MATHS

BOOKS - CENGAGE MATHS (ENGLISH)

3D COORDINATION SYSTEM

Dpp 3 1

1. Given two points A and B. If area of triangle ABC is constant then locus of point C in space is

A. sphere

B. cone

C. cylinder

D. None of these

Answer: C

Watch Video Solution

2. The direction cosines of a line equally inclined to three mutually perpendiclar lines having direction cosines as $l_1, m_1, n_1, l_2, m_2, n_2$ and l_3, m_3, n_3 are

A. $l_1 + l_2 + l_3, m_1 + m_2 + m_3, n_1 + n_2 + n_3$

B. $\dfrac{l_1 + l_2 + l_3}{\sqrt{3}}, \dfrac{m_1 + m_2 + m_3}{\sqrt{3}}, \dfrac{n_1 + n_2 + n_3}{\sqrt{3}}$

C. $\dfrac{l_1 + l_2 + l_3}{3}, \dfrac{m_1 + m_2 + m_3}{3}, \dfrac{n_1 + n_2 + n_3}{3}$

D. none of these

Answer: B

Watch Video Solution

3. If $P(x, y, z)$ is a point on the line segment joining Q(2,2,4) and R(3,5,6) such that the projection of $\overrightarrow{OP}$ on the axes are $\frac{13}{5}, \frac{19}{5}, \frac{26}{5}$ respectively, then P divides QR in the ratio:

A. $1:2$

B. $3:2$

C. $2:3$

D. $1:3$

Answer: B

Watch Video Solution

4. $A=\begin{bmatrix} l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \\ l_3 & m_3 & n_3 \end{bmatrix}$ and $B=\begin{bmatrix} p_1 & q_1 & r_1 \\ p_2 & q_2 & r_2 \\ p_3 & q_3 & r_3 \end{bmatrix}$

Where p_i, q_i, r_i are the co-factors of the elements l_i, m_i, n_i for $i=1, 2, 3$. If (l_1, m_1, n_1), (l_2, m_2, n_2) and (l_3, m_3, n_3) are the direction cosines of three mutually perpendicular lines then (p_1, q_1, r_1), (p_2, q_2, r_2) and (p_3, q, r_3) are

A. the direction cosines of three mutually perpendicular lines

B. the direction ratios of three mutually perpendicular lines which are not direction cosines.

C. the direction cosines of three lines which need not be perpendicular

D. the direction of three lines which need not be perpendicular

Answer: A

Watch Video Solution

5. A line segment joining (1,0,1) and the origin (0,0,0) is resolved about the x-axis to form a right circular cone. If (x,y,z) is any point on the cone, other than the origin, then it satisfies the equation

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

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

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

D. $x^2 - 2y^2 - 2z^2 = 0$

Answer: B

Watch Video Solution

6. Three straight lines mutually perpendicular to each other meet in a point P and one of them intersects the x-axis and another intersects the y-axis, while the third line passes through a fixed point(0,0,c) on the z-axis. Then the locus of P is

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

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

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

D. $x^2+y^2+z^2-2c(x+y+z)=0$

Answer: C

Watch Video Solution

7. ABCD is a tetrahedron such that each of the $\triangle ABC$, $\triangle ABD$ and $\triangle ACD$ has a right angle at A. If $ar(\triangle ABC)=k_1. Ar(\triangle ABD)=k_2, ar(\triangle BCD)=k_3$ then $ar(\triangle ACD)$ is

A. $\sqrt{k_1^2+k_2^2+k_3^2}$

B. $\sqrt{\dfrac{k_1k_2k_3}{k_1+k_2+k_3}}$

C. $\sqrt{|k_1^2 + k_2^2 - k_3^2|}$

D. $\sqrt{|k_2^2 - k_1^2 - k_3^2|}$

Answer: C

Watch Video Solution

8. Find the acute angle between the two straight lines whose direction cosines are given by $l + m + n = 0$ and $l^2 + m^2 - n^2 = 0$

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

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

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

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

Answer: B::D

Watch Video Solution

9. The volume of a right triangular prism $ABCA_1B_1C_1$ is equal to 3. If the position vectors of the vertices of thebase ABC are $A(1, 0, 1), B(2, 0, 0)$ and $C(O, 1, 0)$, then position vectors of the vertex A_1, can be

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

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

C. $(0, 2, 0)$

D. $(2, 2, 2)$

Answer: A::C

Watch Video Solution

10. A and B are two points with coordinates (x_1, y_1, z_1) and (x_2, y_2, z_2), respectively, in space. Let P and Q be feet of the perpendicular drawn from A and B to a line L whose direction ratios are l,m,n. Let θ be the angle between AB and L then find the value of $\cos\theta$

Watch Video Solution

11. The direction cosines of two lines are connected by relation $l + m + n = 0$ and 4l is the harmonic mean between m and n.

Then,

Watch Video Solution