( Answers at the end of all questions)
(1) If the angle $\theta$ between the line $\frac{x+1}{1}=\frac{y-1}{2}=\frac{z-2}{2}$ and the plane $2 x-y+\sqrt{\lambda} x+4=0$ is such that $\sin \theta=\frac{1}{3}$, then the value of $\lambda$
(a) $\frac{5}{3}$
(b) $-\frac{3}{5}$
(c) $\frac{3}{4}$
(d) $-\frac{4}{3}$

(2) If the plane $2 a x-3 a y+4 a z+6=0$ passes through the midpoint of the line joining the centres of the spheres $x^{2}+y^{2}+z^{2}+6 x-8 y-2 z+13$ and $x^{2}+y^{2}+z^{2}-10 x+4 y-\leq$, then a equals
(a) - 1
(b) 1
(c) - 2
(d)
[AIEEE 2005]
(3) The distance between the line plane $\vec{r} \cdot(\hat{i}+5 \hat{j}+\hat{k})=5 \hat{s}$
(a) $\frac{10}{9}$
(b) $\frac{10}{3 \sqrt{3}}$
(d) $\frac{10}{3}$
[ AIEEE 2005]
(4) The angle betwe th lines $2 x=3 y=-z$ and $6 x=-y=-4 z$ is
(a) $0^{\circ}$
(b) $300^{\circ}$
(c) $45^{\circ}$
(d) $30^{\circ}$
[ AIEEE 2005]
(b) 1
(c) 2
(d) $\sqrt{2}$
[AIEEE 2005]
(6) A line makes the same angle $\theta$ with each of the $X$ - and $Z$ - axis. If the angle $\beta$, 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]
(Answers at the end of all questions)
(7) Distance between two parallel planes $2 x+y+2 z=8$ and $4 x+2 y+4 z+5=0$ is
(a) $\frac{3}{2}$
(b) $\frac{5}{2}$
(c) $\frac{7}{2}$
(d) $\frac{9}{2}$
(8) A line with direction cosines proportional to $2,1,2$ meets each d the nes $x=y+a=z$ and $x+a=2 y=2 z$. The coordinates of each or thinnts of intersection are given by
(a) (3a, 3a, 3a), (a, a, a)
(b) (3a, 2a, 3a),
(c) (3a, 2a, 3a), (a, a, 2a)
(d) (2a, 3a, 3a),
[ AIEEE 2004]
(9) If the straight lines $x=1+s, y=-3-\infty=1, y$ and $x=\frac{t}{2}, y=1+t$, $z=2-t$, with parameters $s$ and $t$ res ecti alv are co-planar, then $\lambda$ equals
(a) - 2
(b) -1
(c)
)

[ AIEEE 2004]
(10) The intersection of the phe es $x^{2}+y^{2}+z^{2}+7 x-2 y-z=13$ and $x^{2}+y^{2}+z^{2}-3 x+4=8$ is the same as the intersection of one of the spheres and the
(a) $x-y-z=$
(b) $x-2 y-z=1$
(c) $x-y<2 z=1$
(d) $2 x-y-z=1$
[ AIEEE 2004]
(11) The nes $x=a y+b, z=c y+d$ and $x=a^{\prime} y+b^{\prime}, \quad z=c^{\prime} y+d^{\prime}$ will be perpendicular only if

$$
\begin{aligned}
& \text { (a) } a a^{\prime}+c c^{\prime}+1=0 \\
& \text { (c) } a a^{\prime}+b b^{\prime}=0 \text { and } \\
& \text { (b) } a a^{\prime}+c c^{\prime}=0 \\
& \text { (d) } a a^{\prime}+b b^{\prime}+c c^{\prime}=0
\end{aligned}
$$

[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]
( Answers at the end of all questions)
(13) Two systems of rectangular axes have the same origin. If a plane cuts them at distances $a, b, c$ and $a^{\prime}, b^{\prime} c^{\prime}$ from the origin, then
(a) $\frac{1}{a^{2}}+\frac{1}{b^{2}}+\frac{1}{c^{2}}+\frac{1}{a^{\prime 2}}+\frac{1}{b^{\prime 2}}+\frac{1}{c^{\prime 2}}=0$
(b) $\frac{1}{a^{2}}+\frac{1}{b^{2}}-\frac{1}{c^{2}}+\frac{1}{a^{\prime 2}}+\frac{1}{b^{\prime 2}}$
(c) $\frac{1}{a^{2}}-\frac{1}{b^{2}}-\frac{1}{c^{2}}+\frac{1}{a^{\prime 2}}-\frac{1}{b^{\prime 2}}-\frac{1}{c^{\prime 2}}=0$
( d ) $\frac{1}{a^{2}}+\frac{1}{b^{2}}+\frac{1}{c^{2}}-\frac{1}{a^{\prime 2}}-\frac{1}{b^{n}}$
(14) The direction cosines of the normal to the plane $x+2 y-3 z-4=0$ are
( a ) $-\frac{1}{\sqrt{14}},-\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$
(b) $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}$,
( c ) $-\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$
( d ) $\frac{1}{\sqrt{14}}$,
[ AIEEE 2003]
(15) The radius of a circle in which the ${ }^{2}+y^{2}+z^{2}+2 x-2 y-4 z=19$ is cut by the plane $x+2 y+2 z+7=0$ is
(a) 1
(b) 2
(c) 3
4
[ AIEEE 2003]
(16) The shortest distange om tine plane $12 x+4 y+3 z=327$ to the sphere $x^{2}+y^{2}+z^{2}+4 y-2 y-0 z=155$ is
(a) 13
(b)

(c) 39
(d) 11
[ AIEEE 2003]
(17) The isi nco of a point (1,-2, 3) from the plane $x-y+z=5$ and parallel to the sing $\frac{x}{2}=\frac{y}{3}=\frac{z}{-6}$ is
(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 ) $\left(0, \frac{13}{5}, 2\right)$
(b) $\left(0,-\frac{13}{5},-2\right)$
(c ) $\left(0,-\frac{13}{5}, \frac{2}{5}\right)$
(d) $\left(0, \frac{13}{5}, \frac{2}{5}\right)$
[ AIEEE 2002]
( Answers at the end of all questions)
(19) The angle between the planes $2 x-y+3 z=6$ and $x+y+2 z=7$ is
(a) $0^{\circ}$
(b) $30^{\circ}$
(c) $45^{\circ}$
(d) $60^{\circ}$
[ AIEEE 2002]
(20) If the lines $\frac{x-1}{-3}=\frac{y-2}{2 k}=\frac{z-3}{2}$ and $\frac{x-1}{3 k}=\frac{y-5}{1}$ 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 plan $0=2 \vec{i}-6 \vec{j}-3 \vec{k}$ and $\vec{b}=4 \vec{i}+3 \vec{j}-\vec{k}$ is

$$
\text { (a) } \frac{4 \vec{i}+3 \vec{j}-\vec{k}}{\sqrt{26}}
$$

(b)
(c) $\frac{3 \vec{i}-2 \vec{j}+6 \vec{k}}{7}$
(d)

[ AIEEE 2002]
(22) A unit vector normal the ne through the points $\vec{i}, 2 \vec{j}$ and $3 \vec{k}$ is
(a) $6 \vec{i}+3 \vec{j}$
(b) $\vec{i}+2 \vec{j}+3 \vec{k}$
(c)

(d) $\left|\frac{6 \vec{i}+3 \vec{j}+2 \vec{k}}{7}\right|$
[ AIEEE 2002]
at a unit distance from the origin intersects the coordinate axes at $P, Q$ and If the locus of the centroid of $\triangle P Q R$ 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 $2 x-4 y+z=7$, then the value of $k$ is
(a) 7
(b) - 7
(c) 1
(d) no real value
[ II 2003 ]
(26) There are infinite planes passing through the points (3, 6, 7 touc ing the sphere $x^{2}+y^{2}+z^{2}-2 x-4 y-6 z=11$. If the plane passing th ough 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 ling through the point (3, 6, 7) intersecting the sphere $x^{2}+y^{2}+z^{2}-2 x+6 z=11$ lie on a sphere whose radius =
(a) 3
(b) 4
(c) 5
(28) The ratio of magnitudes vertex at origin, having plane $x+y+z=6$
(a) 1

(d) 4
surface area to volume of a right circular cone with 'ertical angle equal to $30^{\circ}$ and the circular base on the
(29) The direction of normal to the plane passing through origin and the line of intersection of the olal st $+2 y+3 z=4$ and $4 x+3 y+2 z=1$ is
(b)
$(3,2,1)$
(c) $(2,3,1)$
(d) (3, 1, 2 )
) Wo volume of the double cone having vertices at the centres of the spheres $x^{2}+y^{2}+z^{2}=25$ and $x^{2}+y^{2}+z^{2}-4 x-8 y-8 z+11=0$ and the common circle of the spheres as the circular base of the double cone is
(a) $24 \pi$
(b) $32 \pi$
(c) $28 \pi$
(d) $36 \pi$
(31) A line through the point $P(0,6,8)$ intersects the sphere $x^{2}+y^{2}+z^{2}=36$ in points $A$ and $B$. $P A \times P B=$
(a) 36
(b) 24
(c) 100
(d) 64
( Answers at the end of all questions)
(32) A sphere $x^{2}+y^{2}+z^{2}-2 x-4 y-6 z-11=0$ is inscribed in a cone with vertex at ( $6,6,6$ ). The semi-vertical angle of the cone is
(a) $15^{\circ}$
(b) $30^{\circ}$
(c) $45^{\circ}$
(d) $60^{\circ}$
(33) The point which is farthest on the sphere $x^{2}+y^{2}+z^{2}=144$ fro nth pint (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 $x-2 x+4$ and passing through the point ( $1,1,1$ ) is
(a) $3 x+4 y-5 z=2$
(b) $4 x+5 y$
(c) $x+y+z=3$
(d) $3 x+6-5=$
(35) A plane passes through the fin of intersection of the spheres $x^{2}+y^{2}+z^{2}=36$ and $x^{2}+y^{2}+z^{2}-4 x-4 y-8 z-12=0$. 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 (irc) formed by the inter
$x^{2}+y^{2}-z^{2}-4 x-4 y-8 z-12=0$ is
(a) $9 \rightarrow-(b$
b) $18 \pi$
(c) $27 \pi$
(d) $36 \pi$
line joining the points $(1,1,1)$ and $(2,2,2)$ intersects the plane $x+y+z=9$ al the point
(a) $(3,4,2)$
(b) (2, 3, 4 )
(c) $(3,2,4)$
(d) $(3,3,3)$

## Answers



