MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

THE PLANE

Solved Examples

1. If (2,3, - 1) is the foot of the perpendicular from (4, 2, 1) to a plane, the equation of the plane is

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

B. $2x + y - 2z - 9=0$

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

D. $2x - y + 2z + 1 = 0$

Answer: D

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2. The point which is equidistant from $A(3, 4, -1)$ and $B(1, -2, 5)$ on y-axis is

A. (0, 1, 0)

B. (0,1/3,0)

C. (0, - 1/3,0)

D. (0, - 5/3,0)

Answer: C

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3. Find the ratio in which the plane $2x - 3y + 6z = 5$ divides the line joining $(2, 3, -1), (-1, 4, 1)$.

A. (5,2,0)

B. (5,4, – 4)

C. (-3,-1,-6)

D. (10, – 15, 12)

Answer: B

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4. Find the coordinates of the point at which yz plane intersects the line segment joining the points (-2, 3, 7) and (6, -1, 2).

A. (0, 2, 23/4)

B. (0, 2, 33/4)

C. (0, 1, 23/4)

D. (0, 1, 33/4)

Answer: A

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5. The equation of the plane which is parallel to x-axis and making intercepts 3 and 8 on y and z-axes respectively is

A. 3y + 8z = 24

B. 3y - 8z = 24

C. 8y - 3z = 24

D. 8y + 3z = 24

Answer: D

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6. If $\lambda x + 4y + 5z = 7, 4x + 4\lambda y + 10z - 14 = 0$ represent the same plane the value of λ =

A. 1

B. 2

C. 0

D. 3

Answer: B

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7. The angle between the planes 2x +y + z = 3 , x - y + 2z = 5 is

A. $\pi / 2$

B. $\pi / 6$

C. $3\pi / 4$

D. $\pi / 3$

Answer: D

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8. The equation of the plane passing through the points (2, 1, -1).(1, 1, 1), (3,3,0) is

A. $4x - 3y + 2z - 3 = 0$

B. $4x - 4z+1=0$

C. $4x + 3y - 2z +8 = 0$

D. $4x - 3y + 5z - 16 = 0$

Answer: A

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9. The equation of the plane through the point (-1, 6, 2) and perpendicular to the planes $x + 2y + 2z - 5 = 0$ and $3x + 3y + 2z - 8 = 0$ is

A. $2x-3y +2z+15 = 0$

B. $4x +y - 3z -26=0$

C. $2x - 4y +3z + 8 = 0$

D. $3x + 5y - 2z + 12 = 0$

Answer: C

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10. The equation of the plane through the line of intersection of the planes $x + y + z - 6 = 0$, $2x + 3y + 4z + 5 = 0$ and the point $(1,1,1)$ is

A. $7x - 9y + 8z = 0$

B. $7x + y + 8z = 0$

C. $2x - 2y - 3z = 14$

D. $20x + 23y + 26z - 69 = 0$

Answer: D

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11. A plane passing through (1, 2, 3) and whose normal makes equal angles with the coordinate axes is

A. x+y+z- 6 = 0

B. 2x +y - z + 11 = 0

C. x -y +2+6=0

D. x+y+z-5=0

Answer: A

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12. A tetrahedron has vertices O(0,0,0), A(1,2,1), B(2,1,3) and C(-1,1,2). Then the angle between the faces OAB and ABC is

A. $\cos^{-1}\left(\frac{\sqrt{3}}{35}\right)$

B. $\cos^{-1}\left(\frac{21}{35}\right)$

C. $\cos^{-1}\left(\frac{9}{35}\right)$

D. $\cos^{-1}\left(\frac{\sqrt{35}}{3}\right)$

Answer: A

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13. R is the set of real numbers. If $a^2+b^2+c^2 \neq ab+bc+ca$ and $a+b+c \neq 0$ then the set of points satisfying the equations ax+by+z=0, bx + by + az = 0, cx+ay+bz = 0 is

A. $R \times R \times R$

B. $[0 \quad 0 \quad 0]$

C. $R \times R \times [0]$

D. $R \times [0] \times R$

Answer: B

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14. The plane $x = 0, x = a, y = 0, y = a, z =$ and $z = a$ from a

A. Parallelopiped

B. Rectangular parallelopiped with distinct edges

C. Cube

D. Tetrahedron

Answer: C

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15. A tetrahedron has vertices O(0,0,0), A(1,2,1), B(2,1,3) and C(-1,1,2). Then the angle between the faces OAB and ABC is

A. 90°

B. $\cos^{-1}\left(\frac{19}{35}\right)$

C. $\cos^{-1}\left(\frac{17}{31}\right)$

D. 30°

Answer: B

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Excerise 1

1. The projection of the line segment joining the origin and the point P (5, 2, 4) on the line whose d.c.'s are $\left(\frac{2}{7}, -\frac{3}{7}, \frac{6}{7}\right)$ is

A. 6x – 2y – 3z = 35

B. 6x + 2y – 3z = 50

C. 3x – 12y + 4z = 26

D. $2x + y + z = 3\sqrt{11}$

Answer: A

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2. If (2, 4, – 3) is the foot of the perpendicular drawn from the origin to a plane then the equation of the plane is

A. $2x + 4y - 3z - 29 = 0$

B. $2x + 4y - 3z - 39 = 0$

C. $2x + 4y + 3z + 29 = 0$

D. $5x + 6y - 3z - 29 = 0$

Answer: A

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3. If the foot of the perpendicular from (0,0,0) to a plane is (1, 2, 2), then the equation of the plane is

A. $-x + 2y + 8z - 9=0$

B. $x + 2y + 2z - 9=0$

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

D. $x + 2y - 3z + 1 = 0$

Answer: B

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4. If the foot of the perpendicular from (0, 0, 0) to a plane is (1, 2, 3), then the equation of the plane is

A. $2x + y + 3z = 14$

B. $x + 2y + 3z = 14$

C. $x + 2y + 3z + 14 = 0$

D. $x+ 2y - 3z = 14$

Answer: B

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5. The foot of the perpendicular from (1, 3, 4) to $2x - y + z + 3 = 0$ is

A. (1, –4,3)

B. (-1,4,3)

C. (0,3,0)

D. (1,2,3)

Answer: B

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6. The foot of the perpendicular from (0,0,0) to $3x + 4y - 6z = 0$ is

A. (3, 4, -6)

B. (0,4 – 6)

C. (3, 0, – 6)

D. (0, 0, 0)

Answer: D

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7. The image of (1, 3, 4) in the plane 2x - y +z+3 = 0) is

A. (3, – 5,2)

B. (3, 5, - 2)

C. (-3,5,2)

D. (3, 5, 2)

Answer: C

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8. The image of the point (3, 2, 1) in the plane 2x – y + 3z = 7 is:

A. (1,2,3)

B. (2, 3, 1)

C. (3, 2, 1)

D. (2, 1,3)

Answer: C

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9. The image of the point (-1, 3, 4) in the plane x – 2y = 0 is

A. $\left(-\frac{17}{3}, -\frac{19}{3}, 1\right)$

B. $\left(\frac{9}{5}, -\frac{14}{5}, 4\right)$

C. $\left(-\frac{17}{3}, -\frac{19}{3}, 4\right)$

D. $(15, 11, 4)$

Answer: B

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10. The d.c.'s of the normal to the plane 2x + 3y – 6z + 5 = 0 are

A. $(3, -2, 6)$

B. $\left(\frac{2}{7}, \frac{3}{7}, -\frac{6}{7}\right)$

C. $\left(\frac{3}{7}, -\frac{2}{7}, \frac{6}{7}\right)$

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

Answer: B

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11. The perpendicular distance from the origin to the plane x – 2y + 2z - 9 = 0 is

A. 3

B. 6

C. 4

D. 2

Answer: A

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12. The perpendicular distance from the point (-2,3, 1) to the plane 2x – 3y – 6z + 5 = 0 is

A. $\sqrt{14}$

B. $1\sqrt{14}$

C. $5\sqrt{14}$

D. 2

Answer: D

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13. The normal form of 2x – 2y +z = 5 is

A. 12x – 4y + 3z= 39

B. $-\frac{6}{7}x+\frac{2}{7}y+\frac{3}{7}z=1$

C. $\frac{12}{13}x-\frac{4}{13}y+\frac{3}{13}z=3$

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

Answer: D

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14. The equation of the plane passing through (3, 4,-2) and whose normal has the d.r.'s (2, 3, 4) is

A. 3x + 4y + 5z + 20 = 0

B. 3x + 4y + 5z – 20 = 0

C. x – 2y – 3z + 20 = 0

D. 2x – 3y + 4z + 14 = 0

Answer: D

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15. A plane passing through (- 1, 2, 3) and whose normal makes equal angles with the coordinate axes is

A. $x+y+z+4 = 0$

B. $x - y + z + 4 = 0$

C. $x + y + z - 4 = 0$

D. $x+y+z = 0$

Answer: C

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16. A plane passes through (2, 3, -1) and is perpendicular to the line having direction ratios 3, -4,7. The perpendicular distance from the origin to this plane is

A. $\frac{3}{\sqrt{74}}$

B. $\frac{5}{\sqrt{74}}$

C. $\frac{6}{\sqrt{74}}$

D. $\frac{13}{\sqrt{74}}$

Answer: D

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17. A plane $\prod$ passes through the point (1, 1, 1). If b, c, a are the direction ratios of a normal to the plane, where a, b, c (a

A. 29x + 31y + 3z = 63

B. 23x + 29y - 29z = 23

C. 23x + 29y+ 3z = 55

D. 31x + 27y +3z = 71

Answer: C

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18. The equation of the plane which is at a distance of 5 unit from the origin and whose normal has the d.r.'s (6, 12, - 4) is

A. $3x + 6y - 2z = 5$

B. $6x + 12y - 2z = 5$

C. $3x + 6y - 2z = 7$

D. $3x + 6y - 2z = 35$

Answer: D

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19. The equation of the plane having intercepts 2, 3, 6 is

A. $3x + 3y + 6z = 12$

B. $3x + 3y - 6z = 12$

C. $4x + 3y - 6z = 12$

D. $3x + 2y + z = 6$

Answer: D

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20. The intercepts of the plane $2x - 3y + 5z - 30 = 0$ are

A. 15, - 10,6

B. 5, 10, 6

C. 1/8, -1/6, 1/4

D. 3, -4,6

Answer: A

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21. The intercepts form of 6x – 3y – 2z + 12 = 0 is

A. $\frac{x}{-2}+\frac{y}{4}+\frac{z}{6}=1$

B. $\frac{x}{6}+\frac{y}{3}+\frac{z}{-2}=1$

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

D. $\frac{x}{-3}+\frac{y}{6}+\frac{z}{-3}=1$

Answer: A

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22. The area of the triangle formed by $\frac{x}{4}+\frac{y}{3}-\frac{z}{2}=1$ with x-axis and y-axis is is

A. 2

B. 3

C. 6

D. 12

Answer: C

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23. If the areas of triangles formed by a plane with the positive x, y, y, z, 2, x axes respectively are 12,9, 6 sq. unit respectively then the equation of the plane is

A. $\frac{x}{4}+\frac{y}{6}+\frac{z}{3}=1$

B. $\frac{x}{6}+\frac{y}{3}+\frac{z}{4}=1$

C. $\frac{x}{3}+\frac{y}{4}+\frac{z}{6}=1$

D. $\frac{x}{3}+\frac{y}{6}+\frac{z}{4}=1$

Answer: A

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24. If the plane $7x + 11y + 13z = 3003$ meets the coordinate axes in A, B, C then the centroid of the Δ ABC is

A. (143, 91, 77)

B. (143, 77,91)

C. (91, 143, 77)

D. (143, 66, 91)

Answer: A

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25. Find the angle between the planes $2x - y + z = 6$ and $x + y + 2z = 7$.

A. $60^\circ, 120^\circ$

B. 60°

C. 120°

D. 90°

Answer: A

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26. The angle between the planes $2x + 6y + 6z = 9$, $3x + 4y - 5z = 9$ is

A. $\pi / 2$

B. $2\pi / 3$

C. $3\pi / 4$

D. $5\pi / 6$

Answer: A

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27. If the planes $2x + 3y - z + 5 = 0$, $x + 2y - kz + 7 = 0$ are perpendicular then k=

A. 4

B. 6

C. 8

D. -8

Answer: D

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28. If the planes $2x + 3y + 4z + 7 = 0$ and $4x + ky + 8z + 1 = 0$ are parallel then $k =$

A. 2

B. 4

C. 5

D. 6

Answer: D

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29. The equation of the plane passing through the point (1, 2, – 3) and parallel to the plane $2x - 3y + z + 5 = 0$ is

A. $2x - 3y + z + 7 = 0$

B. $2x + 3y - z - 7 = 0$

C. $2x + 3y - z - 9 = 0$

D. $2x + 3y - z + 9 = 0$

Answer: A

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30. The equation of the plane passing through the point (- 1, 2, 4) and parallel to the plane $2x + 3y - 5z + 6 = 0$ is

A. $2x + 3y - z = 0$

B. $2x + 3y - z - 7 = 0$

C. $2x + 3y - 2 - 9 = 0$

D. $2x + 3y - 5z + 16 = 0$

Answer: D

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31. An equation of a plane parallel to the plane $x - 2y + 2z - 5 = 0$ and at a unit distance from the origin is

A. $x - 2y + 2z - 1 = 0$

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

C. $x - 2y + 2z - 3 = 0$

D. $x - 2y + 2z + 1 = 0$

Answer: C

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32. The equation of the plane passing through the point (1, 2, 3) and parallel to xy-plane is

A. $x+2=0$

B. $y-3=0$

C. $z=3$

D. $x-2=0$

Answer: C

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33. The equation of the plane passing through the point (3, -6, 9) and perpendicular to the x-axis is

A. $x+2=0$

B. $y-3=0$

C. z- 7= 0

D. x – 3 = 0

Answer: D

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34. In the space the equation by + cz + d = 0 represents a plane perpendicular to the ..... plane

A. YOZ

B. ZOX

C. XOY

D. z = k

Answer: A

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35. Distance between to parallel planes $2x + y + 2z = 8$ and $4x + 2y + 4z + 5 = 0$ is

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

B. $\frac{9}{2}$

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

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

Answer: A

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36. The distance between the parallel planes $12x - 3y + 4z - 7 = 0$, $12x - 3y + 4z + 6 = 0$) is

A. 1

B. 2

C. $1/2$

D. 3

Answer: A

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37. The planes $x = \pm a, y = \pm a, z = \pm a$ form a

A. parallelopiped

B. rectangular parallelopiped

C. cube

D. tetrahedron

Answer: B

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38. The plane $x = 0, x = a, y = 0, y = a, z =$ and $z = a$ from a

A. parallelopiped

B. rectangular parallelopiped

C. cube

D. tetrahedron

Answer: C

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39. The four planes $7x + 4y - 4z + 3 = 0, 36x - 51y + 12z + 17 = 0, 14x + 8y - 8z - 12 = 0$

are the four faces of a

A. parallelopiped

B. rectangular parallelopiped

C. cube

D. tetrahedron

Answer: A

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40. The ratio in which the plane $2x + 3y - 2z + 7 = 0$ divides the line segment joining the points $(-1, 2, 3), (2, 3, 5)$ is

A. $3:5$

B. $7:5$

C. $9:11$

D. $1:2$ externally

Answer: D

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41. The ratio in which the line joining $(2, -4, 3)$ and $(-4, 5, -6)$ is divided by the plane $3x + 2y + z - 4 = 0$ is

A. $2:1$

B. $4:3$

C. $-1:4$

D. $2:3$

Answer: C

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42. For the plane $II = 4x - 3y + 2z - 3 = 0,$ the points $A(-2, 1, 2)$ B = (3, 1, -2)`

A. lie on the same side of $\prod = 0$

B. line on the opposite sides of $\prod = 0$

C. lie on the normal to $\prod = 0$

D. None

Answer: A

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43. For the plane $\prod = 4x - 3y + 2z - 3 = 0$, the points A = (- 2, 1, 2), B = (3, 1, - 2) 1) lie on the same side of $\prod = 0$

A. lie on the same side of $\prod = 0$

B. line on the opposite sides of $\prod = 0$

C. lie on the normal to $\prod = 0$

D. None

Answer: B

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44. For the plane $\prod = x + y + z - 4 = 0$, the point (1, 2, 3) lie in the

A. opposite to the origin side

B. origin side

C. plane

D. none

Answer: A

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45. Which point lies on the origin side of the plane $2x + 3y + 4z + 7 = 0$?

A. (1, 2, – 7)

B. (2, -3,1)

C. (1, 1, – 4)

D. (2, - 1, -3)

Answer: B

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46. The direction ratios of a normal to the plane passing through (0, 0, 1), (0, 1, 2) and (1, 2, 3) are

A. (0, 1, -1)

B. (1, 0, -1)

C. (0, 0, -1)

D. (1, 0,0)

Answer: A

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47. The equation of the plane passing through the points (1, 2, 1), (1, 1,0), (-2, 2, - 1) is

A. $2x + 3y - 3z - 5 = 0$

B. $2x - 3y + 2z - 11 = 0$

C. $4x + 3y - 2z + 8 = 0$

D. $2x - 3y + 5z - 16 = 0$

Answer: A

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48. The equation of the plane passing through the points (1, 1, 1), (1, - 1,1), (-7, -3, -5) is

A. $4x - 3y + 2z + 11 = 0$

B. $3x - 4z + 1 = 0$

C. $3x + 3y - 2z + 8 = 0$

D. $3x - 3y + 5z - 16 = 0$

Answer: B

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49. If $A = (2, 4, 1), B(-1, 0, 1), C = (-1, 4, 2)$, then the distance of $(1, -2, 1)$ from the plane ABC is

A. $2/3$

B. $14/13$

C. $4/3$

D. 1

Answer: B

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50. The distance from the plane passing through $(1, 3, 2), (-5, 0, 2), (1, 1, -4)$ to the point $(2, 3, 4)$ is

A. 1 unit

B. 5 unit

C. 8 unit

D. 10 unit

Answer: A

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51. The equation of the plane through the points (2, 2, 1), (9,3, 6) and perpendicular to the plane $2x + 6y + 6z = 9$ is

A. $x + 16y + 11z - 7 = 0$

B. $x + 16y - 11z + 37 = 0$

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

D. $3x + 4y - 5z - 9 = 0$

Answer: D

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52. The equation of the plane passing through (1, - 2, 4), (3, -4,5) and perpendicular to xy-plane is

A. $x + y + 1 = 0$

B. $y + 2x + 6 = 0$

C. $y + 2z - 6 = 0$

D. $3y + 2z - 2 = 0$

Answer: A

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53. The equation of the plane passing through (1, - 2, 4), (3, - 4,5) and parallel to x-axis is

A. $5x + 3y = 19$

B. $5x + 3y + 19 = 0$

C. $3x + 5y = 21$

D. $y + 2z - 6 = 0$

Answer: D

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54. The equation of the plane through the point (-1, 6, 2) and perpendicular to the planes $x + 2y + 2z - 5 = 0$ and $3x + 3y + 2z - 8 = 0$ is

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

B. $2x + y - 3z - 26 = 0$

C. $2x - 4y + 3z + 23 = 0$

D. $2x + 5y - 2z + 12 = 0$

Answer: A

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55. The equation of the perpendicular bisecting plane of the line segment joining (-3,3, 2), (9,5, 4) is

A. $x - y + 4z - 13 = 0$

B. $2x - 2y + 7z - 23 = 0$

C. $x - 7y + 2z - 1 = 0$

D. $6x + y + z - 25 = 0$

Answer: D

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56. The equation of the perpendicular bisecting plane of the line segment joining origin, (4, 6, -2) is

A. $2x + 3y - z - 14 = 0$

B. $2x - 2y + 7z - 23 = 0$

C. $3x - 7y + 2z - 1=0$

D. $x + y + z - 4 = 0$

Answer: A

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57. The plane $2x + 3y + kz - 7 = 0$ is parallel to the line whose d.r's are $(2,-3,1)$ then $k=$

A. 5

B. 8

C. 1

D. 0

Answer: A

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58. $P = (0, 1, 0), Q = (0, 0, 1)$ then projection of $\overline{PQ}$ on the plane $x + y + z = 3$ is

A. 2

B. 3

C. $\sqrt{2}$

D. $\sqrt{3}$

Answer: C

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59. A variable plane through a fixed point (1, 2, 3) then the foot of the perpendicular from the origin to the plane lies on

A. a circle

B. a sphere

C. an ellipse

D. a parabola

Answer: B

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60. The locus of the point whose distance from the origin is twice its distance from the plane 2x + 3y – 6z = 0 is

A. $33x^2 - y^2 - 5z^2 - 16xy + 112x - 56y + 196 = 0$

B. $4x^2 - y^2 = 49$

C. $33x^2 + 13y^2 - 95z^2 + 144yz + 96xz - 48xy = 0$

D. $4x^2 + y^2 = 49$

Answer: C

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61. The locus of a point for which the sum of the squares of the distances from the coordinate planes is 5 unit is

A. $x^2 + y^2 + z^2 = 7$

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

C. $x + y + z = \sqrt{5}$

D. $x^2 + y^2 + z^2 = 25$

Answer: A

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62. The locus of the point such that the sum of the squares of its distances from the planes x+y+z = 0, x - y = 0 and x + y - 2z = 0 is equal to the double of the square of its distance from the plane x=z is

A. $x^2 + xy = 0$

B. $x^2 + 2yz = 0$

C. $y^2 = zx$

D. $y^2 + 2zx = 0$

Answer: D

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63. The locus of a point P whose distance from the plane 6x – 2y + 3z + 4 = 0 is equal to its distance from the point (- 1, 1, 2) is

A. $5\left(x^2 + y^2 + z^2\right) + 4(xy + 2yz - xz) - 18(2x - y + 3z) + 126 = 0$

B. $8x^2 + 5y^2 + 5z^2 + 4xy + 8yz - 4zx - 36x + 18y - 54z + 126 = 0$

C. $8x^2 + y^2 + z^2 + 4(xy + 2yz - xz) + 18(2x - y + 3z) + 126 = 0$

D.

$$13x^2 + 44y^2 + 40z^2 + 12yz - 36xz + 24xy + 50x - 82y - 220z + 278 =$$

Answer: D

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64. If a plane meets the coordinate axes in A, B, C such that the centroid of the triangle ABC is the point (p,q, r) then the equation of the plane is

A. $\frac{x}{p}+\frac{y}{q}+\frac{z}{r}=1$

B. $\frac{x}{p}+\frac{y}{q}+\frac{z}{r}=2$

C. $\frac{x}{p}+\frac{y}{q}+\frac{z}{r}=3$

D. $px+qy+rz=3$

Answer: C

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65. A plane meets the coordinate axes at A,B,C so that the centroid of the triangle ABC is $(1, 2, 4)$ Then the equation of the plane is :

A. x + 2y + 4z = 12

B. 4x + 2y +z = 12

C. x + 2y + 4z = 3

D. 4x + 2y + z = 3

Answer: B

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66. A variable plane is at a constant distance p from the origin and meets the axes in A, B and C. The locus of the centroid of the triangle ABC is

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

B. $z^{-2} + y^{-2} + z^{-2} = 3p^{-2}$

C. $x^{-2} + y^{-2} + z^{-2} = 9p^{-2}$

D. $x^{-2} + y^{-2} + z^{-2} = 16p^{-2}$

Answer: A

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67. A variable plane is at a constant distance p from the origin and meets the axes in A, B and C. The locus of the centroid of the triangle ABC is

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

B. $z^{-2}+y^{-2}+z^{-2}=4p^{-2}$

C. $x^{-2}+y^{-2}+z^{-2}=16p^{-2}$

D. $x^{-2}+y^{-2}+z^{-2}=9p^{-2}$

Answer: D

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68. A variable plane is at a constant distance P from the origin and meets the axes in A, B and C. The locus of the centroid of tetrahedran OABC is

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

B. $z^{-2}+y^{-2}+z^{-2}=3p^{-2}$

C. $x^{-2}+y^{-2}+z^{-2}=9p^{-2}$

D. $x^{-2} + y^{-2} + z^{-2} = 16p^{-2}$

Answer: D

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69. Two systems of rectangular axes have the same origin. If a plane cuts them at distances a, b, c and a_1, b_1, c_1 respectively from the origin, then $a^{-2} + b^{-2} + c^{-2}$

A. $a_1^{-2} + b_1^{-2} + c_1^{-2}$

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

C. $a^{-2} + b^{-2} + c^{-2}$

D. None

Answer: A

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70. The equation of the plane which is parallel to y-axis and making intercepts of lengths 3 and 4 on x-axis and z-axis is

A. $2x + 2z = 20$

B. $4x + 3z = 12$

C. $4x - 3z = 12$

D. $6x + 13z = 15$

Answer: B

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71. The point on x-axis with is equidistant to (2,-1-4), (-4,3,0) is

A. (0,0,0)

B. (- 26/3,0,0)

C. (1, 0, 1)

D. (1, 1, 1)

Answer: B

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72. The plane passing through the points $(1, 1, 1), (1, -1, 1)$ and $(-7, -3, -5)$ is parallel to

A. x-axis

B. y-axis

C. z-axis

D. none

Answer: B

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73. The plane determined by the points $(-1, 2, -2), (0, 1, 1)$ and $(1, 1, 2)$ passes through

A. (1, 1, 0)

B. (-1,1,0)

C. (-1,0,1)

D. (1, 0, - 1)

Answer: B

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74. The equation of the plane through the line of intersection of the planes $x - 3y + 2z + 3 = 0, 3x - y + 2z - 5 = 0$ and the origin is

A. $7x - 4y + 8z = 0$

B. $7x + y + 8z = 0$

C. $2x - 2y - 3z = 14$

D. none

Answer: A

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75. The equation of the plane through the line of intersection of the planes $x - 2y + 3z - 1 = 0, 2x + y + z - 2 = 0$ and the point $(1, 2, 3)$ is

A. 7x - 4y + 8z = 0

B. 7x + y + 8z = 0

C. x + 3y - 2z - 1 = 0

D. none

Answer: C

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76. The equation of the plane through the line of intersection of the planes $x + y + z - 1 = 0, 2x + 3y + 4z - 5 = 0$ and perpendicular to the plane is $x + y + z = 0$ is

A. $7x - y - 6z - 17 = 0$

B. $x - y - 6z - 27 = 0$

C. $7x + y + 6z - 27 = 0$

D. none

Answer: A

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77. The equation of the plane through the line of intersection of the planes $2x + 3y + 4z - 7 = 0$, $x + y + z - 1 = 0$ and perpendicular to the plane $x - 5y + 3z - 2 = 0$) is

A. $7x - y - 6z - 17 = 0$

B. $x - y - 6z - 27 = 0$

C. $x + 2y + 3z - 6 = 0$

D. none

Answer: C

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78. The equations to the plane through the line of intersection of $2x + y + 3z - 2 = 0$, $x-y+z+4 = 0$ such that each plane is at a distance of 2 unit from the origin is

A. $x + y + 2z + 13 = 0$, $x + y + z - 3 = 0$

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

C. $15x - 12y + 16z + 50 = 0$, $x + 2y + 2z - 6 = 0$

D. none

Answer: C

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79. Equation of the bisector of the angle between the planes $x + 2y + 2z - 9 = 0, 4x - 3y + 12z + 13 = 0$

A. 25x + 17y +62z - 78 = 0, x + 35y - 10z – 156 = 0

B. 15x – 27y + 2z - 78 = 0, x - 5y - 15z - 15 = 0

C. 50x + 70y + 62z – 80 = 0, x – 35y + 10z + 15 = 0

D. y-1=0, x+z – 3 = 0, y - 1 = 0

Answer: A

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80. The equations of the bisectors of the angles between the planes 3x – 6y + 2z + 5 = 0, 4x – 12y + 3z - 3 = 0 is

A. 25x + 17y +62z - 78 = 0, x + 35y - 10z – 156 = 0

B. 15x – 27y + 2z - 78 = 0, x - 5y - 15z – 15 = 0

C. 67x - 162y +47z +44 = 0, 11x + 6y + 5z + 86 = 0

D. y-1=0, x +z - 3 = 0, y - 1 = 0

Answer: C

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81. Find the equation of locus of point which lies on bisectors of angles between the co-ordinate axes.

A. x - z = 0, x + 2z = 0

B. x -z+2 = 0

C. x +z = 0, x – z = 0

D. x+y=0, x - y = 0

Answer: C

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82. The equations of bisectors of angles between yz-plane and xz-plane is

A. $x - z = 0, x + 2z = 0$

B. $x - z + 2 = 0$

C. $x + z = 0, x - z = 0$

D. $x + y = 0, x - y = 0$

Answer: D

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Exercise 2 Special Type Questions Set 1

1. I: The foot of the perpendicular from (1, 3, 4) to $2x - y + z + 3 = 0$ is (-1,4, 3)

II: The image of (1, 3, 4) in the plane $2x - y + z + 3 = 0$ is (-3, 5,2)

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: C

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2. I: The equation of the plane passing through the point (1, 2, – 3) and parallel to the plane $2x - 3y + z + 5 = 0$ is $2x - 3y + z + 7 = 0$

II : The equation of the plane passing through the point (1, 2, 3) and parallel to xy-plane is $x + 2 = 0$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: A

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3. I: The equation of the plane through the points (1, -2, 2), (3, 1, - 2) and perpendicular to the plane $x + 2y - 3z = 5$ is $x + 16y - 11z + 37 = 0$

II : The equation of the plane passing through (1, – 2, 4), (3, -4,5) and parallel to x-axis is $y + 2z - 6 = 0$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: B

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4. I : The equation of the perpendicular bisecting plane of the line segment joining (-3,3, 2), (9, 5, 4) is $x - 7y + 2z - 1 = 0$

II : The equation of the plane passing through the points (1, 2, 1), (1, 1, 0), (-2,2, - 1) is $2x - 3y + 2z - 11 = 0$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: D

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Exercise 2 Special Type Questions Set 2

1. If a, b, c are the intercepts of the plane $2x + 3y + 5z - 30 = 0$ on the coordinate axes respectively then the increasing order of a, b, c is

A. a, b, c

B. b, c, a

C. c, a, b

D. c, b, a

Answer: A

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2. If the plane ax + by + cz = 5 passes through the points (1, 2, 1), (1, 1,0), (-2, 2, - 1) then the decreasing order of a, b, c is

A. a, b, c

B. b, c, a

C. c, a, b

D. c, b, a

Answer: C

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3. The equation of the plane through the point (-1, 6, 2) and perpendicular to the planes $x + 2y + 2z - 5 = 0$ and $3x + 3y + 2z - 8 = 0$ is

A. a, b, c

B. b, c, a

C. c, a, b

D. c, b, a

Answer: A

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Exercise 2 Special Type Questions Set 3

1. Match the following

Point and plane	Foot of the perpendicular
I. $(1, 3, 4)$, $2x - y + z + 3 = 0$	a) $(-3, 5, -8)$
II. $(7, 14, 5)$, $2x + 4y - z = 2$	b) $(-1, 4, 3)$
III. $(0, 0, 0)$, $3x + 4y - 6z = 0$	c) $(1, 2, 8)$
IV. $(0, 0, 0)$, $3x - 5y + 8z + 98 = 0$	d) $(0, 0, 0)$

A. a, b, c, d

B. b, a, d, c

C. c, b, d, a

D. b, c, d, a

Answer: D

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2. Match the following

Parallel planes	Distance between the planes
I. $12 - 3y + 4z - 7 = 0$, $12x - 3y + 4z + 6 = 0$	a) 1
II. $4x - 4y + 2z + 5 = 0$, $2x - 2y + z + 3 = 0$	b) 2
III. $2x + 3y - 6z + 5 = 0$, $2x + 3y - 6z - 9 = 0$	c) 3
IV. $x + 2y + 2z - 1 = 0$, $x + 2y + 2z + 8 = 0$	d) $1/6$

A. a, b, c, d

B. b, a, d, c

C. c, b, d, a

D. b, c, d, a

Answer: C

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3. Match the following

Points	Perpendicular bisecting plane
I. $(-3, 3, 2), (9, 5, 4)$	a) $2x - y + z + 3 = 0$
II. $(2, 0, 6), (-6, 2, 4)$	b) $6x + y + z - 25 = 0$
III. $(0, 0, 0), (4, 6, 2)$	c) $4x + y + z - 4 = 0$
IV. $(1, 3, 4), (-3, 5, 2)$	d) $2x + 3y - z - 14 = 0$

A. a, b, c, d

B. b, a, d, c

C. c, b, d, a

D. b, c, d, a

Answer: D

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4. Match the following

Point and plane	Perpendicular distance
I. $(1, 3, 4), 2x - y + z + 3 = 0$	a) $\sqrt{6}$
II. $(7, 14, 5), 2x + 4y - z = 2$	b) $3\sqrt{21}$
III. $(0, 0, 0), 3x + 4y - 6z = 0$	c) 0
IV. $(0, 0, 0), 3x - 5y + 8z + 98 = 0$	d) $7\sqrt{2}$

A. a, b, c, d

B. b, a, d, c

C. c, b, d, a

D. b, c, d, a

Answer: A

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Exercise 2 Special Type Questions Set 4

1. A: The equation of the plane passing through the point (- 1, 2, 4) and parallel to the plane 2x + 3y – 5z +6=0 is 2x + 3y - 5z + 16 = 0.

R: The equation of the plane passing through the point (x_1, y_1, z_1) and parallel to the plane ax + by + cz +d=0 is $a(x-x_1) + b(y-y_1) + c(z-z_1) = 0$

A. both A and R are true and R is the correct explanation of A

B. both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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2. A: The area of the triangle formed by $\frac{x}{4} + \frac{y}{3} - \frac{z}{2} = 1$ with x-axis and y-axis is 6.

R: The area of the triangle formed by $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$ with x-axis and y-axis is $\frac{1}{2}|bc|$

A. both A and R are true and R is the correct explanation of A

B. both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: C

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3. A: The plane 2x + 3y + 5 = 0 is parallel to x-axis.

R: The plane ax + by + cz +d=0 is parallel to x-axis if a = 0.

A. both A and R are true and R is the correct explanation of A

B. both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: D

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4. Statement-I : The point $A(3, 1, 6)$ is the miror image of the point $B(1, 3, 4)$ in the plane $x - y + z = 5$.

Statement-II : The plane $x - y + z = 5$ bisects the line segment joining $A(3, 1, 6)$ and $B(1, 3, 4)$

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-1

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: B

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