MATHS

BOOKS - TARGET MATHS (HINGLISH)

PLANE

Classical Thinking

1. The vector equation of a plane which is at a unit form the origin and which is normal to the vector $\hat{i} - 2\hat{j} + 3\hat{k}$ is

A. $\bar{r}.\left(\hat{i} - 2\hat{j} + 3\hat{k}\right) = 1$

B. $\bar{r}.\left(\hat{i} - 2\hat{j} + 3\hat{k}\right) = \sqrt{14}$

C. $\bar{r}.\left(\hat{i} + 2\hat{j} - 3\hat{k}\right) = 1$

D. $\bar{r}.\left(\hat{i} + 2\hat{j} - 3\hat{k}\right) = \sqrt{14}$

Answer: B

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2. The normal from of the vector equation $\bar{r}.\left(3\hat{i}-2\hat{j}+2\hat{k}\right)=14$ is

A. $\bar{r}.\left(\frac{3}{\sqrt{17}}\hat{i}-\frac{2}{\sqrt{17}}\hat{j}+\frac{2}{\sqrt{17}}\hat{k}\right)=12$

B. $\bar{r}.\left(3\hat{i}-2\hat{j}+2\hat{k}\right)=\frac{12}{\sqrt{17}}$

C. $\bar{r}.\left(\frac{3}{\sqrt{17}}\hat{i}-\frac{2}{\sqrt{17}}\hat{j}+\frac{2}{\sqrt{17}}\hat{k}\right)=\frac{12}{\sqrt{17}}$

D. $\bar{r}.\left(3\hat{i}-2\hat{j}+2\hat{k}\right)=12$

Answer: C

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3. The direction cosines of normal to the plane $\bar{r}.\left(2\hat{i}-3\hat{j}+\hat{k}\right)+9=0$

A. $2, \ -3, 1$

B. $\frac{2}{9\sqrt{14}}, \frac{-3}{9\sqrt{14}}, \frac{1}{9\sqrt{14}}$

C. $\frac{2}{9}, \frac{-3}{9}, \frac{1}{9}$

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

Answer: D

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4. If lx+my+nz=p is equation of a plane in normal form, then

A. $l^2 + m^2 + n^2 = 1$

B. l,m,n are direction cosines of normal to the plane

C. $p > 0$

D. All above

Answer: D

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5. Equation of XY-plane is

A. z=0

B. x=0

C. y=0

D. $ax + by + d = 0$

Answer: A

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6. The direction cosines of any normal to the plane XY-plane are

A. 0,0,1

B. 1,0,0

C. 1,1,0

D. 0,1,0

Answer: A

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7. If plane $ax + y + z = 7$ has equal intercepts on axes, then a is equal to

A. 7

B. $\frac{1}{7}$

C. 1

D. $\frac{1}{5}$

Answer: C

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8. Equation of plane passing through point (1,-1,2) and making equal intrcepts on co-ordinate axes is

A. x+y+z=1

B. x-y+2z=6

C. x+y+z=2

D. x+y+2z=6

Answer: C

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9. The vector equation of the plane perpendicular to the vector $3\hat{i}-2\hat{j}+3\hat{k}$ and passing through a pont having position vector $\hat{i}+\hat{j}+2\hat{k}$ is

A. $\bar{r}.\left(3\hat{i}-2\hat{j}+3\hat{k}\right)-7=0$

B. $\bar{r}.\left(\hat{i}+\hat{j}+2\hat{k}\right)-7=0$

C. $\bar{r}.\left(3\hat{i}-2\hat{j}+3\hat{k}\right)+7=0$

D. $\bar{r}.\left(\hat{i}+\hat{j}+2\hat{k}\right)+7=0$

Answer: A

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10. The equation of a plane passing through (0,1,-3) and having 1,2,4 as direction ratios of normal to the plane is

A. $\bar{r}.\left(\hat{j}-3\hat{k}\right)=-10$

B. $\bar{r}.\left(\hat{i}+2\hat{j}+4\hat{k}\right)=-10$

C. $\bar{r}.\left(\hat{j}-3\hat{k}\right)=10$

D. $\bar{r}.\left(\hat{i}+2\hat{j}+4\hat{k}\right)=10$

Answer: B

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11. The equation of a plane passing through (2,-1,1) and perpendicular to the line joining (2,3,-1) and (1,2,1) is

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

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

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

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

Answer: D

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12. The equation of the plane passing through (3,2,-1) and normal to the line joining the points (2,1,2) and (4,3,-1) is

A. 2x+2y+3z=13

B. 2x+2y+z=13

C. 2x+2y-3z=13

D. 4x+4y-6z=14

Answer: C

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13. The line draw from points (4,-1,2) to the points (-3,2,3)meets and a palne at right angle at the points (-10,5,4), then the equation of plane is

A. $7x - 3y + z + 89 = 0$

B. $7x - 3y - z + 89 = 0$

C. $7x + 3y + z + 89 = 0$

D. $7x - y + 3z = 89$

Answer: B

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14. If (1,2,-3) is the foot of the perpendicular drawn from origin on a plane, then equation of that plane is

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

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

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

D. $x - 3y - 2z = 7$

Answer: A

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15. The coordinate of the foot of perpendicular drawn from origin to a plane is (2,4,-3). The equation of the plane is

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

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

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

D. $2x + 4y + 3z = 29$

Answer: C

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16. The vector eqution of the plane passing through a point having position vector $\hat{i} - \hat{j} + \hat{k}$ and parallel to the vectors $2\hat{i} + \hat{j} + \hat{k}$ and $\hat{j} + 2\hat{k}$ is

A. $\bar{r}.\left(\hat{i} - 4\hat{j} - 2\hat{k}\right) = 7$

B. $\bar{r}.\left(\hat{i} + 4\hat{j} + 2\hat{k}\right) = 7$

C. $\bar{r}.\left(\hat{i} - 4\hat{j} - 2\hat{k}\right) = -7$

D. $\bar{r}.\left(\hat{i} - 4\hat{j} + 2\hat{k}\right) = 7$

Answer: D

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17. The equation of plane passing through (0,1,2) and parallel to the vectors $3\hat{i}+\hat{k}+\hat{k}$ and $-\hat{i}+2\hat{j}-5\hat{k}$ is

A. x+2y+z+4=0

B. x-2y-z-4=0

C. x-2y-z+4=0

D. x+2y-z+4=0

Answer: C

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18. The equation of plane passing through (1,2,-1) and containg the lines whose direction ratios are 2,1,3 and 4,1,2

A. x-5y+z+10=0

B. x-5y-z+10=0

C. x+5y+z+10=0

D. x+5y-z-10=0

Answer: A

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

A. 2x+4y+3z+16=0

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

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

D. 2x+4y-3z+16=0

Answer: C

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20. The vector equation of the plane $\bar{r} = \left(3\hat{i} + \hat{j}\right) + \lambda\left(-\hat{j} + \hat{k}\right) + \mu\left(\hat{i} + 2\hat{j} + 3\hat{k}\right)$ in scalar product form is

A. $\bar{r}.\left(-5\hat{i} + \hat{j} + \hat{k}\right) = -14$

B. $\bar{r}.\left(3\hat{i} + \hat{j}\right) = 14$

C. $\bar{r}.\left(\hat{i} + 2\hat{j} + 3\hat{k}\right) = 14$

D. $\bar{r}.\left(\hat{i} + 2\hat{j} + \hat{k}\right) = 14$

Answer: A

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

A. $\bar{r}.\left(\hat{i} - 11\hat{j} - 3\hat{k}\right) = 14$

B. $\bar{r}.\left(\hat{i} + 11\hat{j} + 3\hat{k}\right) = 14$

C. $\bar{r}.\left(\hat{i}-11\hat{j}-3\hat{k}\right)=-14$

D. $\bar{r}.\left(\hat{i}+11\hat{j}+3\hat{k}\right)=-14$

Answer: B

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22. vector equation of the plane passing through the points $(1,-2,5),(0,-5,-1)$ and $(-3,5,0)$ is

A. $\bar{r}.\left(3\hat{i}+\hat{j}-\hat{k}\right)=4$

B. $\bar{r}.\left(3\hat{i}+\hat{j}-\hat{k}\right)+4=0$

C. $\bar{r}.\left(3\hat{i}+\hat{j}+\hat{k}\right)+4=0$

D. $\bar{r}.\left(\hat{i}+3\hat{j}-\hat{k}\right)=4$

Answer: B

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23. The vector equation of a plane passing through three points $\hat{i}+\hat{j}-2\hat{k}, 2\hat{i}-\hat{j}+\hat{k}$ and $\hat{i}+2\hat{j}+\hat{k}$ is

A. $\bar{r}.\left(9\hat{i}-3\hat{j}-\hat{k}\right)=14$

B. $\bar{r}.\left(9\hat{i}+3\hat{j}-\hat{k}\right)=14$

C. $\bar{r}.\left(9\hat{i}+3\hat{j}+\hat{k}\right)=14$

D. $\bar{r}.\left(9\hat{i}+3\hat{j}-\hat{k}\right)=7$

Answer: B

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24. The equation of plane passing through (4,1,2),(1,-1,0) and origin is

A. 2x+2y+5z+10=0

B. 2x+2y-5z-10=0

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

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

Answer: D

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25. Find the cartesian equation of plane passing through the points $(1, 1, 1), (1, -1, 1)$ and $(-7, -3, -5)$.

A. 3x-4y+1=0

B. 3x+4y+1=0

C. 3x-4z+1=0

D. 3x-4y-1=0

Answer: C

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26. The vector of the plane passing through the intersection of the planes $\bar{r}.\left(\hat{i}-\hat{j}+2\hat{k}\right)=3$ and $\bar{r}.\left(3\hat{i}-\hat{j}-\hat{k}\right)=4$ is

A. $\bar{r}.\left(\hat{i}-\hat{j}+2\hat{k}\right)=3+4\lambda$

B. $\bar{r}.\left(3\hat{i}-\hat{j}+2\hat{k}\right)=3+4\lambda$

C. $\bar{r}.\left[(1+3\lambda)\hat{i}-(1+\lambda)\hat{j}+(2-\lambda)\hat{k}\right)]=3+4\lambda$

D. $\bar{r}.\left[(1+3\lambda)\hat{i}-(1+\lambda)\hat{j}+(2-\lambda)\hat{k}\right)]=3-4\lambda$

Answer: C

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27. The equation of the plane through the intersection of the planes $\bar{r}\cdot\left(\hat{i}+2\hat{j}+3\hat{k}\right)=-3, \bar{r}\cdot\left(\hat{i}+\hat{j}+\hat{k}\right)=4$ and the point (1,1,1) is

A. $\bar{r}\cdot\left(10\hat{i}+11\hat{j}+12\hat{k}\right)=39$

B. $\bar{r}\cdot\left(10\hat{i}+11\hat{j}+12\hat{k}\right)=33$

C. $\bar{r}\cdot\left(11\hat{i}+10\hat{j}-12\hat{k}\right)=46$

D. $\bar{r} \cdot \left(10\hat{i} + 11\hat{j} + 12\hat{k}\right) = 23$

Answer: B

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28. The vector equation of the plane passing through the intersection of the planes $\bar{r}.\left(3\hat{i} + 4\hat{j}\right) = 1$ and $\bar{r}.\left(\hat{i} - \hat{j} - \hat{k}\right) = 4$ and the point (1,2,-1) is

A. $\bar{r}.\left(11\hat{i} + 3\hat{j} + 5\hat{k}\right) = 11$

B. $\bar{r}.\left(11\hat{i} - 3\hat{j} - 5\hat{k}\right) = 11$

C. $\bar{r}.\left(11\hat{i} + 3\hat{j} + 5\hat{k}\right) = 22$

D. $\bar{r}.\left(11\hat{i} + 3\hat{j} - 5\hat{k}\right) = 22$

Answer: D

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29. The equation of the plane through the intersection of the planes $x + y + z = 1$ and $2x + 3y - z + 4 = 0$ and parallel to x-axis is

A. y-3z-6=0

B. y-3z+6=0

C. y-z-1=0

D. y-z+1=0

Answer: B

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30. Equation of plane parallel to plane 2x+4y+2z=5 and passing through the point (1,2,3) is

A. 2x+4y+2z=1

B. x+2y+z=8

C. x+2y+z=4

D. x+y+z=16

Answer: B

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31. The equation of the plane through the origin and parallel to the plane $3x - 4y + 5z - 6 = 0$ is (A) $3x - 4y - 5z - 6 = 0$ (B) $3x - 4y + 5z + 6 = 0$ (C) $3x - 4y_5z = 0$ (D) $3x + 4y - 5z + 6 = 0$

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

B. 3x+4y-5z+6=0

C. 3x-4y+5z+6=0

D. 3x-4y-5z=6

Answer: A

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32. Equation of plane parallel to ZX-plane and passing through the point (0,2,0) is

A. x=2

B. y=2

C. z=2

D. x+y=1

Answer: B

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33. Equation of the plane passing through (-1,3,4) and parallel to YZ-plane is

A. y=3

B. z=4

C. x+1=0

D. $y+z=3$

Answer: C

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34. The equation of a plane parallel to x-axis is

A. $ax+by+cz+d=0$

B. $ax+by+d=0$

C. $by+cz+d=0$

D. $ax+cz+d=0$

Answer: C

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35. The equation of the plane passing through (α, β, γ) and parallel to ax+by+cz=0 is

A. $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=\frac{a}{\alpha}+\frac{b}{\beta}+\frac{c}{\gamma}$

B. $ax+by+cz-\alpha x-\beta y+\gamma z=0$

C. $ax+by+cz=a\alpha-b\beta+c\gamma$

D. $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=a\alpha+b\beta+c\gamma$

Answer: C

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36. The equationof the plane passing through the origin and containing the line $\frac{x-1}{5}=\frac{y-2}{4}=\frac{z-3}{5}$ is (A) $x+5y-3z=0$ (B) $x-5y+3z=0$ (C) $x-5y-3z=0$ (D) $3x-10y+5z=0$

A. x+y-z=0

B. x-5y+3z=0

C. x+5y-5z=0

D. 2x+5y-6z=0

Answer: B

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37. The equation to the perpendicular from the point $(\alpha, \beta\gamma)$ to the plane $ax + by + cz + d = 0$ is

A. $a(x-\alpha) + b(y-\beta) + c(z-\gamma) = 0$

B. $\frac{x-\alpha}{a} = \frac{y-\beta}{b} = \frac{z-\gamma}{c}$

C. $a(x-\alpha) + b(y-\beta) + c(z-\gamma) = abc$

D. $\frac{x-a}{\alpha} = \frac{y-b}{\beta} = \frac{z-c}{\gamma}$

Answer: B

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38. Equation of the line passing through (1,1,1) and perpendicular to 2x-3y+z=5 is

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

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

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

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

Answer: D

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39. The equation of the line passing though the point $(1, 1, -1)$ and perpendicular to the plane $x-2y-3z=7$ is :

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

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

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

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

Answer: C

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40. Equation of a line passing through point (1,2,3) and perpendicular to YZ-plane is

A. $\frac{x-1}{1}=\frac{y-1}{1}=\frac{z-3}{0}$

B. $\frac{x-1}{1}=\frac{y-2}{0}=\frac{z-3}{0}$

C. $\frac{x-1}{0}=\frac{y-2}{1}=\frac{z-3}{1}$

D. $\frac{x-1}{0}=\frac{y-2}{0}=\frac{z-3}{1}$

Answer: B

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41. Equation of a line passing through point (1,2,3) and parallel to XZ-plane is

A. $\frac{x-1}{a}=\frac{y-2}{0}=\frac{z-3}{0}$

B. $\frac{x-1}{0}=\frac{y-2}{b}=\frac{z-3}{c}$

C. $\frac{x-1}{a}=\frac{y-2}{b}=\frac{z-3}{0}$

D. $\frac{x-1}{a}=\frac{y-2}{0}=\frac{z-3}{c}$

Answer: D

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42. Equation of the line passing through $(1,1,1)$ and parallel to the plane $2x+3y+z+5=0$ is

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

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

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

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

Answer: A

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43. The value of k such that $\frac{x-4}{1}=\frac{y-2}{1}=\frac{z-k}{2}$ lies in the plane $2x-4y=z=7$ is a. 7 b. -7 c. no real value d. 4

A. 7

B. -7

C. no real value

D. 4

Answer: A

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44. The angle between the planes

$\vec{r}.\left(2\hat{i}-\hat{j}+\hat{k}\right)=6$ and $\vec{r}.\left(\hat{i}+\hat{j}+2\hat{k}\right)=5$ is

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

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

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

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

Answer: C

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45. The angle between the planes x+2y-3z+5=0 and 4x+y+2z+3=0 is

A. 0

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

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

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

Answer: D

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46. Two planes $\bar{r}_1.\bar{n}_1 = p_1$ and $\bar{r}_2.\bar{n}_2 = p_2$ are parallel if

A. $\bar{n}_1.\bar{n}_2 = 1$

B. $\bar{n}_1.\bar{n}_2 = 0$

C. $\bar{n}_1 = \lambda\bar{n}_2$

D. $\bar{n}_1 - \bar{n}_2 = 0$

Answer: C

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47. If the angle between the normal to the planes is $\frac{\pi}{2}$, then

A. $\bar{n}_1 . \bar{n}_2 = 1$

B. $\bar{n}_1 . \bar{n}_2 = 0$

C. $\bar{n}_1 = \lambda \bar{n}_2$

D. $\bar{n}_1 - \bar{n}_2 = 0$

Answer: B

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48. If planes $ax + by + cz + d = 0$ and $a'x + b'y + c'z + d' = 0$ are perpendicular, then

A. $aa' + \prime + ' + dd' = 0$

B. $aa' + \prime + ' = 0$

C. $\frac{a}{a'} = \frac{b}{b'} = \frac{c}{c'}$

D. $\frac{a}{a'} + \frac{b}{b'} + \frac{c}{c'} = 0$

Answer: B

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49. In space 2y+3z=0 represents

A. a plane passing through X-axis

B. a plane passing through Y-axis

C. a plane passing through Z-axis

D. none of these

Answer: A

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50. The angle between the line $\bar{r} = \left(2\hat{i} + 3\hat{j} + \hat{k}\right) + \lambda\left(\hat{i} + 2\hat{j} - \hat{k}\right)$ and the plane $\bar{r}.\left(2\hat{i} - \hat{j} + \hat{k}\right) = 4$ is

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

B. $\sin^{-1}\left(\frac{1}{6}\right)$

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

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

Answer: B

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51. The acute angle between the line $\bar{r} = \left(3\hat{i} - \hat{j} - \hat{k}\right) + \lambda\left(\hat{i} - \hat{j} + \hat{k}\right)$ and the plane $\bar{r}.\left(3\hat{i} - 4\hat{k}\right) = 4$ is

A. $\sin^{-1}\left(\frac{1}{5\sqrt{3}}\right)$

B. $\sin^{-1}\left(\frac{-1}{5\sqrt{3}}\right)$

C. $\cos^{-1}\left(\frac{1}{5\sqrt{3}}\right)$

D. $\cos^{-1}\left(\frac{-1}{5\sqrt{3}}\right)$

Answer: A

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52. The angle between the line $\frac{x}{2} = \frac{y}{3} = \frac{z}{4}$ and the plane 3x+2y-3z=4 is

A. 45°

B. 0°

C. $\cos^{-1}\left(\frac{24}{\sqrt{29}\sqrt{22}}\right)$

D. 90°

Answer: B

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53. Find the angle between the line $\frac{x+1}{3} = \frac{y-1}{2} = \frac{z-1}{4}$ and the plane $2x + y - 3z + 4 = 0$.

A. 30°

B. $\cos^{-1}\left(\frac{4}{\sqrt{406}}\right)$

C. $\sin^{-1}\left(\frac{-4}{\sqrt{406}}\right)$

D. 60°

Answer: C

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54. The angle between the plane ax+by+cz+d=0 and the line $\frac{x-1}{a}=\frac{y-2}{b}=\frac{z-3}{c}$ is

A. 45°

B. 60°

C. 90°

D. $\cos ec^{-1}\sqrt{a^2+b^2+c^2}$

Answer: C

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55. The angle between the line 6x=4y=3z and the plane 3x+2y-3z=4 is

A. 45°

B. 0°

C. 90°

D. $\cos^{-1}\left(\frac{24}{\sqrt{27}\sqrt{22}}\right)$

Answer: B

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56. The line $\frac{x-x_1}{a_1}=\frac{y-y_1}{b_1}=\frac{z-z_1}{c_1}$ is parallel to the plane ax+by+cz+d=0 if

A. $\frac{a_1}{a}=\frac{b_1}{b}=\frac{c_1}{c}$

B. $aa_1+\_1+\_1=1$

C. $aa_1+\_1+\_1=0$

D. $a_1b_1c_1 = a_2b_2c_2$

Answer: C

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57. If the line $\bar{r} = \hat{i} + \lambda\left(2\hat{i} - m\hat{j} - 3\hat{k}\right)$ is parallel to the plane $\bar{r}.\left(m\hat{i} + 3\hat{j} + \hat{k}\right) = 0$, then m is equal to

A. 3

B. -3

C. 1

D. -1

Answer: B

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58. IF the line $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z}{4}$ and origin lie on the plane 4x+4y-kz=0, then k=

A. 1

B. 3

C. 5

D. 7

Answer: C

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59. The distance of the point (2,3,4) from the plane $\bar{r}\cdot\left(3\hat{i}-2\hat{j}+6\hat{k}\right)=5$ is

A. $\frac{18}{7}$

B. $\frac{19}{7}$

C. $\frac{17}{7}$

D. $\frac{16}{7}$

Answer: B

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60. Distance of plane x+y+z=3 from origin is

A. 3

B. $\sqrt{3}$

C. $\frac{1}{\sqrt{3}}$

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

Answer: B

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61. What is the distance of the point (2,3,4) from the plane $3x - 6y + 2z + 11 = ?$

A. 9

B. 10

C. 2

D. 1

Answer: D

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62. A plane makes 2,1,-2 intercepts on co-ordinate axes. Its distance from the origin is

A. 3

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

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

D. $\sqrt{6}$

Answer: C

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63. If a plane cuts intercepts -6,3,4 on the co-ordinate axes, then the length of the perpendicular form the origin to the plane is

A. $\frac{1}{\sqrt{61}}$

B. $\frac{13}{\sqrt{61}}$

C. $\frac{12}{\sqrt{29}}$

D. $\frac{5}{\sqrt{41}}$

Answer: C

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64. If the distance of the point (1,1,1) from the origin is half its distance from the plane $x + y + z + k = 0$, then k is equal to

A. ± 3

B. ± 6

C. $-3, 6$

D. $3, \ -9$

Answer: D

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

A. 0

B. 1

C. 2

D. 3

Answer: B

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66. The distance between the line $\frac{x-1}{3}=\frac{y+2}{-2}=\frac{z-1}{2}$ and the plane 2x+2y-z=6 is

A. 9

B. 1

C. 2

D. 3

Answer: D

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67. Show that the distance between planes $2x - 2y + z + 3 = 0$ and $4x - 4y + 2z + 5 = 0 is \frac{1}{6}$

A. $\frac{1}{11}$

B. $\frac{1}{\sqrt{6}}$

C. $\frac{1}{12}$

D. $\frac{1}{6}$

Answer: D

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68. Find the distance between the planes $x + 2y + 3z + 7 - 0$ and $2x + 4y + 6z + 7 = 0.$

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

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

C. $\frac{\sqrt{7}}{2}$

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

Answer: A

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69. The equation of the planes which conatains lines $\frac{x-1}{1}=\frac{y+2}{2}=\frac{z-3}{1}$ and $\frac{x-4}{1}=\frac{y}{2}=\frac{z+1}{1}$ is

A. $10x-7y+4z-36=0$

B. $10x+7y-4z+36=0$

C. $10x-7y-4z-36=0$

D. $10x-7y-4z+36=0$

Answer: A

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70. The equation of the plane containing lines $\bar{r} = \hat{i} + 2\hat{j} - \hat{k} + \lambda\left(\hat{i} + 2\hat{j} - \hat{k}\right)$ and $\bar{r} = \hat{i} + 2\hat{j} - \hat{k} + \mu\left(\hat{i} + \hat{j} + 3\hat{k}\right)$ is

A. $\bar{r} \cdot \left(7\hat{i} - 4\hat{j} - \hat{k}\right) = 0$

B. $7(x-1) - 4(y-1) - (z+3) = 0$

C. $\bar{r} \cdot \left(\hat{i} + 2\hat{j} - 3\hat{k}\right) = 0$

D. $\bar{r} \cdot \left(\hat{i} + \hat{j} + \hat{k}\right) = 0$

Answer: A

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Critical Thinking

1. A variable plane passes through a fixed point (α, β, γ) and meets the axes at $A, B, andC$. show that the locus of the point of intersection of

the planes through $A, BandC$ parallel to the coordinate planes is $\alpha x^{-1} + \beta y^{-1} + \gamma z^{-1} = 1.$

A. $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 2$

B. $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 1$

C. $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = -2$

D. $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = -1$

Answer: B

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2. Equation of a plane passing through (1,1,1) and containg X-axis is

A. x-y=0

B. x-z=0

C. y-z=0

D. x+y+z=3

Answer: C

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3. Equation of the plane passing through points (1,-1,3) and (2,3,-4) and parallel to X-axis is

A. 7y+4z+5=0

B. 7y+4z-5=0

C. 7y-4z-5=0

D. 7y-4z+5=0

Answer: B

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4. The equation of plane passing through mid-point of the joining $\hat{i}+2\hat{j}+4\hat{k}$ and $-\hat{i}+2\hat{j}-6\hat{k}$ and perpendicular to it is

A. $\bar{r}.\left(\hat{i}-5\hat{k}\right)-10=0$

B. $\bar{r}.\left(\hat{i}-5\hat{k}\right)+10=0$

C. $\bar{r}.\left(\hat{i}+5\hat{k}\right)-10=0$

D. $\bar{r}.\left(\hat{i}+5\hat{k}\right)+10=0$

Answer: D

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5. Equation of the plane passing through point P(a,b,c) and perpendicular to OP is

A. $ax+by+cz=a+b+c$

B. $ax+by+cz=a^2+b^2+c^2$

C. $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=3$

D. $ax+by+cz=(a+b+c)^2$

Answer: B

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6. Equation of the plane which bisects the line segment joining (-1,2,3) and (3,-5,6) perpendicularly, is

A. 4x+2y-3z=28

B. 4x-7y-3z=28

C. 4x-7y+3z=28

D. 4x-7y-3z=8

Answer: C

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7. The intercepts made on the axes by the plane the which bisects the line joining the points $(1, 2, 3)$ and $(-3, 4, 5)$ at right angles are a. $\left(-\frac{9}{2}, 9, 9\right)$ b. $\left(\frac{9}{2}, 9, 9\right)$ c. $\left(9, -\frac{9}{2}, 9\right)$ d. $\left(9, \frac{9}{2}, 9, \right)$

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

B. $\left(\frac{9}{2}, 9, 9\right)$

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

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

Answer: A

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8. The equation of the plane through the points (2,-1,0), (3,-4,5) parallel to a line with direction cosines proportional to 2,3,4 is 9x-2y-3z=k, where k is

A. 20

B. -20

C. 10

D. -10

Answer: A

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9. If the vector equation of a plane passing through three points $(1, 0, z_1), (1, -1, 1),$ and $(4, -3, 2)$ is $\bar{r}.\left(-\hat{i}+3\hat{k}\right)=2,$ then the value of z_1 is

A. 0

B. 1

C. -1

D. 3

Answer: B

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10. The equation of the plane passing through the points $(3, 2, -1), (3, 4, 2)$ and $(7, 0, 6)$ is $5x + 3y - 2z = \lambda$, where λ is :

A. 23

B. 21

C. 19

D. 27

Answer: A

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11. The equation of the plane which contains the origin and the line of intersectio of the plane $\vec{r} . \vec{a} = d_1$ and $\vec{r} . \vec{b} = d_2$ is

A. $\bar{r} . \left(p\bar{a} - q\bar{b}\right) = 0$

B. $\bar{r} . \left(q\bar{a} - p\bar{b}\right) = 0$

C. $\bar{r} . \left(p\bar{a} + q\bar{b}\right) = 0$

D. $\bar{r}.\left(q\bar{a}+p\bar{b}\right)=0$

Answer: B

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12. The line of intersection of the planes $\bar{r}.\left(3\hat{i}-\hat{j}+\hat{k}\right)=1$ and $\bar{r}.\left(\hat{i}+4\hat{j}-2\hat{k}\right)=2$ is parallel to the vector

A. $-2\hat{i}-7\hat{j}+3\hat{k}$

B. $2\hat{i}+7\hat{j}-13\hat{k}$

C. $2\hat{i}+7\hat{j}+13\hat{k}$

D. $-2\hat{i}+7\hat{j}+13\hat{k}$

Answer: D

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13. The equation of the plane through the intersection of plane x+2y+3z-4=0 and 2x+y-z+5=0 and perpendicular to plane 5x+3y-6z+8=0 is

A. $33x + 45y + 50z - 41 = 0$

B. $33x + 50y + 45z - 41 = 0$

C. $33x + 45y + 50z + 41 = 0$

D. $45x + 33y + 50z - 41 = 0$

Answer: A

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14. The equation of a plane passing through origin and perpendicular to the line x=2y=3z is

A. x+2y+3z=0

B. 3x+2y+z=0

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

D. 6x-3y+2z=0

Answer: C

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15. The equation of the plane passing through Z-axis and perpendicular to line $\frac{x-1}{\cos\theta}=\frac{y+2}{\sin\theta}=\frac{z-3}{0}$ is

A. $y+x\tan\theta=0$

B. $x+y\tan\theta=0$

C. $y+z\tan\theta=0$

D. $x+z\tan\theta=0$

Answer: B

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16. Equation of plane which contains the line $\frac{x-1}{1}=\frac{y-2}{3}=\frac{z-3}{2}$ and which is perpendicular to the plane 2x+7y+5z=2, is

A. $x+y+z=6$

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

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

D. $x-y+z=2$

Answer: D

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17. The equation of the plane passing through $A(x_1, y_1, z_1)$ and containg the line $\frac{x=x_2}{d_1}=\frac{y=y_2}{d_2}=\frac{z=z_2}{d_3}$ is

A. $\begin{vmatrix} x+x_1 & y+y_1 & z+z_1 \\ x_2+x_1 & y_2+y_1 & z_2+z_1 \\ d_1 & d_2 & d_3 \end{vmatrix}=0$

B. $\begin{vmatrix} x-x_1 & y-y_1 & z-z_1 \\ x_2-x_1 & y_2-y_1 & z_2-z_1 \\ d_1 & d_2 & d_3 \end{vmatrix}=0$

C. $\begin{vmatrix} x-d_1 & y-d_2 & z-d_3 \\ x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \end{vmatrix} = 0$

D. $\begin{vmatrix} x & y & z \\ x_1-x_2 & y_1-y_2 & z_1-z_2 \\ d_1 & d_2 & d_2 \end{vmatrix} = 0$

Answer: B

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18. Find the equation of a line passing through the point $\left(2\hat{i}-3\hat{j}-5\hat{k}\right)$ and perpendicular to the plane $\vec{r}.\left(6\hat{i}-3\hat{j}+5\hat{k}\right)+2=0$. Also find the point of intersection of this line and the plane.

A. $\bar{r}=6\hat{i}-3\hat{j}+5\hat{k}+\lambda\left(2\hat{i}+3\hat{j}-5\hat{k}\right)$

B. $\bar{r}=\left(6\hat{i}-3\hat{j}+5\hat{k}\right)+\lambda\left(2\hat{i}-3\hat{j}-5\hat{k}\right)$

C. $\bar{r}=\left(2\hat{i}-3\hat{j}-5\hat{k}\right)+\lambda\left(6\hat{i}+3\hat{j}-5\hat{k}\right)$

D. $\bar{r}=\left(2\hat{i}-3\hat{j}-5\hat{k}\right)+\lambda\left(6\hat{i}-3\hat{j}+5\hat{k}\right)$

Answer: D

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19. Find the vector equation of a line passing through $3\hat{i} - 5\hat{j} + 7\hat{k}$ and perpendicular to theplane $3x - 4y + 5z = 8$.

A. $\bar{r} = 3\hat{i} - 5\hat{j} + 7\hat{k} + \lambda\left(3\hat{i} - 4\hat{j} + 5\hat{k}\right)$

B. $\bar{r} = 3\hat{i} - 4\hat{j} + 5\hat{k} + \lambda\left(3\hat{i} - 5\hat{j} + 7\hat{k}\right)$

C. $\bar{r} = 3\hat{i} + 5\hat{j} - 7\hat{k} + \lambda\left(3\hat{i} - 4\hat{j} - 5\hat{k}\right)$

D. $\bar{r} = 3\hat{i} + 4\hat{j} - 5\hat{k} + \mu\left(3\hat{i} + 5\hat{j} + 7\hat{k}\right)$

Answer: A

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20. The equation of a line passing through point (1,2,3) and perpendicular to the plane x+2y-5z+9=0 are

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

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

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

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

Answer: A

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21. The equation of the line passing through $(1, 2, 3)$ and parallel to the planes $x - y + 2z = 5$ and $3x + y + z = 6$ is.

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

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

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

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

Answer: A

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22. If the angle between the planes $\bar{r}.\left(x\hat{i}+\hat{j}-\hat{k}\right)=4$ and $\bar{r}.\left(\hat{i}+x\hat{j}+\hat{k}\right)=-1$ is $\frac{\pi}{3}$, then the value of x is

A. 2

B. 0

C. -2

D. 4

Answer: A

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23. For any four points O(0,0,0),P(1,2,1),Q(2,3,0),R(0,1,-1), the angle between the planes OPQ and PQR is

A. $\cos^{-1}\left(\frac{5}{\sqrt{28}}\right)$

B. $\sin^{-1}\left(\frac{5}{\sqrt{28}}\right)$

C. $\cos^{-1}\left(\frac{5}{\sqrt{14}}\right)$

D. $\sin^{-1}\left(\frac{5}{\sqrt{14}}\right)$

Answer: A

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24. The active angle between the plane 2x+3y-z+7=0 and X-axis is

A. $\cos^{-1}\left(\frac{2}{\sqrt{14}}\right)$

B. $\cos^{-1}\left(\frac{-2}{\sqrt{14}}\right)$

C. $\sin^{-1}\left(\frac{2}{\sqrt{14}}\right)$

D. $\sin^{-1}\left(\frac{-2}{\sqrt{14}}\right)$

Answer: C

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25. If the angle between the line $\frac{x-1}{1}=\frac{y-2}{k}=\frac{z+3}{4}$ and the plane x-3y+2z+5=0 is $\sin^{-1}\left(\frac{3}{7\sqrt{6}}\right)$, the value of k is

A. 2

B. -2

C. 1

D. -1

Answer: A

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26. Equation of a line and plane are respectively $\frac{x-1}{2}=\frac{y}{3}=\frac{z-3}{2}$ and 4x-2y-z=1. Then

A. line is parallel to the plane

B. line is perpendicular to the plane

C. line lies in the plane

D. none of these

Answer: C

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27. Equation of a line and a plane are respectively $\frac{x+3}{2}=\frac{y-4}{3}=\frac{z+5}{1}$ and 2x-3y+5z=1. Then

A. line lies in the plane

B. line is parallel to the plane

C. line is perpendicular to the plane

D. none of these

Answer: B

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28. If line $\frac{x-3}{2}=\frac{y-4}{3}=\frac{z-5}{4}$ lines in the plane 4x+4y-cz-d=0, then values of c,d are

A. 5,3

B. 4,8

C. $-4,\ -8$

D. $-5,\ -3$

Answer: A

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29. If the line $\frac{x-1}{2}=\frac{y-1}{3}=\frac{z+2}{2}$ lies in the plane x+By-3z+D=0, then the values of B and D are

A. $\frac{4}{3},\frac{-25}{3}$

B. $\frac{-4}{3},\frac{-25}{3}$

C. $\frac{3}{4}, \frac{25}{4}$

D. $\frac{-3}{4}, \frac{-25}{4}$

Answer: A

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30. Find the vector equation of the plane in which the lines $\vec{r} = \hat{i} + \hat{j} + \lambda\left(\hat{i} + 2\hat{j} - \hat{k}\right)$ and $\vec{r} = \left(\hat{i} + \hat{j}\right) + \mu\left(-\hat{i} + \hat{j} - 2\hat{k}\right)$ lie.

A. $\bar{r}.\left(\hat{i} + \hat{j} + \hat{k}\right) = 0$

B. $\bar{r}.\left(\hat{i} - \hat{j} + \hat{k}\right) = 0$

C. $\bar{r}.\left(\hat{i} + \hat{j} - \hat{k}\right) = 0$

D. $\bar{r}.\left(-\hat{i} + \hat{j} + \hat{k}\right) = 0$

Answer: D

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31. The equation of the plane containing lines $\frac{x}{1}=\frac{y-2}{2}=\frac{z+3}{3}$ and $\frac{x-2}{2}=\frac{y-6}{3}=\frac{z-3}{4}$ is

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

B. x-2y+z=7

C. x+2y-z=7

D. x-2y+z=0

Answer: A

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32. Find the equation of the plane containing the lines $\frac{x-5}{4}=\frac{y-7}{4}=\frac{z+3}{-5} and \frac{x-8}{7}=\frac{y-4}{1}=\frac{z-5}{3}.$

A. 17x-47y-24z+172=0

B. 17x+47y-24z+172=0

C. 17x+47y+24z+172=0

D. 17x-47y+24z+172=0

Answer: A

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33. The plane containing lines $\frac{x+1}{3}=\frac{y+3}{5}=\frac{z+5}{7}$ and $\frac{x-2}{1}=\frac{y-4}{4}=\frac{z-6}{7}$ passes through

A. (0,0,0)

B. (1,0,1)

C. (1,-1,1)

D. (-1,1,0)

Answer: A

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34. If lines $\frac{x+l}{3}=\frac{y+3}{5}=\frac{z+5}{7}$ and $\frac{x-2}{1}=\frac{y-4}{3}=\frac{z-6}{5}$ are coplanar, then l is equal to

A. 0

B. 1

C. 2

D. 3

Answer: B

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35. If the lines $\frac{x-2}{1}=\frac{y-4}{4}=\frac{z-6}{k}$ and $\frac{x+1}{3}=\frac{y+3}{5}=\frac{z+5}{7}$ are coplanar, then the value of k is

A. 7

B. 3

C. -3

D. -7

Answer: A

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36. The lines $\frac{x-3}{1}=\frac{y-1}{2}=\frac{z-3}{-\lambda}$ and $\frac{x-1}{\lambda}=\frac{y-2}{3}=\frac{z-1}{4}$ are coplanar, if value of λ is

A. 2

B. 13

C. -13

D. no real value exists

Answer: D

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37. Lines $\frac{x}{1}=\frac{y-2}{2}=\frac{z+3}{3}$ and $\frac{x-2}{2}=\frac{y-6}{3}=\frac{z-3}{4}$ are

A. parallel

B. perpendicular

C. coplanar

D. non-coplanar

Answer: C

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38. If product of distance of point (1,2,-1) from planes 2x-3y+z+k=0 and x+2y+3z=0 is 1, then k is equal to

A. 12

B. 14

C. 10

D. 8

Answer: A

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39. If P_1 and P_2 are the lenghts of the perpendicular from the points (2,3,4) and (1,1,4) respectively from the plane 3x-6y+2z+11=0, then P_1 and P_2 are the roots of the equation

A. $P^2 - 23P + 7 = 0$

B. $7P^2 - 23P + 16 = 0$

C. $P^2 - 17P + 16 = 0$

D. $P^2 - 16P + 7 = 0$

Answer: B

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40. Find the equation of a plane which is parallel to the plane $x - 2y + 2z = 5$ and whose distance from thepoint $(1, 2, 3)$ is 1.

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

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

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

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

Answer: C

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41. Find the locus of a point, the sum of squares of whose distances from the planes $x - z = 0, x - 2y + z = 0$ and $x + y + z = 0$ is 36.

A. $x^2 + y^2 + z^2 = 6$

B. $x^2 + y^2 + z^2 = 36$

C. $x^2 + y^2 + z^2 = 216$

D. $x^2 + y^2 + z^2 = \frac{1}{36}$

Answer: B

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42. If p_1, p_2, p_3 denote the distance of the plane 2x-3y+4z+2=0 from the planes 2x-3y+4z+6=0, 4x-6y+8z+3=0 and 2x-3y+4z-6=0 respectively, then

A. $p_1 + 8p_2 - p_1 = 0$

B. $p_2^3 = 16p_2^2$

C. $8p_2^2 = p_1^2$

D. $p_1 + 2p_2 + 3p_3 = \sqrt{29}$

Answer: A

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43. A plane meets the co-ordinate axes at A,B,C such that the centroid of the triangle is (3,3,3). The eqation of the plane is

A. $9x + 9y + 9z = 1$

B. $x + y + z = 3$

C. $3x + 3y + 3z = 1$

D. $x + y + z = 9$

Answer: D

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44. A plane meets the co-ordinate axes at A,B,C and (α, β, γ) is the centroid of the triangle ABC. Then the equation of the plane is

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

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

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

D. $\frac{3x}{\alpha}+\frac{3y}{\beta}+\frac{3z}{\gamma}=1$

Answer: C

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45. If plane 6x-3y+2z-18 meets co-ordinate axes at points A,B,C, then centroid of $\triangle ABC$ is

A. (1,2,3)

B. (-1,2,3)

C. (1,-2,3)

D. (1,2,1)

Answer: C

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46. The plane $ax + by + cz = 1$ meets the coordinate axes in A, B, C. The centroid of ΔABC is

A. $\left(\frac{a}{3}, \frac{b}{3}, \frac{c}{3}\right)$

B. $\left(\frac{3}{a}, \frac{3}{b}, \frac{3}{c}\right)$

C. $\left(\frac{1}{3a}, \frac{1}{3b}, \frac{1}{3c}\right)$

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

Answer: C

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47. A plane a constant distance p from the origin meets the coordinate axes in A, B, C. Locus of the centroid of the triangle ABC is

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

B. $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = \frac{9}{p^2}$

C. $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = \frac{2}{p^2}$

D. $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{4}{p^2}$

Answer: B

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48. Foot of perpendicular of point (2,2,2) in the plane x+y+z=9 is

A. (1,1,1)

B. (3,3,3)

C. (9,0,0)

D. (2,6,1)

Answer: B

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49. The plane passing through the point $(5, 1, 2)$ perpendicular to the line $2(x-2) = y-4 = z-5$ will meet the line in the point :

A. (1,2,3)

B. (2,3,1)

C. (1,3,2)

D. (3,2,1)

Answer: A

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50. The equation of the plane passing through the intersection of the planes $2x - 5y + z = 3$ and $x + y + 4z = 5$ and parallel to the plane $x + 3y + 6z = 1$ is $x + 3y + 6z = k$, where k is

A. 5

B. 3

C. 7

D. 2

Answer: C

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51. The plane $4x + 7y + 4z + 81 = 0$ is rotated through a right angle about its line of intersection with the plane $5x + 3y + 10z = 25$. If the equation of the plane in its new position is $x - 4y + 6z = K$, then the value of K is

A. 106

B. -89

C. 73

D. 37

Answer: A

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52. Equation of a plane bisecting the angle between the planes 2x-y+2z+3=0 and 3x-2y+6z+8=0 is

A. 5x-y-4z-45=0

B. 5x-y-4z-3=0

C. 23x+13y+32z-45=0

D. 23x-13y+32z+5=0

Answer: B

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53. The line $\frac{x+3}{3} = \frac{y-2}{-2} = \frac{z+1}{1}$ and the plane 4x+5y+3z-5=0 intersect at a point

A. (3,1,-2)

B. (3,-2,1)

C. (2,-1,3)

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

Answer: B

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54. The point at which the line joining the points $(2, -3, 1)$ and $(3, -4, -5)$ intersects the plane $2x + y + z = 7$ is

A. (1,2,7)

B. (1,-2,7)

C. (-1,2,7)

D. (1,-2,-7)

Answer: B

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55. Find the distance of the point of intersection of the line $\frac{x-3}{1}=\frac{y-4}{2}=\frac{z-5}{2}$ and the plane $x+y+z=17$ from the point $(3,4,5)$.

A. 3

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

C. $\sqrt{3}$

D. None of these

Answer: A

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

A. $\frac{7}{6}$

B. $\frac{6}{7}$

C. 1

D. 2

Answer: C

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57. Equation of the plane parallel to the planes

$x + 2y + 3z - 5 = 0, \quad x + 2y + 3z - 7 = 0$ and equidistant from them is

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

B. $x + 2y + 3z = 1$

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

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

Answer: A

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58. Equation of plane equidistant form planes $3x+4y+5z-6=0$ and $3x+4y+5z+6=0$ is

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

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

C. $3x+4y+5z=12$

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

Answer: A

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Competative Thinking

1. The vector equation of the plane which is at distance of $\frac{3}{\sqrt{14}}$ form the origin and the normal form the origin is $2\hat{i}-3\hat{j}+\hat{k}$ is

A. $\bar{r}.\left(\hat{i}+\hat{j}+\hat{k}\right)=9$

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

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

D. $\bar{r}.\left(\hat{i}+2\hat{j}\right)=3$

Answer: C

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2. The equation of the plane through (-1,1,2), whose normal makes equal acute angles with coordinate axes is

A. $\bar{r}\cdot\left(\hat{i}+\hat{j}+\hat{k}\right)=2$

B. $\bar{r}\cdot\left(\hat{i}+\hat{j}+\hat{k}\right)=6$

C. $\bar{r} \cdot \left(3\hat{i} - 3\hat{j} + 3\hat{k}\right) = 2$

D. $\bar{r} \cdot \left(\hat{i} - \hat{j} + \hat{k}\right) = 3$

Answer: A

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3. The direction cosines of the normal to the plane

$x + 2y - 3z + 4 = 0$ are

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: D

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4. If the normal of the plane makes angles $\frac{\pi}{4}, \frac{\pi}{4}$ and $\frac{\pi}{2}$ with positive X-axis, Y-axis and Z-axis respectively and the length of the perpendicular line segment form origin to the plane is $\sqrt{2}$, then the equation of the plane is .....

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

B. $x+y=2$

C. $x+y+z=1$

D. $x=\sqrt{2}$

Answer: C

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5. The equation of the plane through $(1, 2, -3)$ and $(2, -2, 1)$ and parallel to X-axis is

A. y-z+1=0

B. y-z-1=0

C. y+z-1=0

D. y+z+1=0

Answer: D

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6. The equation of the plane through $(2, 3, 4)$ and parallel to the plane $x + 2y + 4z = 25$ is :

A. x+2y+4z=10

B. x+2y+4z=3

C. x+y+2z=2

D. x+2y+4z=24

Answer: D

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7. The equation of the plane passing through (2,3,4) and parallel to the plane 5x-6y+7z=3 is

A. 5x-6y+7z+20=0

B. 5x-6y+7z-20=0

C. $-5x+6y-7z-3=0$

D. 5x+6y+7z+3=0

Answer: B

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

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

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

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

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

Answer: D

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9. The intercepts of the plane $5x - 3y + 6z - 60 = 0$ on the coordinate axes are

A. (10,20,-10)

B. (10,-20,12)

C. (12,-20,10)

D. (12,20,-10)

Answer: C

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10. If the plane $x - 3y + 5z = d$ passes through the point $(1, 2, 4)$, then the intercepts cut by it on the axes of x, y, z are respectively-

A. $(15, -5, 3)$

B. $(1, -5, 3)$

C. $(-15, 5, -3)$

D. $(1, -6, 20)$

Answer: A

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11. A plane pi makes intercepts 3 and 4 respectively on z-axis and x-axis. If pi is parallel to y-axis, then its equation is (A) $3x - 4z = 12$ (B) $3z + 4z = 12$ (C) $3y + 4z = 12$ (D) $3z + 4y = 12$

A. 3x+4z=12

B. 3z+4x=12

C. 3y+4z=12

D. 3z+4y=12

Answer: A

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12. The equation of a plane which cuts equal intercepts of unit length on the axes is

A. x+y+z=0

B. z+y+z=1

C. x+y-z=1

D. $\frac{x}{a}+\frac{y}{a}+\frac{z}{a}=1$

Answer: B

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13. If a plane has x-intercept l, y-intercept m and z-intercet n, and perpendicular distance of plane from origin is k, then

A. $\frac{1}{l^2}+\frac{1}{m^2}+\frac{1}{n^2}=k^2$

B. $\frac{1}{l^2}+\frac{1}{m^2}+\frac{1}{n^2}=\frac{1}{k^2}$

C. $l^2+m^2+n^2=\frac{1}{k^2}$

D. $l^2+m^2+n^2=k^2$

Answer: B

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14. The equation of the plane which bisects the line joining $(2, 3, 4)$ and $(6, 7, 8)$

A. x+y+z+15=0

B. x-y-z-15=0

C. x-y+z-15=0

D. x+y+z-15=0

Answer: D

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15. If the foot of the perpendicular from $O(0, 0, 0)$ to a plane is $P(1, 2, 2)$. 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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16. If the foot of the perpendicular drawn from the origin to a plane is (1,2,3), then a point on the plane is

A. (3,2,1)

B. (7,2,1)

C. (7,3,-1)

D. (6,-3,4)

Answer: B

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17. Find the co-ordinate of the foot of the perpendicular drawn form the origin to the plane 5y+8=0

A. $\left(0, \frac{8}{5}, 0\right)$

B. $\left(0, -\frac{8}{5}, 0\right)$

C. $\left(0, -\frac{18}{5}, 2\right)$

D. $\left(\frac{8}{25}, 0, 0\right)$

Answer: B

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18. If P be the point $(2, 6, 3)$ then the equation of the plane through P, at right angles to OP, where 'O' is the origin is

A. 2x+6y+3z=7

B. 2x-6y+3z=7

C. 2x+6y-3z=49

D. 2x+6y+3z=49

Answer: D

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19. The equation of the plane passng throuogh (1,1,1) and (1,-1,-1) and perpendicular to $2x - y + z + 5 = 0$ is (A) $2x + 5y + z - 8 = 0$ (B) $x + y - z - 1 = 0$ (C) $2x + 5y + z + 4 = 0$ (D) $x - y + z - 1 = 0$

A. 2x+5y+z-8=0

B. x+y-z-1=0

C. 2x+5y+z+4=0

D. x-y+z-1=0

Answer: B

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20. Equation of the plane through $(- 2, 2, 2)$ and $(2, - 2, - 2)$ and perpendicular to the plane x+2y-3z=7 is

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

B. 5x-2y+3z+8=0

C. 5x-2y+3z-7=0

D. 5x-2y-3z=0

Answer: A

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21. The equation of the plane passing through the points (0,1,2) and (-1,0,3) and perpendicular to the plane $2x + 3y + z = 5$ is

A. 3x-4y+18z+32=0

B. 3x+4y-18z+32=0

C. 4x+3y-17z+31=0

D. 4x-3y+z+1=0

Answer: D

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22. The equation of the plane which passes through (2,-3,1) and is normal to the line joining the points (3,4,-1) and (2,-1,5) is given by

A. $x+5y-6z+19=0$

B. $x-5y+6z-19=0$

C. $x+5y+6z+19=0$

D. $x-5y-6z-19=0$

Answer: A

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23. The equation of the plane passing through the point (-10,5,4) and perpendicular to the line joining the points (4,-1,2) and (-3,2,3) is

A. $7x-3y-z+89=0$

B. $7x-3y-z-89=0$

C. $7x+3y-z+89=0$

D. 7x-3y+z-89=0

Answer: A

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24. A plane II passes through the point (1,1,1).If b, c, a are the direction ratios of a normal to the plane where $a, b, c(a < b < c)$ are the prime factors of 2001, then the equation of the plane II is

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

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

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

D. 31x+37y+3z=71

Answer: C

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25. If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are three non-coplanar vectors, then the vector equation $\vec{r} - (1-p-q)\vec{a} + p\vec{b} + q\vec{c}$ represents a

A. straight line

B. plane

C. plane passing through the origin

D. sphere

Answer: B

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26. The equation of the plane that passes through the points (1,0,2), (1,1,2),(5,0,3) is

A. x+2y-4z+7=0

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

C. x-2y+4z+7=0

D. $2y-4z-7+x=0$

Answer: A

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27. The equation of the plane passing through the points (1,2,3), (-1,4,2) and (3,1,1) is

A. $5x+y+12z-23=0$

B. $5x+6y+2z=23$

C. $2x+6y+5z=7$

D. $x+y+z=13$

Answer: B

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28. If the plane passing through the points (1,2,3),(2,3,1) and (3,1,2) is ax+by+cz=1 then a+2b+3c=

A. 0

B. 1

C. 6

D. 18

Answer: B

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29. The equation of the plane passing through the intersection of the planes $x+2y+3z+4=0adn4x+3y+2z+1=0$ and the origin ils (A) $3x+2y+z+1=0$ (B) $3x+2y+z=0$ (C) $2x+3y+z=0$ (D) $x+y+z=0$

A. 3x+2y+z+1=0

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

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

D. $x+y+z=0$

Answer: B

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30. The equation of plane passing through $(2,1,0)$ and line of intersection of planes $x-2y+3z=4$ and $x-y+z=3$ is

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

B. $2x+y+z+1=0$

C. $x-z=2$

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

Answer: C

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31. Equation of the plane perpendicular to the line $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ and passing through the point (2,3,4) is

A. 2x+3y+z=17

B. x+2y+3z=9

C. 3x+2y+z=16

D. x+2y+3z=20

Answer: D

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32. A plane which passes through the point (3,2,0) nd the line $\frac{x-4}{1}=\frac{y-7}{5}=\frac{z-4}{4}$ is (A) $x-y+z=1$ (B) x+y+z=5(C)x+2y-z=1 (D)2x-y+z=5`

A. x-y+z=1

B. x+y+z=5

C. x+2y-z=0

D. 2x-y+z=5

Answer: A

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33. The equation of the plane through the point (2,-1,-3) and parallel to the lines $\frac{x-1}{3}=\frac{y+2}{2}=\frac{z}{-4}$ and $\frac{x}{2}=\frac{y-1}{-3}=\frac{z-2}{2}$ is

A. 8x+14y+13z+37=0

B. 8x-14y+13z+37=0

C. 8x+14y-13z+37=0

D. 8x+14y+13z-37=0

Answer: A

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34. Let the line $\frac{x-2}{3}=\frac{y-1}{-5}=\frac{z+2}{2}$ lies in the plane $x+3y-\alpha z+\beta=0$. Then, (α, β) equals

A. $(6, -17)$

B. $(-6, 7)$

C. $(5, -15)$

D. $(-5, 5)$

Answer: B

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35. The angular between two planes $x+2y+2z=3$ and $-5x+3y+4z=9$ is

A. $\cos^{-1}\left(\frac{3\sqrt{2}}{10}\right)$

B. $\cos^{-1}\left(\frac{19\sqrt{2}}{30}\right)$

C. $\cos^{-1}\left(\frac{9\sqrt{2}}{20}\right)$

D. $\cos^{-1}\left(\frac{3\sqrt{2}}{5}\right)$

Answer: A

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36. The angle between the planes 3x-4y+5z=0 and 2x-y-cz=5 is

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

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

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

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

Answer: B

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37. The locus represented by $xy + yz = 0$ is

A. a pair of perpendicular lines

B. a pair of parallel lines

C. a pair of parallel planes

D. a pair of perpendicular planes

Answer: D

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38. If the angle between the planes $\bar{r}.\left(m\hat{i} - \hat{j} + 2\hat{k}\right) + 3 = 0$ and $\bar{r}.\left(2\hat{i} - m\hat{j} - \hat{k}\right) - 5 = 0$ is $\frac{\pi}{3}$, then m=

A. 2

B. ± 3

C. 3

D. -2

Answer: C

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39. IF planes $\bar{r}.\left(p\hat{i}-\hat{j}+2\hat{k}\right)+3=0$ and $\bar{r}.\left(2\hat{i}-p\hat{j}-\hat{k}\right)-5=0$ include angle $\frac{\pi}{3}$ then the value of p is

A. $1, \ -3$

B. $-1, 3$

C. -3

D. 3

Answer: D

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40. The d,r,s of normal to the plane through (1,0,0),(0,1,0) which makes an angle $\frac{\pi}{4}$ with plane x+y=3, are

A. $1, \sqrt{2}, 1$

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

C. 1,1,2

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

Answer: B

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41. If the planes $x + 2y + kz = 0$ and $2x + y - 2z = 0$, are at right angles, then the value of k is

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

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

C. -2

D. 2

Answer: D

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42. The value of k for which the planes $3x - 6y - 2z = 7$ and $2x + y - kz = 5$ areperpendicular to each other is

A. 0

B. 1

C. 2

D. 3

Answer: A

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43. If the planes $3x - 2y + 2z + 17 = 0$ and $4x + 3y - kz = 25$ are mutually perpendicular , then k=

A. 3

B. -3

C. 9

D. -6

Answer: A

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44. The equation of the plane through (4,4,0) and perpendicular to the planes 2x+y+2z+3=0 and 3x+3y+2z-8=0 is

A. 4x+3y+3z=28

B. 4x-2y-3z=8

C. 4x+2y+3z=24

D. 4x+2y-3z=24

Answer: B

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

A. $\cos^{-1}\left(\frac{2}{\sqrt{84}}\right)$

B. $\cos^{-1}\left(\frac{-2}{\sqrt{84}}\right)$

C. $\sin^{-1}\left(\frac{-2}{\sqrt{42}}\right)$

D. $\sin^{-1}\left(\frac{-2}{\sqrt{14}}\right)$

Answer: C

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46. The sine of the angle between the straight line $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ and the plane $2x-2y+z=5$ is

A. $\frac{10}{6\sqrt{5}}$

B. $\frac{4}{5\sqrt{2}}$

C. $\frac{\sqrt{2}}{10}$

D. $\frac{2\sqrt{3}}{5}$

Answer: C

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47. If the angle θ 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 λ is

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

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

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

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

Answer: D

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48. The plane $2x - 3y + 6z - 11 = 0$ makes an angle $\sin^{-1}(\alpha)$ with X-axis. The value of $alpah$ is

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

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

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

D. $\frac{3}{7}$

Answer: C

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

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

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

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

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

Answer: A

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50. The value of λ for which the straight line $\frac{x-\lambda}{3} = \frac{y-1}{2+\lambda} = \frac{z-3}{-1}$ may lie on the plane x-2y=0 is

A. 1

B. 0

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

D. there is no such λ

Answer: C

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51. The line $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ is parallel to the plane

A. 3x+4y+5z=7

B. 2x+y-2z=0

C. x+y-z=2

D. 2x+3y+4z=0

Answer: B

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52. The condition that the line $\frac{x-x_1}{l}=\frac{y-y_1}{m}=\frac{z-z_1}{n}$ lies in the plane $ax+by+cz+d=0$ is

A. $\frac{a}{l}=\frac{b}{m}=\frac{c}{n}$

B. $al+bm+cn=0$

C. $\frac{a}{l}=\frac{b}{m}=\frac{c}{n}=0$

D. None of these

Answer: B

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53. Value of k such that the line

$\frac{x-4}{1}=\frac{y-2}{1}=\frac{z-k}{2}$ lies in the plane 2x-4y+z=7 is

A. -7

B. 4

C. -4

D. 7

Answer: D

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54. 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. 18

B. 5

C. 2

D. 26

Answer: C

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55. The condition that the line $\frac{x-x_1}{l}=\frac{y-y_1}{m}=\frac{z-z_1}{n}$ lies in the plane $ax+by+cz+d=0$ is

A. l=0

B. m=0

C. n=0

D. l=0,m=0

Answer: C

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56. If $P(3,2,6)$ is a point in space and Q be a point on the line $\vec{r}=\left(\hat{i}-\hat{j}+2\hat{k}\right)+\mu\left(-3\hat{i}+\hat{j}+5\hat{k}\right)$. Then the value of μ for which the vector PQ is parallel to the plane $x-4y+3z=1,$ is :

A. $\frac{1}{4}$

B. $-\frac{1}{4}$

C. $\frac{1}{8}$

D. $-\frac{1}{8}$

Answer: A

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57. The equation of plane containing intersecting lines $\frac{x+3}{3}=\frac{y}{1}=\frac{z-2}{2}$ and $\frac{x-3}{4}=\frac{y-2}{2}=\frac{z-6}{3}$ is.....

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

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

C. x+y+z+5=0

D. x+y-2x+7=0

Answer: D

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58. The lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{2}=\frac{z-5}{1}$ are coplanar, if

A. k=3 or -3

B. k=0 or -1

C. k=1 or -1

D. k=0 or -3

Answer: D

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59. If planes $x-cy-bz=0, cx-y+az=0$ and $bx+ay-z=0$ pass through a straight line then $a^2+b^2+c^2=$

A. $1-abc$

B. $abc-1$

C. $1 - 2abc$

D. $2abc - 1$

Answer: C

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60. IF for a plane the intercepts on the coordinate axes are 8,4,4 then the length of the perpendicular from the origin on to the plane is (A) $\frac{8}{3}$ (B) $\frac{3}{8}$ (C) 3 (D) $\frac{4}{3}$

A. $\frac{8}{3}$

B. $\frac{3}{8}$

C. 3

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

Answer: A

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61. Two system of rectangular axes have the same origin. If a plane cuts them at distance a, b, c and a', b', c' from the origin, then:

A. $\frac{1}{a^2}+\frac{1}{b^2}+\frac{1}{c^2}-\frac{1}{a'^2}-\frac{1}{b'^2}-\frac{1}{c'^2}=0$

B. $\frac{1}{a^2}+\frac{1}{b^2}+\frac{1}{c^2}+\frac{1}{a'^2}+\frac{1}{b'^2}+\frac{1}{c'^2}=0$

C. $\frac{1}{a^2}+\frac{1}{b^2}-\frac{1}{c^2}+\frac{1}{a'^2}+\frac{1}{b'^2}-\frac{1}{c'^2}=0$

D. $\frac{1}{a^2}-\frac{1}{b^2}-\frac{1}{c^2}+\frac{1}{a'^2}-\frac{1}{b'^2}-\frac{1}{c'^2}=0$

Answer: A

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62. The perpendicular distance of the point $P(6, 7, 8)$ from xy-plane is a. 8 b. 7 c. 6 d. 10

A. 8

B. 7

C. 6

D. 5

Answer: A

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63. Length of the perpendicular form the point (-6,2,3) on the plane 3x-6y+2z+10=0 is

A. 2

B. $\frac{13}{7}$

C. $\frac{10}{7}$

D. $\frac{8}{7}$

Answer: A

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64. If the distance of points $2\hat{i} + 3\hat{t}j + \lambda\hat{k}$ from the plane $r \cdot \left(3\hat{i} + 2\hat{j} + 6\hat{k}\right) = 13$ is 5 units, then $\lambda =$

A. $6, \ -\frac{17}{3}$

B. $6, \ \frac{17}{3}$

C. $-6, \ -\frac{17}{3}$

D. $-6, \ \frac{17}{3}$

Answer: A

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65. The distance between (2,1,0) and 2x+y+2z+5=0 is

A. 10

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

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

D. 5

Answer: B

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66. 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 $\frac{x-1}{1} = \frac{y+2}{-2} = \frac{z-4}{3} and \frac{x-2}{2} = \frac{y+1}{-1} = \frac{z+7}{-1} is:$ $\frac{5}{\sqrt{83}}$ (2) $\frac{10}{\sqrt{74}}$ (3) $\frac{20}{\sqrt{74}}$ (4) $\frac{10}{\sqrt{83}}$

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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67. A plane is at a distance of 5 units form the origin and perpendicular to the vector $2\hat{i}+\hat{j}+2\hat{k}$. The equation of the plane is

A. $\bar{r}.\left(2\hat{i}+\hat{j}-2\hat{k}\right)=15$

B. $\bar{r}.\left(2\hat{i}+\hat{j}-\hat{k}\right)=15$

C. $\bar{r}.\left(2\hat{i}+\hat{j}+2\hat{k}\right)=15$

D. $\bar{r}.\left(\hat{i}+\hat{j}+2\hat{k}\right)=15$

Answer: C

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68. If the length of perpendicular drawn from origin on a plane is 7 units and its direction ratios are $-3, 2, 6,$ then that plane is

A. $-3x+2y+6z-7=0$

B. $-3x+2y+6z-49=0$

C. $3x - 2y + 6z + 7 = 0$

D. $-3x + 2y - 6z - 49 = 0$

Answer: B

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69. A plane passes through (1,-2,1) and is perpendicular to two planes 2x-2y+z=0 and x-y+2z=4. The distance of the plane form the point (1,2,2) is

A. 0

B. 1

C. $\sqrt{2}$

D. $2\sqrt{2}$

Answer: D

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70. 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 $x + 2y - z - 3 = 0 \quad 3x - y + 2z - 1 = 0$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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71. The equation of a plane passing through the line of intersection of the planes x+2y+3z = 2 and x y + z = 3 and at a distance 2 3 from the point (3, 1, 1) is (A) 5x 11y + z = 17 (B) 2x y 3 2 1 (C) x + y + z = 3 (D) x 2y 1 2

A. 5x-11y+z=17

B. $\sqrt{2}+y=3\sqrt{2}-1$

C. $x+y+z=\sqrt{3}$

D. $x-\sqrt{2}y=1-\sqrt{2}$

Answer: A

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72. The point A(-1,3,0), B(2,2,1) and C(1,1,3) determine a plane. The distance from the plane to the point D(5,7,8) is

A. $\sqrt{66}$

B. $\sqrt{71}$

C. $\left(\sqrt{73}\right.$

D. $\sqrt{76}$

Answer: A

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

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

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

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

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

Answer: C

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74. In a three-dimensional xyz space , the equation $x^2 - 5x + 6 = 0$ represents a. Points b. planes c. curves d. pair of straight lines

A. points

B. plane

C. curves

D. pair of straight lines

Answer: B

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75. The plane $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=3$ meets the co-ordinate axes in A,B,C. The centroid of the triangle ABC is

A. $\left(\frac{a}{3}, \frac{b}{3}, \frac{c}{3}\right)$

B. $\left(\frac{3}{a}, \frac{3}{b}, \frac{3}{c}\right)$

C. $\left(\frac{1}{a}, \frac{1}{b}, \frac{1}{c}\right)$

D. (a, b, c)

Answer: D

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76. A plane cuts the coordinate axes X,Y,Z at A,B,C respectively such that the centroid of the $\triangle ABC$ is (6,6,3). Then the equation of that plane is

A. x+y+z-6=0

B. x+2y+z-18=0

C. 2x+y+z-18=0

D. x+y+2z-18=0

Answer: D

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77. Plane ax+by+cz=1 intersect axes in A,B,C respectively. If $G\left(\frac{1}{6}, -\frac{1}{3}, 1\right)$ is the centroid of $\triangle ABC$, then $a+b+3c=$ .....

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

B. 4

C. 2

D. $\frac{5}{6}$

Answer: C

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78. Let a,b, and c be three real numbers satistying $[a, b, c]\begin{bmatrix} 1 & 9 & 7 \\ 8 & 2 & 7 \\ 7 & 3 & 7 \end{bmatrix} = [0, 0, 0]$ If the point $P(a, b, c)$ with reference to (E), lies on the plane $2x + y + z = 1$, the the value of $7a + b + c$ is (A) 0 (B) 12 (C) 7 (D) 6

A. 0

B. 12

C. 7

D. 6

Answer: D

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79. 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. 2x+6y+12z=13

B. x+3y+6z= -7

C. x+3y+6z=7

D. 2x+6y+12z= -13

Answer: C

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80. The point of intersection of the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z+2}{3}$ and the plane 2x+3y+z=0 is

A. $(0, 1, -2)$

B. $(1, 2, 3)$

C. $(-1, 9, -25)$

D. $\left(\frac{-1}{11}, \frac{9}{11}, \frac{-25}{11}\right)$

Answer: D

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81. The co-ordinate of the point where the line $\frac{x-6}{-1} = \frac{y+1}{0} = \frac{z+3}{4}$ meets the plane x+y+z=3 are

A. (2,1,0)

B. $(7, -1, -7)$

C. $(1, 2, -6)$

D. $(5, -1, 1)$

Answer: D

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82. The point of intersection of the line $\frac{x-1}{3}=\frac{y+2}{4}=\frac{z-3}{-2}$ and the plane $2x-y+3z-1=0$, is

A. $(10,\ -10, 3)$

B. $(10, 10, 3)$

C. $(-10, 10, 3)$

D. $(-10,\ -10,\ -3)$

Answer: B

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83. which of the following points is on the line of intersection of planes $x=3z-4, y=2z-3$? (A) $(4, 3, 0)$ (B) $(-3,\ -4, 0)$ (C) $(3, 2, 1)$ (D) $(-4,\ -3, 0)$

A. (4,3,0)

B. $(-3, -4, 0)$

C. $(3, 2, 1)$

D. $(-4, -3, 0)$

Answer: D

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84. The distance 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 : (1) $2\sqrt{14}$ (2) 8 (3) $3\sqrt{21}$ (4) 27

A. $2\sqrt{14}$

B. 8

C. $3\sqrt{21}$

D. 13

Answer: D

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85. If the distance of the point $P(1, -2, 1)$ from the plane $x + 2y - 2z = \alpha, where \alpha > 0, is 5,$ then the foot of the perpendicular from P to the place is a. $\left(\frac{8}{3}, \frac{4}{3}, -\frac{7}{3}\right)$ b. $\left(\frac{4}{3}, -\frac{4}{3}, \frac{1}{3}\right)$ c. $\left(\frac{1}{3}, \frac{2}{3}, \frac{10}{3}\right)$ d. $\left(\frac{2}{3}, -\frac{1}{3}, -\frac{5}{3}\right)$

A. $\left(\frac{8}{3}, \frac{4}{3}, \frac{-7}{3}\right)$

B. $\left(\frac{4}{3}, \frac{-4}{3}, \frac{1}{3}\right)$

C. $\left(\frac{1}{3}, \frac{2}{3}, \frac{10}{3}\right)$

D. $\left(\frac{2}{3}, -\frac{1}{3}, \frac{5}{2}\right)$

Answer: A

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86. A point P lies on a line through Q(1,-2,3) and is parallel to the line $\frac{x}{1}=\frac{y}{4}=\frac{z}{5}$. If P lies on the plane 2x+3y-4z+22=0, then segment PQ equal to

A. $\sqrt{42}$ units

B. $\sqrt{32}$ units

C. 4 units

D. 5 units

Answer: A

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87. 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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88. 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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89. If the three planes $x = 5, 2x - 5ay + 3z - 2 = 0$ and $3bx + y - 3z = 0$ contain a common line, then (a, b) is equal to

A. $\left(-\frac{1}{5}, \frac{8}{15}\right)$

B. $\left(\frac{1}{5}, -\frac{8}{15}\right)$

C. $\left(-\frac{8}{15}, \frac{1}{5}\right)$

D. $\left(\frac{8}{15}, -\frac{1}{5}\right)$

Answer: B

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Evaluation Test

1. If the planes $x - cy - bz = 0, cx - y + az = 0$ and $bx + ay - z = 0$ pass through a line, then the value of $a^2 + b^2 + c^2 + 2abc$ is

A. 0

B. 1

C. -1

D. None of these

Answer: B

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2. 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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3. If $\bar{r} = \hat{i} + \hat{j} + \lambda\left(2\hat{i} + \hat{j} + 4\hat{k}\right)$ and $\bar{r} \cdot \left(\hat{i} + 2\hat{j} - \hat{k}\right) = 3$ are the equations of a line and plane respectively, then which of the following is truwe?

A. The line is perpendicular to the plane

B. The line lies in the plane

C. The line is parallel to the plane but doesn't lie in the plane.

D. The line cuts the plane obliquely.

Answer: B

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4. The distance from the line $x = 2 + t, y = 1 + t, z = -\frac{1}{2} - \frac{1}{2}t$ to the plane $x + 2y + 6z = 10$ is $\frac{\lambda}{\sqrt{\mu}}$. Then $5\lambda - \mu =$

A. 1

B. 2

C. 3

D. 4

Answer: D

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5. If θ is the angle between the lines in which the planes 3x-7y-5z=1 and 5x-13y+3z+2=0 cuts the plane 8x-11y+2z=0, then $\sin\theta$ is

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

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

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

D. 1

Answer: D

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6. The plane $2x-(1+\lambda)y+3\lambda z=0$ passes through the intersection of the plane

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

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

C. 2x+3x=0 and y=0

D. None of these

Answer: B

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7. The reflectionof thepoint (2,-1,3) $\in thela \neq$ 3x-2y-z=9$is(A)$ (28/7,15/7,17/7)(B)(26/7,-15/7,17/7)(C)15/7,26/,-17/7) (D) $\left(\frac{26}{7}, \frac{17}{7}, -\frac{15}{70}\right.$

A. $\left(\frac{26}{7}, \frac{15}{7}, \frac{17}{7}\right)$

B. $\left(\frac{26}{7}, -\frac{15}{7}, \frac{17}{7}\right)$

C. $\left(\frac{15}{7}, \frac{26}{7}, -\frac{17}{7}\right)$

D. $\left(\frac{26}{7}, \frac{17}{7}, -\frac{15}{7}\right)$

Answer: B

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8. The vectors $\bar{a}$ and $\bar{b}$ determine one plane and the vectors $\bar{c}$ and $\bar{d}$ determine another plane. If the planes are parallel, then

A. $(\bar{a} \times \bar{c}) \times (\bar{b} \times \bar{d}) = \bar{0}$

B. $(\bar{a} \times \bar{c}) \cdot (\bar{b} \times \bar{d}) = \bar{0}$

C. $(\bar{a} \times \bar{b}) \times (\bar{c} \times \bar{d}) = \bar{0}$

D. $(\bar{a} \times \bar{b}) \cdot (\bar{c} \times \bar{d}) = \bar{0}$

Answer: C

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9. If the distance between the plane $Ax - 2y + z = d$ and the plane containing the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ is $\sqrt{6}$, then |d| is equal to....

A. 3

B. 4

C. 5

D. 6

Answer: D

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10. A line with positive direction cosines passes through the point P(2, –1, 2) and makes equal angles with the coordinate axes. The line meets the plane 2x + y + z = 9 at point Q. The length of the line segment PQ equals

A. 1

B. $\sqrt{2}$

C. $\sqrt{3}$

D. 2

Answer: C

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11. A variable plane at a distance of 1 unit from the origin cuts the 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. 9

B. 3

C. 1

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

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

B. 30°

C. 90°

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

Answer: D

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13. The volume of the tetrahedron included between the plane $3x + 4y - 5z - 60 = 0$ and the co-odinate planes is

A. 60

B. 600

C. 720

D. None of these

Answer: B

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14. The lines $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$ and $\frac{x-1}{k} = \frac{y-4}{2} = \frac{z-5}{1}$ are coplanar, if

A. k=0 or -1

B. k=0 or 1

C. k=0 or -3

D. k=3 or -3

Answer: C

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