MATHS

BOOKS - CENGAGE

EQUATION OF PLANE AND ITS APPLICATIONS - II

Dpp 3 4

1. Let $A(0, 6, 6)$, B(6,6,0) and C(6,0,6) are three points and point D is moving on the line $x+z-3=0=y$. If G is centroid of ΔABC, then minimum value of GD is

A. $\sqrt{\frac{47}{2}}$

B. $\sqrt{\frac{37}{2}}$

C. $\sqrt{\frac{57}{2}}$

D. $\sqrt{\frac{23}{2}}$

Answer: C

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2. Equation of line of projection of the line $3x - y + 2z - 1 = 0 = x + 2y - z = 2$ on the plane $3x + 2y + z = 0$ is

A. $\frac{x+1}{11} = \frac{y-1}{-9} = \frac{z-1}{-15}$

B. $3x - 8y + 7z + 4 = 0 = 3x + 2y + z$

C. $\dfrac{x+12}{11}=\dfrac{y+8}{-9}=\dfrac{z+14}{15}$

D. $\dfrac{x+12}{11}=\dfrac{y+8}{-9}=\dfrac{z+14}{-15}$

Answer: B

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3. The orthocenter of triangle whose vertices are $A(a,0,0)$, $B(0,b,0)$ and $C(0,0,c)$ is $\left(\dfrac{k}{a},\dfrac{k}{b},\dfrac{k}{c}\right)$ then k is equal to

A. $\left(\dfrac{1}{a^2}+\dfrac{1}{b^2}+\dfrac{1}{c^2}\right)^{-1}$

B. $\left(\dfrac{1}{a}+\dfrac{1}{b}+\dfrac{1}{c}\right)^{-1}$

C. $\left(\dfrac{1}{a^2}+\dfrac{1}{b^2}+\dfrac{1}{c^2}\right)$

D. $\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$

Answer: A

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4. The shortest distance between the lines $2x+y+z-1=0=3x+y+2z-2$ and $x=y=z$, is

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

B. $\sqrt{2}$ units

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

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

Answer: A

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5. If plane $2x + 3y + 6z + k = 0$ is tangent to the sphere $x^2 + y^2 + z^2 + 2x - 2y + 2z - 6 = 0$, then a value of k is

A. 26

B. 16

C. -26

D. none of these

Answer: A

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6. The shortest distance from (1,1,1) to the line of intersection of the pair of planes $xy + yz + zx + y^2 = 0$ is

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

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

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

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

Answer: A

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7. A variable plane makes intercepts on x, y and z axes and it makes a tetrahedron of volume 64 cu. Units. The locus of foot of perpendicular from origin on the plane is

A. $\left(x^2+y^2+z^2\right)^2=384xyz$

B. $xyz=681$

C. $(x+y+z)\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)^2=16$

D. $xyz(x+y+z)=81$

Answer: A

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8. If the projection of the line $\frac{x}{2}=\frac{y-1}{2}=\frac{z-1}{1}$ on a plane P is $\frac{x}{1}=\frac{y-1}{1}=\frac{z-1}{-1}$. Then the distance of plane P from origin is

A. $\sqrt{3}$

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

C. $\sqrt{6}$

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

Answer: B

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9. Image of sphere $x^2 + y^2 + z^2 = 9$ in plane $2x + 3y + 4z - 29 = 0$ is

A. $x^2 + y^2 + z^2 - 8x - 12y - 16z + 107 = 0$

B. $x^2+y^2+z^2+8x-12y-16z+107=0$

C. $x^2+y^2+z^2-8x+12y-16z+107=0$

D. $x^2+y^2+z^2-8x-12y+16z+107=0$

Answer: A

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10. The locus of point which moves in such a way that its distance from the line (x)/(1)=(y)/(1)=(z)/(-1) is twice the distance from the plane x+y+z=0 is

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

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

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

D. $x^2 + y^2 + z^2 + 5xy + 3yz + 3zx = 0$

Answer: C

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11. A plane cutting the axes in P,Q,R passes through $(\alpha, \beta, \beta - \lambda, \lambda - \alpha)$. If O is origin, then locus of center of sphere OPQR is

A. $\alpha x + \beta y + \lambda z = 4$

B. $(\alpha - \beta)x + (\beta - \lambda)y + (y - \alpha)z = 0$

C. $(\alpha - \beta)yz + (\beta - y)zx + (\lambda - \alpha)xy = 2xyz$

D. $\left(\frac{1}{\alpha^2}+\frac{1}{\beta^2}+\frac{1}{\lambda^2}\right)\left(x^{2+y^2+z^2}\right)=xyz$

Answer: C

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12. Let a plane pass through origin and be parallel to the line $\frac{x-1}{2}=\frac{y_3}{-1}=\frac{z+1}{-2}$ is such that distance between the plane and the line is $\frac{5}{3}$. Then equation of the plane is/are

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

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

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

D. $x+y+z=0$

Answer: A::C

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13. The planes $ax + 4y + z = 0, 2y + 3z - 1 = 0$ and $3x - bz + 2 = 0$ will

A. a) meet at a point if $ab \neq 15$.

B. b) meet on a line if ab =15, a=3

C. c) have no common point if ab=15, $a \neq 3$.

D. d) have no common point if ab=15, $a \neq 5$

Answer: A::B::C

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14. If the line $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ intersects the the line $3\beta^2+3(1-2\alpha)y+z=3-\frac{1}{2}\{6\alpha^2x+3(1-2\beta)y+2z\}$ then point $(\alpha, \beta, 1)$ lies on the plane

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

B. $x+y-z=0$

C. $x-2y=0$

D. $2x-y=0$

Answer: A::B::C

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15. Let $A=(1,1,-1), B=(0,2,1)$ be two given points. Also, let P:$x+y+z=0$ be a plane.

If A' and B' are the feet of perpendicular from A and B, respectively, on the plane 'P' then $A'B'$ equals

A. $\frac{\sqrt{14}}{3}$

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

C. $\sqrt{3}$

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

Answer: A

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16. Let A = (1,1,-1) and B = (0, 2,1) be two given points .Also, let P:x+y+z=0 be a plane. The equation of the line perpendicular to $\overrightarrow{AB}$ and lying completely in the plane 'P' is

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

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

C. (c) $x=y=z$

D. (d) $x-3=y-1=z=2$

Answer: A

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17. Let $P_1 : x + y + 2z - 3 = 0$ and $P_2 = x - 2y + z = 4$ be two planes. Also, let $A(1, 3, 4)$ and $B(3, 2, 7)$ be two points in space.

The equation of plane which passes through line of intersection of P_1 and P_2 and upon which length of projection of the line segment AB is the greatest, is

A. (a) $2x + 3y + z + 4 = 0$

B. (b) $3x - 3y + 4z - 11 = 0$

C. (c) $x + 3y + z + 2 = 0$

D. (d) $3y + z + 1 = 0$

Answer: D

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18. Let $P_1 : x + y + 2z - 3 = 0$ and $P_2 = x - 2y + z = 4$ be two planes. Also, let $A(1, 3, 4)$ and $B(3, 2, 7)$ be two points in space.

The equation of plane which passes through line of intersection of P_1 and P_2 upon which length of projection of the line segment AB is the least, is

A. a) $x + 3y + z + 2 = 0$

B. b) $3y + z + 1 = 0$

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

D. d) $3x - 3y + 4z - 11 = 0$

Answer: C

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