the lines lines $\frac{x}{2} = \frac{y}{2} = \frac{z}{1}$ and $\frac{x+2}{-1} = \frac{y-4}{8} = \frac{z-5}{4}$ in the interval:

A. $(3, 4]$

B. $(2, 3]$

C. $[1, 2)$

D. $[0, 1)$

**Answer: B**

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**13.** The equation of the plane containing the line $2x - 5y + z = 3, x + y + 4z = 5$ and parallel to the plane

$x + 3y + 6z = 1$, is

A. $x + 3y + 6z = 7$

B. $2x + 6y + 12z = -13$

C. $2x + 6y + 12z = 13$

D. $x + 3y + 6z = -7$

**Answer: A**

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**14.** The disatance of the point $(1, 0, 2)$ from the point of intersection of the line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ and the plane $x - y + z = 16$, is

A. $3\sqrt{21}$

B. 13

C. $2\sqrt{14}$

D. 8

**Answer: B**

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**15.** Ifthe points $(1, 1, \lambda)$ and $(-3, 0, 1)$ are equidistant from the plane, $3x + 4y - 12z + 13 = 0$, then $\lambda$ satisfiesthe equation

A. $3x^2 + 10x - 13 = 0$

B. $3x^2 - 10x + 21 = 0$

C. $3x^2 - 10x + 7 = 0$

D. $3x^2 + 10x - 7 = 0$

**Answer: C**

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**16.** If the shortest distance between the lines $\frac{x-1}{\alpha} = \frac{y+1}{-1} = \frac{z}{1}$ and $x + y + z + 1 = 0 = 2x - y + z + 3$ is $\frac{1}{\sqrt{3}}$ then value of $\alpha$

A. $-\frac{16}{19}$

B. $-\frac{19}{16}$

C. $\frac{32}{19}$

D. $\frac{19}{32}$

**Answer: C**

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**17.** The angle between the lines whose direction cosines satisfy the equations $l+m+n=0$ and $l^2=m^2+n^2$ is (1) $\frac{\pi}{3}$ (2) $\frac{\pi}{4}$ (3) $\frac{\pi}{6}$ (4) $\frac{\pi}{2}$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{4}$

**Answer: C**

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**18.** The image of the line $\frac{x-1}{3}=\frac{y-3}{1}=\frac{z-4}{-5}$ in the plane $2x-y+z+3=0$ is the line (1) $\frac{x+3}{3}=\frac{y-5}{1}=\frac{z-2}{-5}$ (2) $\frac{x+3}{-3}=\frac{y-5}{-1}=\frac{z+2}{5}$ (3) $\frac{x-3}{3}=\frac{y+5}{1}=\frac{z-2}{-5}$ (3) $\frac{x-3}{-3}=\frac{y+5}{-1}=\frac{z-2}{5}$

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

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

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

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

**Answer: C**

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**19.** A line makes an angle $\theta$ both with x-axis and y-axis. A possible range of $\theta$ is

A. $\left(0, \frac{\pi}{4}\right]$

B. $\left[\frac{\pi}{6}, \frac{\pi}{3}\right]$

C. $\left[\frac{\pi}{4}, \frac{\pi}{2}\right]$

D. $\left(\frac{\pi}{3}, \frac{\pi}{2}\right]$

**Answer: C**

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**20.** Equation of plane which passes through the intersection point of the lines $L_1 : \frac{x-1}{3} = \frac{y-2}{1} = \frac{z-3}{2}$ and $L_2 : \frac{x-2}{2} = \frac{y-1}{2} = \frac{z-6}{-1}$ and has the largest distance from origin

A. $7x + 2y + 4z = 54$

B. $3x + 4y + 5z = 49$

C. $4x + 3y + 5z = 50$

D. $5x + 4y + 3z = 57$

**Answer: C**

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## Exercise 1 Concept Builder Topicwise

**1.** Let (1,2,0) , B(2,0,4) , C (1,1,2) & D(0,1,3) be four points in space then the length of projection of line segment AB on the line C D is

A. $3\sqrt{2}$

B. $\frac{3\sqrt{2}}{2}$

C. $\sqrt{2}$

D. None of these

**Answer: B**

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**2.** If a line in the space makes angle $\alpha, \beta \text{ and } \gamma$ with the coordinate axes, then $\cos 2\alpha + \cos 2\beta + \cos 2\gamma + \sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma$ equals

A. $-1$

B. 0

C. 1

D. 2

**Answer: C**

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**3.** If line makes angle $\alpha, \beta, \gamma, \delta$ with four diagonals of a cube, then the value of $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma + \sin^2 \delta$ is (A) $\frac{4}{-}$ (B) 1 (C) $\frac{8}{3}$ (D) $\frac{7}{3}$

A. $4/3$

B. $8/3$

C. $7/3$

D. 1

**Answer: B**

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**4.** Find the angel between any two diagonals of a cube.

A. $\frac{2}{\sqrt{6}}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. None of these

**Answer: B**

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**5.** Three lines with direction ratios

$< 1, 1, 2 > \ < \sqrt{3} - 1, \ -\sqrt{3} - 1, 4 > \ \text{and} \ < \ -\sqrt{3} - 1, \sqrt{3} - 1, 4 >$

form

A. a right angled triangle

B. a isosceles triangle

C. an equilateral triangle

D. None of these

**Answer: B**

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**6.** What is the sum of the squares of direction cosines of the line joining the points (1,2,-3) and (-2,3,1)?

A. 0

B. 1

C. 3

D. $\frac{2}{\sqrt{26}}$

**Answer: B**

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**7.** The distance between two points P and Q is d and the length of their projections of PQ on the co-ordinate planes are $d_1, d_2, d_3$. Then $d_1^2 + d_2^2 + d_3^2 = kd^2$, where k is _____.

A. 1

B. 5

C. 3

D. 2

**Answer: D**

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**8.** The projections of a directed line segment on the coordinate axes are 12,4,3. The direction cosines of the line are

A. $-\frac{12}{13}, -\frac{4}{13}, \frac{3}{13}$

B. $\frac{12}{13}, -\frac{4}{13}, \frac{3}{13}$

C. $\frac{12}{13}, \frac{4}{13}, \frac{3}{13}$

D. None of these

**Answer: C**

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**9.** The projections of the segment PQ on the coordinate axes are -9,12,-8 respectively. The direction cosines of the line PQ are (A) $-\frac{9}{\sqrt{17}}, \frac{12}{\sqrt{17}}, -\frac{8}{\sqrt{17}}$ (B) $-\frac{9}{288}, \frac{12}{289}, -\frac{8}{289}$ (C) $-\frac{9}{17}, \frac{12}{17}, -\frac{8}{17}$ (D) none of these

A. $< \frac{-9}{\sqrt{17}}, \frac{12}{\sqrt{17}}, \frac{-8}{\sqrt{17}} >$

B. $< -9, 12, -8 >$

C. $< -\frac{9}{289}, \frac{12}{298}, \frac{-8}{289} >$

D. $< -\frac{9}{17}, \frac{12}{17}, \frac{-8}{17} >$

**Answer: D**

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**10.** $L_1 and L_2$ and two lines whose vector equations are $L_1 : \vec{r} = \lambda\left(\left(\cos\theta + \sqrt{3}\right)\hat{i}\left(\sqrt{2}\sin\theta\right)\hat{j} + \left(\cos\theta - \sqrt{3}\right)\hat{k}\right)$ $L_2 : \vec{r} = \mu\left(a\hat{i} + b\hat{j} + c\hat{k}\right)$, where $\lambda and \mu$ are scalars and $\alpha$ is the acute angel between $L_1 and L_2$. If the angel $\alpha$ is independent of $\theta$, then the value of $\alpha$ is a. $\frac{\pi}{6}$ b. $\frac{\pi}{4}$ c. $\frac{\pi}{3}$ d. $\frac{\pi}{2}$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

**Answer: A**

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**11.** If

$\vec{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + \lambda\left(\hat{i} - \hat{j} + \hat{k}\right)$ and $\vec{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + \mu\left(\hat{i} + \hat{j}\right.$

are two lines, then find the equation of acute angle bisector of two lines.

A. $\vec{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + t\left(\hat{j} - \hat{k}\right)$

B. $\vec{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + t\left(2\hat{i}\right)$

C. $\vec{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + t\left(\hat{j} + \hat{k}\right)$

D. None of these

**Answer: A**

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**12.** The lines $\left(x-\frac{20}{1}=\frac{y-3}{1}=\frac{z-4}{-k}\right.$ and $\left(x-\frac{10}{k}=\frac{y-4}{2}=\frac{z-5}{1}\right.$ are coplanar if (A) $k=3$ or $-3$ (B) $k=0$ or $-1$ (C) $k=1$ or $-1$ (D) $k=0$ or $-3$

A. k = 3 or - 2

B. k = 0

C. k = 1 or - 1

D. k = 0 or -3

**Answer: D**

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**13.** A unit vector parallel to the straight line $\frac{x-2}{3}=\frac{3+y}{-1}=\frac{z-2}{-4}$ is

A. $\frac{1}{\sqrt{26}}\left(3\hat{i}-\hat{j}+4\hat{k}\right)$

B. $\frac{1}{\sqrt{26}}\left(\hat{i}+3\hat{j}-\hat{k}\right)$

C. $\frac{1}{\sqrt{26}}\left(3\hat{i}-\hat{j}-4\hat{k}\right)$

D. $\frac{1}{\sqrt{26}}\left(3\hat{i}+\hat{j}+4\hat{k}\right)$

**Answer: C**

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**14.** Find the equation of the two lines through the origin which intersects the line $\frac{x-3}{2}=\frac{y-3}{1}=\frac{z}{1}$ at angles of $\frac{\pi}{3}$ each.

A. $\frac{x}{1}=\frac{y}{2}=\frac{z}{1}, \frac{x}{1}=\frac{y}{1}=\frac{z}{2}$

B. $\frac{x}{1}=\frac{y}{2}=\frac{z}{-1}, \frac{x}{-1}=\frac{y}{1}=\frac{z}{-2}$

C. $\frac{x}{1}=\frac{y}{2}=\frac{z}{-1}, \frac{x}{1}=\frac{y}{-1}=\frac{z}{-2}$

D. None of these

**Answer: B**

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**15.** If the line through the points A (k,1,-1) and B(2k,0,2) is perpendicular to the line through the points B and $C(2+2, k, 1)$, then what is the value of k?

A. $-1$

B. 1

C. $-3$

D. 3

**Answer: D**

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**16.** The vector equation of the line $\frac{x-2}{2} = \frac{2y-5}{-3}, z = -1$ is $r = \left(2\hat{i} + \frac{5}{2}\hat{j} - \hat{k}\right) + \lambda\left(2\hat{i} - \frac{3}{2}\hat{j} + x\hat{k}\right)$ where x is equal to

A. 0

B. 1

C. 2

D. 2

**Answer: A**

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**17.** If $P(3, 2, -4), Q(5, 4, -6)$ and $R(9, 8, -10)$ are collinear, then $R$ divides $PQ$ in the ratio

A. $(3, 4)$

B. (5,4)

C. (4,5)

D. (4,3)

**Answer: B**

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**18.** What is the value of n so that the angle between the lines having direction ratios (1,1,1) and (1,-1,n) is $60^\circ$?

A. $\sqrt{3}$

B. $\sqrt{6}$

C. 3

D. None of these

**Answer: B**

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**19.** The equation of motion of rockets are $x = 2t, y = -4t, z = 4t$ where the time 't' is given in second and the coordinate of a moving point in kilometres. What is the path of the rockets? At what distance will the rocket be from the starting point $O(0, 0, 0)$ in 10s.

A. Straight line , 60 km

B. Straight line , 30 km

C. Parabola , 60 km

D. Ellipse , 60 km

**Answer: A**

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**20.** The distance of point $A(-2, 3, 1)$ from the line $PQ$ through $P(-3, 5, 2)$, which makes equal angles with the axes is a. $2/\sqrt{3}$ b. $14/\sqrt{3}$ c. $16/\sqrt{3}$ d. $5/\sqrt{3}$

A. $2/\sqrt{3}$

B. $\sqrt{14/3}$

C. $16/\sqrt{3}$

D. $5/\sqrt{3}$

**Answer: B**

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**21.** Distance of the point $P\left(\vec{c}\right)$ from the line $\vec{r} = \vec{a} + \lambda \vec{b}$ is

A. $\left|\left(\vec{a} - \vec{p}\right) + \frac{\left(\left(\vec{p} - \vec{a}\right).\vec{b}\right)\vec{b}}{\left|\vec{b}\right|^2}\right|$

B. $\left|\left(\vec{b} - \vec{p}\right) + \frac{\left(\left(\vec{p} - \vec{a}\right).\vec{b}\right)\vec{b}}{\left|\vec{b}\right|^2}\right|$

C. $\left|\left(\vec{a} - \vec{p}\right) + \frac{\left(\left(\vec{p} - \vec{b}\right).\vec{b}\right)\vec{b}}{\left|\vec{b}\right|^2}\right|$

D. None of these

**Answer: C**

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**22.** The length of the perpendicular drawn from the point $(3, -1, 11)$ to the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ is (A) $\sqrt{33}$ (B) $\sqrt{53}$ (C) $\sqrt{66}$ (D) $\sqrt{29}$

A. $\sqrt{29}$

B. $\sqrt{33}$

C. $\sqrt{53}$

D. $\sqrt{66}$

**Answer: C**

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**23.** The point of intersection of the lines $\frac{x+1}{3}=\frac{y+3}{5}=\frac{z+5}{7}$ and $\frac{x-2}{1}=\frac{y-4}{3}=\frac{z-6}{5}$ is

A. $\left(\frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right)$

B. $\left(\frac{1}{2}, \frac{1}{2}, -\frac{3}{2}\right)$

C. $\left(\frac{1}{3}, -\frac{1}{3}, -\frac{2}{3}\right)$

D. None of these

**Answer: B**

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**24.** Find the equation of a line which passes through the point $(1, 1, 1)$ and intersects the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} and \frac{x+2}{1} = \frac{y-3}{2} = \frac{z+1}{4}$.

A. $\frac{x-1}{3} = \frac{y-1}{10} = \frac{z-1}{17}$

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

C. $\frac{x-1}{-2} = \frac{y-1}{1} = \frac{z-1}{-4}$

D. $\frac{x-1}{8} = \frac{y-1}{-2} = \frac{z-1}{3}$

**Answer: A**

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**25.** The lines which intersect the skew lines $y = mx, z = c; y = -mx, z = -c$ and the x-axis lie on the surface a. $cz = mxy$ b. $xy = cmz$ c. $cy = mxz$ d. none of these

A. cz = mxy

B. xy = cmz

C. cy = mxz

D. None of these

**Answer: C**

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**26.** Find the equations of the perpendicular from the point $(1, 6, 3)$ to the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$. Find also the coordinates of the foot of perpendicular.

A. (1,3,5)

B. (-1,-1,-1)

C. $(2, 5, 8)$

D. $(-2, -3, -4)$

**Answer: A**

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**27.** The length of the perpendicular drawn from the point $(3, -1, 11)$ to the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ is (A) $\sqrt{33}$ (B) $\sqrt{53}$ (C) $\sqrt{66}$ (D) $\sqrt{29}$

A. $(1, 11, 3)$

B. (11,11,3)

C. (3,1,11)

D. (1,3,11)

**Answer: A**

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**28.** The foot of the perpendicular form $(2, 4, -1)$ to the line $x + 5 = \frac{1}{4}(y + 3) = -\frac{1}{9}(z - 6)$ is

A. (-4,1,-3)

B. (4,-1,-3)

C. (-4,-1,3)

D. (-4,-1,-3)

**Answer: A**

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**29.** The line through $\hat{i}+3\hat{j}+2\hat{k}$ and perpendicular to the lines $\vec{r}=\left(\hat{i}+2\hat{j}-\hat{k}\right)+\lambda\left(2\hat{i}+\hat{j}+\hat{k}\right)$ and $\vec{r}=\left(2\hat{i}+6\hat{j}+\hat{k}\right)+\mu\left(\hat{i}+2\hat{j}+3\hat{k}\right)$ is

A. $\vec{r}=\left(\hat{i}+2\hat{j}-\hat{k}\right)+\lambda\left(-\hat{i}+5\hat{j}-3\hat{k}\right)$

B. $\vec{r}=\hat{i}+3\hat{j}+2\hat{k}+\lambda\left(\hat{i}-5\hat{j}+3\hat{k}\right)$

C. $\vec{r}=\hat{i}+3\hat{j}+2\hat{k}+\lambda\left(\hat{i}+5\hat{j}+3\hat{k}\right)$

D. $\vec{r}=\hat{i}+3\hat{j}+2\hat{k}+\lambda\left(-\hat{i}-5\hat{j}-3\hat{k}\right)$

**Answer: B**

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**30.** If a line with direction ration 2: 2: 1 intersects the lines $\frac{x-7}{3}=\frac{y-5}{2}=\frac{z-3}{1}$ and $\frac{x-1}{2}=\frac{y+1}{4}=\frac{z+1}{3}$ at A and B, respectively then AB

A. $\sqrt{2}$

B. 2

C. $\sqrt{3}$

D. 3

**Answer: D**

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**31.** Find the shortest distance between the lines

$$\frac{x+3}{-4}=\frac{y-6}{3}=\frac{z}{2} \quad \text{and} \quad \frac{x+2}{-4}=\frac{y}{1}=\frac{z-7}{1}$$

A. 7

B. 9

C. 13

D. 8

**Answer: B**

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**32.** A line with direction cosines proportional to 2,1,2 meet each of the lines $x=y+a=zndx+a=2y=2z$. The coordinastes of each of the points of intersection are given by (A) $(3a, 2a, 3a), (a, a, 2a)$ (B) $(3a, 2a, 3a), (a, a, a0$ (C) $(3a, 3a, 3a), (a, a, a)$ (D) $92a, 3a, 3a), (2a, a, a0$

A. $(2a, 3a, 3a), (2a, a, a)$

B. $(3a, 2a, 3a), (a, a, a)$

C. $(3a, 2a, 3a), (a, a, 2a)$

D. $(3a, 3a, 3a), (a, a, a)$

**Answer: B**

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**33.** If the straight lines $\frac{x-1}{k} = \frac{y-2}{2} = (z-3)$ and $\frac{x-2}{3} = \frac{y-3}{k} = (z-1)$ intersect at a point, then the integer k is equal to

A. $-5$

B. 5

C. 2

D. $-2$

**Answer: A**

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**34.** The vector equation of the line of intersection of the planes $\vec{r} = \vec{b} + \lambda_1\left(\vec{b} - \vec{a}\right) + \mu_1\left(\vec{a} - \vec{c}\right)$ and $\vec{r} = \vec{c} + \lambda_2\left(\vec{b} - \vec{c}\right) +$ $\vec{a}, \vec{b}, \vec{c}$ being non - coplanar vectors, is

A. $\vec{r} = \vec{b} + \mu_1\left(\vec{a} + \vec{c}\right)$

B. $\vec{r} = \vec{b} + \lambda_1\left(\vec{a} - \vec{c}\right)$

C. $\vec{r} = 2\vec{b} + \lambda_2\left(\vec{a} - \vec{c}\right)$

D. None of these

**Answer: A**

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**35.** find the equation of a plane passing through the points $(2, -1, 0)$ and $(3, -4, 5)$ and parallel to the line $2x = 3y = 4z$

A. $29(x-2) + 27(y+1) - 22z = 0$

B. $29(x-2) - 27(y+1) - 22z = 0$

C. $29(x-2) + 27(y+1) + 22z = 0$

D. None of these

**Answer: B**

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**36.** The planes $3x - y + z + 1 = 0, 5x + y + 3z = 0$ intersect in the line PQ. The equation of the plane through the point (2,1,4) and the perpendicular to PQ is

A. $x + y - 2z = 5$

B. $x + y + 2z = -5$

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

D. $x + y - 2z = -5$

**Answer: D**

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**37.** A variable plane moves so that the sum of the reciprocals of its intercepts on the coordinate axes is $(1/2)$. Then, the plane passes through the point

A. $\left(\frac{1}{2}, \frac{1}{2}, -\frac{1}{2}\right)$

B. (-1,1,1)

C. (2,2,2)

D. (0,0,0)

**Answer: C**

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**38.** What is the condition for the plane ax + by + cz + d = 0 to be perpendicular to xy - plane ?

A. a = 0

B. b = 0

C. c = 0

D. a + b + c = 0

**Answer: C**

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**39.** The plane $x + 3y + 13 = 0$ passes through the line of intersection of the planes $2x - 8y + 4z = p$ and $3x - 5y + 4z + 10 = 0$ . If the plane is perpendicular to the plane 3x - y - 2z - 4 = 0 , then the value of p is equal to

A. 2

B. 5

C. 9

D. 3

**Answer: D**

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**40.** Equation of the plane through the mid - point of the line segment joining the points P(4,5,-10) and Q (-1,2,1) and perpendicular to PQ is

A. $\vec{r}.\left(\frac{3}{2}\hat{i}+\frac{7}{2}\hat{j}-\frac{9}{2}\hat{k}\right)=45$

B. $\vec{r}.\left(-\hat{i}+2\hat{j}-\hat{k}\right)=\frac{135}{2}$

C. $\vec{r}.\left(5\hat{i}+3\hat{j}-11\hat{k}\right)+\frac{135}{2}=0$

D. $\vec{r}.\left(5\hat{i}+3\hat{j}-11\hat{k}\right)+\frac{135}{2}$

**Answer: D**

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**41.** For what value (s) of a will the two points $(1, a, 1) and ( -3, 0, a)$ lie on opposite sides of the plane $3x + 4y - 12z + 13 = 0$? a. $a \succ 1$ or $a > 1/3$ b. $a = 0$ only c. `0

A. $a < -1$ or $a > 1/3$

B. $a = 0$ only

C. $0 < a < 1$

D. $-1 < a < 1$

**Answer: A**

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**42.** A vector $\vec{n}$ is inclined to $x$-axis at $45^\circ$, to y-axis at $60^\circ$ 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. $4\sqrt{2}x + 7y + z - 2$

B. $2x + y + 2z = 2\sqrt{2} + 1$

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

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

**Answer: B**

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**43.** A variable plane which remains at a constant distance 3p from the origin cuts the coordinate axes at A, B, C. Show that the locus of the centroid of triangle ABC is $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = \frac{1}{p^2}$.

A. $x^{-1} + y^{-1} + z^{-1} = p^{-1}$

B. $x^{-2} + y^{-2} + z^{-2} = p^2$

C. $x + y + z = p$

D. $x^2 + y^2 + z^2 = p^2$

**Answer: B**

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**44.** The ratio in which the join of the points $A(2, 1, 5)$ and $B(3, 4, 3)$ is divided by the plane $2x + 2y - 2z = 1$, is

A. $3:5$

B. $5:7$

C. $1:3$

D. $4:5$

**Answer: B**

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**45.** For the $l: \frac{x-1}{3} = \frac{y+1}{2} = \frac{z-3}{-1}$ and the plane $P: x - 2y - z = 0$ of the following assertions the ony one which is true

is (A) l lies in P (B) l is parallel to P (C) l is perpendiculr to P (D) none of these

A. L is $\perp$ to $\pi$

B. L lies in $\pi$

C. L is parallel to $\pi$

D. None of these

**Answer: B**

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**46.** Find an equation or the line that passes through the point $P(2,\ 3,\ 1)$ and is parallel to the line of intersection o the planes $x + 2y - 3z = 4\ and\ x - 2y + z = 0$.

A. $\frac{x-2}{-5} = \frac{y-3}{-4} = \frac{z-1}{3}$

B. $\frac{x-2}{5} = \frac{y-3}{-4} = \frac{z-1}{3}$

C. $\frac{x-2}{5} = \frac{y-3}{4} = \frac{z-1}{3}$

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

**Answer: A**

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**47.** The value of m for which straight line $3x - 2y + z + 3 = 0 = 4x - 3y + 4z + 1$ is parallel to the plane $2x - y + mz - 2 = 0$ is

A. $-2$

B. 8

C. $-18$

D. 11

**Answer: A**

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**48.** The distance between the line $\vec{r} = 2\hat{i} - 2\hat{j} + 3\hat{k} + \lambda\left(\hat{i} - \hat{j} + 4\hat{k}\right)$ and the plane $\vec{r}.\left(\hat{i} + 5\hat{j} + \hat{k}\right) = 5$ is

A. $\frac{10}{3\sqrt{3}}$

B. $\frac{10}{9}$

C. $\frac{10}{3}$

D. $\frac{3}{10}$

**Answer: A**

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**49.** If plane passes through the point (1, 1,1) and is perpendicular to the line, $\frac{x-1}{3} = \frac{y-1}{0} = \frac{z-1}{4}$, then its perpendicular distance from the origin is

A. $\frac{3}{4}$

B. $\frac{4}{3}$

C. $\frac{7}{5}$

D. 1

**Answer: C**

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**50.** If Q is the image of the point $P(2, 3, 4)$ under the reflection in the plane $x - 2y + 5z = 6$, then the equation of the line PQ is

A. $\frac{x-2}{-1} = \frac{y-3}{2} = \frac{z-4}{5}$

B. $\frac{x-2}{1} = \frac{y-3}{-2} = \frac{z-4}{5}$

C. $\frac{x-2}{-1} = \frac{y-3}{-2} = \frac{z-4}{5}$

D. $\frac{x-2}{1} = \frac{y-3}{2} = \frac{z-4}{5}$

**Answer: B**

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**51.** The distance of the point (-5,-5,-10) from the point of intersection of the line $r. = 2\hat{i} - \hat{j} + 2\hat{k} + \lambda\left(3\hat{i} + 4\hat{j} + 2\hat{k}\right)$ and the plane $r.\left(\hat{i} - \hat{j} + hak\right) = 5$ is

A. 13

B. 12

C. $4\sqrt{15}$

D. $10\sqrt{2}$

**Answer: A**

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**52.** A plane passes through a fixed point $(a, b, c)$. The locus of the foot of the perpendicular to it from the origin is a sphere of radius a. $\frac{1}{2}\sqrt{a^2 + b^2 + c^2}$ b. $\sqrt{a^2 + b^2 + c^2}$ c. $a^2 + b^2 + c^2$ d. $\frac{1}{2}\left(a^2 + b^2 + c^2\right)$

A. $\sqrt{a^2 + b^2 + c^2}$

B. $\frac{1}{2}\sqrt{a^2+b^2+c^2}$

C. $a^2+b^2+c^2$

D. None of these

**Answer: B**

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**53.** If the centre of the sphere

$ax^2+by^2+cx^2-2x+4y+2z-3=0$ is $(1/2, -1, 1/2)$, what is the value of b?

A. 1

B. $-1$

C. 2

D. $-2$

**Answer: C**

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**54.** If the plane $2ax - 3ay + 4az + 6 = 0$ passes through the mid point of the line joining the centre of the spheres $x^2 + y^2 + z^2 + 6x - 8y - 2z = 13$ and $x^2 + y^2 + z^2 - 10x + 4y - 2z =$ , then $\alpha$ equals

A. $-1$

B. 1

C. $-2$

D. 2

**Answer: C**

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**55.** The radius of the circle in which the sphere $x^2 + y^2 + z^2 + 2x - 2y - 4z - 19 = 0$ is cut by the plane

$x + 2y + 2z + 7 = 0$ is

A. 4

B. 1

C. 2

D. 3

**Answer: D**

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**56.** From the point (1,-2,3) lines are drawn to meet the sphere $x^2 + y^2 + z^2 = 4$ and they are divided internally in the ratio $2 : 3$ . The locus of the point of division is

A. $5x^2 + 5y^2 + 5z^2 - 6x + 12y + 22 = 0$

B. $5\left(x^2 + y^2 + z^2\right) = 22$

C. $5x^2 + 5y^2 + 5z^2 - 2xy - 3yz - zx - 6x + 12y + 5y + 22 = 0$

D. $5x^2 + 5y^2 + 5z^2 - 6x + 12y + 18z + 22 = 0$

**Answer: D**

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**57.** Show that the plane $2x - 2y + z + 12 = 0$ touches the sphere $x^2 + y^2 + z^2 - 2x - 4 + 2z - 3 = 0.$

A. $(1, -4, 2)$

B. (-1,4,-2)

C. $(-1, -4, 2)$

D. $(1, 4, -2)$

**Answer: B**

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**58.** If the plane 2ax - 3ay + 4az + 6 = 0 passes through the midpoint of the line joining centres of the spheres $x^2 + y^2 + z^2 - 2x - 4y + 2z - 3 = 0$ and $x^2 + y^2 + z^2 + x - y - 2z = 13$ then a equals

A. $-1$

B. 1

C. 24/13

D. 2

**Answer: C**

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**59.** The equation of the sphere circumscribing the tetrahedron whose faces are x = 0 , y = 0 z = 0 and $\frac{x}{a} + \frac{y}{b} + \frac{z}{c}$ is

A. $x^2 + y^2 + z^2 = a^2 + b^2 + c^2$

B. $x^2 + y^2 + z^2 = ax - by - cz = 0$

C. $x^2 + y^2 + z^2 = 2ax - 2by - 2cz = 0$

D. None of these

**Answer: B**

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**60.** Circles of radii 3 and 4 intersect orthogonally The area common to the two circles is

A. 12

B. $\frac{12}{5}$

C. $\frac{\sqrt{12}}{5}$

D. $\sqrt{12}$

**Answer: B**

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## Exercise 2 Concept Applicator

**1.** A line makes the same angle $\alpha$ with each of the x and y axes. If the angle $\theta$, which it makes with the z-axis, is such that $\sin^2\theta = 2\sin^2\alpha$, then what is the value of $\alpha$?

A. $\pi/4$

B. $\pi/6$

C. $\pi/3$

D. $\pi/2$

**Answer: A**

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**2.** A mirror and source of light are situated at the origin O and a point on OX respectively. A ray of light from the source strikes the mirror and is

reflected. If the DRs of the normal to the plane of mirror are $1, -1, 1,$ then DCs for the reflacted ray are :

A. $\frac{1}{3}, \frac{2}{3}, \frac{2}{3}$

B. $-\frac{1}{3}, \frac{2}{3}, \frac{2}{3}$

C. $-\frac{1}{3}, \frac{2}{3}, -\frac{2}{3}$

D. $-\frac{1}{3}, -\frac{2}{3}, \frac{2}{3}$

**Answer: D**

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**3.** The point of intersection of the line passing through $(0, 0, 1)$ and intersecting the lines $x + 2y + z = 1, = -x + y - 2z = 2 and x + y = 2, x + z = 2 with xy$ plane is a. $\left(\frac{5}{3}, -\frac{1}{3}\right)$ b. 1, , 0 c. $\frac{2}{3}, \frac{1}{3}, 0$ d. $\left(-\frac{5}{3}, \frac{1}{3}, 0\right)$

A. $\left(\frac{5}{3}, -\frac{1}{3}, 0\right)$

B. $(1, 1, 0)$

C. $\left(\frac{2}{3}, -\frac{1}{3}, 0\right)$

D. $\left(-\frac{5}{3}, \frac{1}{3}, 0\right)$

**Answer: A**

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**4.** The direction cosines l, m and n of two lines are connected by the relations $l + m + n = 0$ and $lm = 0$, then the angle between the lines is

A. $\pi/3$

B. $\pi/4$

C. $\frac{\pi}{2}$

D. 0

**Answer: A**

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**5.** The angle between the plane $2x + 3y - 8z = 0$ and the line . $\frac{x-2}{1} = \frac{y-3}{2} = \frac{x-4}{1}$ is

A. $\pi/3$

B. $\pi/4$

C. $\frac{\pi}{2}$

D. 0

**Answer: D**

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**6.** Find the direction cosines of the two lines which are connected by th relations. $l - 5m + 3n = 0 and 7l^2 + 5m^2 - 3n^2 = 0$

A. $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

B. $\frac{-1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

C. $\frac{1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

D. $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}$

**Answer: A**

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**7.** Find the equation of a line which passes through the point $(1, 1, 1)$ and intersects the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} and \frac{x+2}{1} = \frac{y-3}{2} = \frac{z+1}{4}.$

A. $\frac{x-1}{3} = \frac{y-1}{10} = \frac{z-1}{17}$

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

C. $\frac{x-1}{-2} = \frac{y-1}{1} = \frac{z-1}{-4}$

D. $\frac{x-1}{8} = \frac{y-1}{-2} = \frac{z-1}{3}$

**Answer: A**

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**8.** If the line through the points A (k,1,-1) and B(2k,0,2) is perpendicular to the line through the points B and $C(2+2, k, 1)$, then what is the value of k?

A. $-1$

B. 1

C. $-3$

D. 3

**Answer: D**

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**9.** The equation of the line intersection of the planes $4x + 4y - 5z = 12$ and $8x + 12y - 13z = 32$ can be written as: (A) $\frac{x}{2} = \frac{y-1}{3} = \frac{z-2}{4}$ (B) $\frac{x}{2} = \frac{y}{3} = \frac{z-2}{4}$ (C) $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z}{4}$ (D) (x-1)/2=(y-2)/(-3)=z/4`

A. $\frac{x-1}{2}=\frac{y+2}{-3}=\frac{z}{4}$

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

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

D. $\frac{x}{2}=\frac{y}{3}=\frac{z-2}{4}$

**Answer: B**

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**10.** If the straighat lines $x=1+s, y=-3-\lambda s, z=1+\lambda s$ and $x=\frac{t}{2}, y=1+t, z=2-t$ with parameters s and t respectively, are coplanar, then $\lambda$ equals (A) $-\frac{1}{2}$ (B) $-1$ (C) $-2$ (D) $0$

A. 0

B. $-1$

C. $-\frac{1}{2}$

D. $-2$

**Answer: D**

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**11.** The line which contains all points $(x, y, z)$ which are of the form $(x, y, z) = (2, -2, 5) + \lambda(1, -3, 2)$ intersects the plane $2x - 3y + 4z = 163$ at P and intersects the YZ-plane at Q. If the distance PQ is $a\sqrt{b}$, where $a, b \in N$ and $a > 3$, then $(a + b)$ is equalto

A. 23

B. 95

C. 27

D. None of these

**Answer: A**

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**12.** Show that the points A(1,2,3), B(-1,-2,-1), C(2,3,2), D(4,7,6) are the vertices of a parallelogram.

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

B. $\frac{x+2}{1}=\frac{y+3}{2}=\frac{z-3}{2}$

C. $\frac{x}{2}=\frac{y}{3}=\frac{z}{2}$

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

**Answer: D**

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**13.** The shortest distance between the line 1+x=2y=-12z and x=y+2=6z-6 is

A. $\frac{1}{2}$

B. 2

C. 1

D. $\frac{3}{2}$

**Answer: B**

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**14.** The line which passes through the origin and intersect the two lines $\frac{x-1}{2}=\frac{y+3}{4}=\frac{z-5}{3}$ and $\frac{x-4}{2}=\frac{y+3}{2}=\frac{z-14}{4}$ is :

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

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

C. $\frac{x}{1}=\frac{y}{3}=\frac{z}{-3}$

D. $\frac{x}{1}=\frac{y}{4}=\frac{z}{-5}$

**Answer: A**

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**15.** The angle between the lines $\frac{x+1}{2}=\frac{y+3}{2}=\frac{z-4}{-1}$ and $\frac{x-4}{1}=\frac{y+4}{2}=\frac{z+1}{2}$ is

A. $\cos^{-1}\left(\frac{1}{9}\right)$

B. $\cos^{-1}\left(\frac{4}{9}\right)$

C. $\cos^{-1}\left(\frac{2}{9}\right)$

D. $\cos^{-1}\left(\frac{3}{9}\right)$

**Answer: B**

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**16.** The distance between the line given by $\vec{r} = \hat{i} + \hat{j} + \lambda\left(\hat{i} - 2\hat{j} + 3\hat{k}\right)$ and $\vec{r} = \left(2\hat{i} - 3\hat{k}\right) + \mu\left(\hat{i} - 2\hat{j} + 3\hat{j}\right)$

A. $\sqrt{\frac{59}{14}}$

B. $\sqrt{\frac{59}{7}}$

C. $\sqrt{\frac{118}{7}}$

D. $\frac{\sqrt{59}}{7}$

**Answer: B**

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**17.** Find the point on the line $\frac{x+2}{3} = \frac{y+1}{2} = \frac{z-3}{2}$ at a distance of $3\sqrt{2}$ from the point $(1, 2, 3)$.

A. $(56, 43, 111)$

B. $\left(\frac{56}{17}, \frac{43}{17}, \frac{111}{17}\right)$

C. (2,1,3)

D. (-2,-1,-3)

**Answer: B**

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**18.** The coordinates o the foot of the perpendicular drawn from the origin to the line joining the point $(-9, 4, 5) and (10, 0, -1)$ will be a. $(-3, 2, 1)$ b. $(1, 2, 2)$ c. $4, 5, 3$ d. none of these

A. (-3,2,1)

B. (1,2,2)

C. (4,5,3)

D. None of these

**Answer: D**

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**19.** If A,B,C are point (1,0,4) , (0,-1,5) and (2,-3,1) respectively , then the coordinates of foot of the perpendicular drawn from A to the line BC are

A. $\left(\frac{1}{2}, -\frac{1}{2}, \frac{9}{2}\right)$

B. (1,-2,3)

C. $\left(\frac{3}{2}, \frac{3}{2}, \frac{5}{2}\right)$

D. None of these

**Answer: D**

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**20.** If from a point $P(a, b, c)$ prpendiculars $PAandPB$ are drawn to $yzandzx - planes$, find the eqution of th plane $OAB$.

A. $bcx + cay + abz = 0$

B. $bcx + cay - abz = 0$

C. $bcx - cay + abz = 0$

D. $-bcx + cay + abz = 0$

**Answer: B**

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**21.** The equation of the plane which makes with coordinate axes a triangle with its centroid $(\alpha, \beta, \gamma)$ is (A) $\alpha x + \beta y + \gamma z = 3$ (B) $\frac{x}{\alpha} + \frac{y}{\gamma} + \frac{z}{\gamma} = 1$ (C) $\alpha x + \beta y + \gamma z = 1$ (D) $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 3$

A. $\alpha x + \beta y + \gamma z = 3$

B. $\alpha x + \beta y + \gamma z = 1$

C. $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 3$

D. $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 1$

**Answer: C**

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**22.** The plane $ax + by = 0$ is rotated through an angle $\alpha$ about its line of intersection with the plane $z = 0$. Show that the equation to the plane in new position is $ax + by \pm z\sqrt{a^2 + b^2}\tan\alpha = 0$.

A. $ax - by \pm z\sqrt{a^2 + b^2}\tan\alpha = 0$

B. $ax + by \pm z\sqrt{a^2 + b^2}\tan\alpha = 0$

C. $ax - by \pm z\sqrt{a^2 - b^2}\tan\alpha = 0$

D. None of these

**Answer: B**

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**23.** The plane x + 3y + 13 = 0 passes through the line of intersection of the planes $2x - 8y + 4z = p$ and $3x - 5y + 4z + 10 = 0$ If the plane is perpendicular to the plane , $3x - y - 2z - 4 = 0$then the value of p is equal to

A. 2

B. 5

C. 9

D. 3

**Answer: D**

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**24.** A variable plane at distance of 1 unit from the origin cuts the coordinte axes at A,B and C. If the centroid $D(x, y, z)$ of triangle ABC satisfies the relation $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=k$ then the value of k is (A) 3 (B) 1 (C) $\frac{1}{3}$ (D) 9

A. 3

B. 1

C. $1/3$

D. 9

**Answer: D**

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**25.** If the angle $\theta$ between the line $\frac{x+1}{1}=\frac{y-1}{2}=\frac{z-2}{2}$ and the plane $2x-y+\sqrt{\lambda z}+4=0$ is such that $\sin\theta=\frac{1}{3}$, the value of $\lambda$ is

A. $\frac{5}{3}$

B. $\frac{-3}{5}$

C. $\frac{3}{4}$

D. $\frac{-4}{3}$

**Answer: A**

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**26.** The equation of the line passing through $(1, 1, 1)$ and perpendicular to the line of intersection of the planes $x + 2y - 4z = 0$ and $2x - y + 2z = 0$ is

A. $8x + 5y - 11z + 8 = 0$

B. $8x + 5y + 11z + 8 = 0$

C. $8x - 5y - 11z + 8 = 0$

D. None of these

**Answer: C**

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**27.** If the distance between the plane Ax 2y + z = d and the plane containing the lines 2 1x = 3 2y = 4 3z and 3 2x = 4 3y = 5 4z is 6 , then |d| is

A. 4

B. 5

C. 6

D. 7

**Answer: C**

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**28.** If the angle between the line $x = \frac{y-1}{2} = (z-3)(\lambda)$ and the plane $x + 2y + 3z = 4 is \cos^{-1}\left(\sqrt{\frac{5}{14}}\right)$, then $\lambda$ equals

A. $\frac{3}{2}$

B. $\frac{2}{5}$

C. $\frac{5}{3}$

D. $\frac{2}{3}$

**Answer: D**

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**29.** If two points are $P(7, -5, 11)$ and $Q(-2, 8, 13)$, then the projection of PQ on a straight line with direction cosines $\frac{1}{2}, \frac{2}{3}, \frac{2}{3}$ is

A. $\frac{1}{2}$

B. $\frac{26}{3}$

C. $\frac{4}{3}$

D. 6

**Answer: D**

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**30.** Radius of the circle $\vec{r_2} + \vec{r}\left(2\hat{i} - 2\hat{j} - 4\hat{k}\right) - 19 = 0.\ \vec{r}.\left(\hat{i} - 2\hat{j} + 2\hat{k}\right) + 8 = 0$, is

A. 5

B. 4

C. 3

D. 2

**Answer: B**

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