

- (1) If the angle θ between the line $\frac{x+1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$ and the plane $2x - y + \sqrt{\lambda}x + 4 = 0$ is such that $\sin \theta = \frac{1}{3}$, then the value of λ is
- (a) $\frac{5}{3}$ (b) $-\frac{3}{5}$ (c) $\frac{3}{4}$ (d) $-\frac{4}{3}$ [AIEEE 2005]

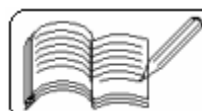
- (2) If the plane $2ax - 3ay + 4az + 6 = 0$ passes through the midpoint of the line joining the centres of the spheres $x^2 + y^2 + z^2 + 6x - 8y - 2z = 13$ and $x^2 + y^2 + z^2 - 10x + 4y - 2z = 8$, then a equals
- (a) -1 (b) 1 (c) -2 (d) 2 [AIEEE 2005]

- (3) The distance between the line $\vec{r} = 2\hat{i} - 2\hat{j} + 3\hat{k} + \lambda(\hat{i} - \hat{j} + 4\hat{k})$ and the plane $\vec{r} \cdot (\hat{i} + 5\hat{j} + \hat{k}) = 5$ is
- (a) $\frac{10}{9}$ (b) $\frac{10}{3\sqrt{3}}$ (c) $\frac{3}{10}$ (d) $\frac{10}{3}$ [AIEEE 2005]

- (4) The angle between the lines $2x = 3y = -z$ and $6x = -y = -4z$ is
- (a) 0° (b) 90° (c) 45° (d) 30° [AIEEE 2005]

- (5) The plane $x + 2y - z = 4$ cuts the sphere $x^2 + y^2 + z^2 - x + z - 2 = 0$ in a circle of radius
- (a) 3 (b) 1 (c) 2 (d) $\sqrt{2}$ [AIEEE 2005]

- (6) A line makes the same angle θ with each of the X- and Z- axis. If the angle β , which it makes with the y-axis, is such that $\sin^2 \beta = 3 \sin^2 \theta$, then $\cos^2 \theta$ equals
- (a) $\frac{2}{3}$ (b) $\frac{1}{5}$ (c) $\frac{3}{5}$ (d) $\frac{2}{5}$ [AIEEE 2004]



(7) Distance between two parallel planes $2x + y + 2z = 8$ and $4x + 2y + 4z + 5 = 0$ is

- (a) $\frac{3}{2}$ (b) $\frac{5}{2}$ (c) $\frac{7}{2}$ (d) $\frac{9}{2}$ [AIEEE 2004]

(8) A line with direction cosines proportional to 2, 1, 2 meets each of the lines $x = y + a = z$ and $x + a = 2y = 2z$. The coordinates of each of the points of intersection are given by

- (a) $(3a, 3a, 3a)$, (a, a, a) (b) $(3a, 2a, 3a)$, (a, a, a)
(c) $(3a, 2a, 3a)$, $(a, a, 2a)$ (d) $(2a, 3a, 3a)$, $(2a, a, a)$ [AIEEE 2004]

(9) If the straight lines $x = 1 + s$, $y = -3 - \lambda s$, $z = 1 + \lambda s$ and $x = \frac{t}{2}$, $y = 1 + t$, $z = 2 - t$, with parameters s and t respectively, are co-planar, then λ equals

- (a) -2 (b) -1 (c) $-\frac{1}{2}$ (d) 0 [AIEEE 2004]

(10) The intersection of the spheres $x^2 + y^2 + z^2 + 7x - 2y - z = 13$ and $x^2 + y^2 + z^2 - 3x + 3y + 4z = 8$ is the same as the intersection of one of the spheres and the plane

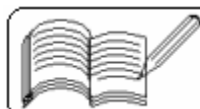
- (a) $x - y - z = 1$ (b) $x - 2y - z = 1$
(c) $x - y - 2z = 1$ (d) $2x - y - z = 1$ [AIEEE 2004]

(11) The lines $x = ay + b$, $z = cy + d$ and $x = a'y + b'$, $z = c'y + d'$ will be perpendicular if and only if

- (a) $aa' + cc' + 1 = 0$ (b) $aa' + cc' = 0$
(c) $aa' + bb' = 0$ and (d) $aa' + bb' + cc' = 0$ [AIEEE 2003]

(12) 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) $k = 1$ or -1
(c) $k = 0$ or -3 (d) $k = 3$ or -3 [AIEEE 2003]



(13) Two systems of rectangular axes have the same origin. If a plane cuts them at distances a, b, c and a', b', c' from the origin, then

$$(a) \frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} + \frac{1}{a'^2} + \frac{1}{b'^2} + \frac{1}{c'^2} = 0 \quad (b) \frac{1}{a^2} + \frac{1}{b^2} - \frac{1}{c^2} + \frac{1}{a'^2} + \frac{1}{b'^2} - \frac{1}{c'^2} = 0$$

$$(c) \frac{1}{a^2} - \frac{1}{b^2} - \frac{1}{c^2} + \frac{1}{a'^2} - \frac{1}{b'^2} - \frac{1}{c'^2} = 0 \quad (d) \frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} - \frac{1}{a'^2} - \frac{1}{b'^2} - \frac{1}{c'^2} = 0$$

[AIEEE 2003]

(14) The direction cosines of the normal to the plane $x + 2y - 3z + 4 = 0$ are

$$(a) -\frac{1}{\sqrt{14}}, -\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}} \quad (b) \frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$$

$$(c) -\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}} \quad (d) \frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, -\frac{3}{\sqrt{14}}$$

[AIEEE 2003]

(15) The radius of a circle in which the sphere $x^2 + y^2 + z^2 + 2x - 2y - 4z = 19$ is cut by the plane $x + 2y + 2z + 7 = 0$ is

(a) 1 (b) 2 (c) 3 (d) 4

[AIEEE 2003]

(16) The shortest distance from the plane $12x + 4y + 3z = 327$ to the sphere $x^2 + y^2 + z^2 + 4x - 2y - 6z = 155$ is

(a) 13 (b) 26 (c) 39 (d) 11

[AIEEE 2003]

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

(a) 1 (b) 7 (c) 3 (d) 13

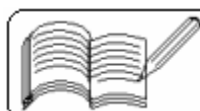
[AIEEE 2002]

(18) The co-ordinates of the point in which the line joining the points $(3, 5, -7)$ and $(-2, 1, 8)$ and intersected by the YZ-plane are

$$(a) \left(0, \frac{13}{5}, 2\right) \quad (b) \left(0, -\frac{13}{5}, -2\right)$$

$$(c) \left(0, -\frac{13}{5}, \frac{2}{5}\right) \quad (d) \left(0, \frac{13}{5}, \frac{2}{5}\right)$$

[AIEEE 2002]



(19) The angle between the planes $2x - y + 3z = 6$ and $x + y + 2z = 7$ is

- (a) 0° (b) 30° (c) 45° (d) 60° [AIEEE 2002]

(20) If the lines $\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$ and $\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z-6}{-5}$ are at right angles, then the value of k is

- (a) $-\frac{10}{7}$ (b) $-\frac{7}{10}$ (c) -10 (d) -7 [AIEEE 2002]

(21) A unit vector perpendicular to the plane of $\vec{a} = 2\vec{i} - 6\vec{j} - 3\vec{k}$ and $\vec{b} = 4\vec{i} + 3\vec{j} - \vec{k}$ is

- (a) $\frac{4\vec{i} + 3\vec{j} - \vec{k}}{\sqrt{26}}$ (b) $\frac{2\vec{i} - 6\vec{j} - 3\vec{k}}{7}$
(c) $\frac{3\vec{i} - 2\vec{j} + 6\vec{k}}{7}$ (d) $\frac{2\vec{i} - 3\vec{j} - 6\vec{k}}{7}$ [AIEEE 2002]

(22) A unit vector normal to the plane through the points \vec{i} , $2\vec{j}$ and $3\vec{k}$ is

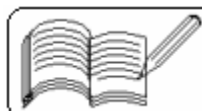
- (a) $6\vec{i} + 3\vec{j} + 2\vec{k}$ (b) $\vec{i} + 2\vec{j} + 3\vec{k}$
(c) $\frac{6\vec{i} + 3\vec{j} + 2\vec{k}}{7}$ (d) $\left| \frac{6\vec{i} + 3\vec{j} + 2\vec{k}}{7} \right|$ [AIEEE 2002]

(23) A plane at a unit distance from the origin intersects the coordinate axes at P, Q and R. If the locus of the centroid of ΔPQR satisfies the equation $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = k$, then the value of k is

- (a) 1 (b) 3 (c) 6 (d) 9 [IIT 2005]

(24) Two lines $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-1}{4}$ and $\frac{x-3}{1} = \frac{y-k}{2} = \frac{z}{1}$ intersect at a point, then k is

- (a) $\frac{3}{2}$ (b) $\frac{9}{2}$ (c) $\frac{2}{9}$ (d) 2 [IIT 2004]



(25) If the line $\frac{x-1}{1} = \frac{y-2}{1} = \frac{z-k}{2}$ lies exactly on the plane $2x - 4y + z = 7$, then the value of k is

- (a) 7 (b) -7 (c) 1 (d) no real value [IIT 2003]

(26) There are infinite planes passing through the points (3, 6, 7) touching the sphere $x^2 + y^2 + z^2 - 2x - 4y - 6z = 11$. If the plane passing through the circle of contact cuts intercepts a, b, c on the co-ordinate axes, then $a + b + c =$

- (a) 12 (b) 23 (c) 67 (d) 47

(27) The mid-points of the chords cut off by the lines through the point (3, 6, 7) intersecting the sphere $x^2 + y^2 + z^2 - 2x - 4y - 6z = 11$ lie on a sphere whose radius =

- (a) 3 (b) 4 (c) 5 (d) 6

(28) The ratio of magnitudes of total surface area to volume of a right circular cone with vertex at origin, having semi-vertical angle equal to 30° and the circular base on the plane $x + y + z = 6$ is

- (a) 1 (b) 2 (c) 3 (d) 4

(29) The direction of normal to the plane passing through origin and the line of intersection of the planes $x + 2y + 3z = 4$ and $4x + 3y + 2z = 1$ is

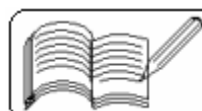
- (a) (1, 2, 3) (b) (3, 2, 1) (c) (2, 3, 1) (d) (3, 1, 2)

(30) The volume of the double cone having vertices at the centres of the spheres $x^2 + y^2 + z^2 = 25$ and $x^2 + y^2 + z^2 - 4x - 8y - 8z + 11 = 0$ and the common circle of the spheres as the circular base of the double cone is

- (a) 24π (b) 32π (c) 28π (d) 36π

(31) A line through the point P (0, 6, 8) intersects the sphere $x^2 + y^2 + z^2 = 36$ in points A and B. $PA \times PB =$

- (a) 36 (b) 24 (c) 100 (d) 64



(32) A sphere $x^2 + y^2 + z^2 - 2x - 4y - 6z - 11 = 0$ is inscribed in a cone with vertex at (6, 6, 6). The semi-vertical angle of the cone is

- (a) 15° (b) 30° (c) 45° (d) 60°

(33) The point which is farthest on the sphere $x^2 + y^2 + z^2 = 144$ from the point (2, 4, 4) is

- (a) (3, 6, 6) (b) (-3, -6, -6) (c) (4, 8, 8) (d) (-4, -8, -8)

(34) The equation of the plane containing the line $x + y - z = 0 = 2x - y + 4$ and passing through the point (1, 1, 1) is

- (a) $3x + 4y - 5z = 2$ (b) $4x + 5y - 6z = 3$
(c) $x + y + z = 3$ (d) $3x + 6y - 5z = 4$

(35) A plane passes through the points of intersection of the spheres $x^2 + y^2 + z^2 = 36$ and $x^2 + y^2 + z^2 - 4x - 4y - 8z - 12 = 0$. A line joining the centres of the spheres intersects this plane at

- (a) (1, 1, 1) (b) (1, 1, 2) (c) (1, 2, 1) (d) (2, 1, 1)

(36) The area of the circle formed by the intersection of the spheres $x^2 + y^2 + z^2 = 36$ and $x^2 + y^2 + z^2 - 4x - 4y - 8z - 12 = 0$ is

- (a) 9π (b) 18π (c) 27π (d) 36π

(37) A line joining the points (1, 1, 1) and (2, 2, 2) intersects the plane $x + y + z = 9$ at the point

- (a) (3, 4, 2) (b) (2, 3, 4) (c) (3, 2, 4) (d) (3, 3, 3)

Answers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
a	c	b	b	b	c	c	b	a	d	a	c	d	d	c	a	a	a	d	a
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
c	c	d	b	a	d	a	c	b	b	d	c	d	d	b	c	d			

