Mathematics

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B.Sc. F.Y. Sem - II

Paper - IV : Geometry

Unit - I

1) Let α, β, γ be the angles which any line makes with the positive directions of the Co-ordinate axes then $\cos\alpha, \cos\beta, \cos\gamma$ are called _____ of the given line.

a) direction Cosines b) direction ratios
c) both a & b d) None of a) & b)

2) The direction Cosines of x-axis are

a) (1, 0, 1) b) (1, 0, 0) c) (0, 1, 0) d) (0, 0, 1)

3) The direction Cosines of y-axis are

a) (1, 0, 1) b) (1, 0, 0) c) (0, 1, 0) d) (0, 0, 1)

4) The direction Cosines of z-axis are

a) (1, 0, 1) b) (1, 0, 0) c) (0, 1, 0) d) (0, 0, 1)

5) If l, m, n are d.c's of a line then

a) $l^2+m^2+n^2 = 0$ b) $l^2+m^2+n^2 = 1$
c) $l+m+n = 0$ d) $l+m+n = 1$

6) If α, β, γ are the angles which a half ray makes with the positive directions of the axes then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$ _____

a) 1 b) 0 c) 2 d) 3

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19 7) Set of three numbers which are proportional to the direction Cosines of a line are called _____.

a) direction ratios b) direction numbers
c) both a) & b) d) none of a) & b).

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8) If a, b, c are the direction ratios of a line then its direction Cosines are given by

a) $\pm \frac{a}{\sqrt{\Sigma a^2}}, \pm \frac{b}{\sqrt{\Sigma a^2}}, \pm \frac{c}{\sqrt{\Sigma a^2}}$

b) $\pm \frac{a}{\sqrt{b^2+c^2}}, \pm \frac{b}{\sqrt{a^2+c^2}}, \pm \frac{c}{\sqrt{a^2+b^2}}$

c) both a) & b)
d) none of a) & b)

9) If AB is any segment, XX' is a line and θ is the angle between them then the projection of AB on XX' is

a) AB Sinθ b) AB Cosθ c) AB tanθ d) AB Cotθ

10) The d.c's of the line joining the two points $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$ is given by

a) $\frac{x_2-x_1}{l} = \frac{y_2-y_1}{m} = \frac{z_2-z_1}{n} = PQ$

b) $\frac{x_2-x_1}{l} = \frac{y_2-y_1}{m} = \frac{z_2-z_1}{n} = -PQ$

c) both a) & b) d) none of a) & b)

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(11) The projection of the segment joining the points $P(x_1, y_1, z_1)$ & $Q(x_2, y_2, z_2)$ on a line with direction Cosines l, m, n is

a) $(x_2 + x_1)l + (y_2 + y_1)m + (z_2 + z_1)n$
b) $(x_2 - x_1)l + (y_2 - y_1)m + (z_2 - z_1)n$
c) $(x_2 + x_1)l + (y_2 - y_1)m + (z_2 - z_1)n$
d) None of the above.

(12) The angle between lines whose direction Cosines are (l_1, m_1, n_1) and (l_2, m_2, n_2) is given by

a) $\cos\theta = l_1 l_2 + m_1 m_2 + n_1 n_2$
b) $\sin\theta = l_1 l_2 + m_1 m_2 + n_1 n_2$
c) $\tan\theta = l_1 l_2 + m_1 m_2 + n_1 n_2$
d) None of these.

(13) If direction Cosines of two lines are ~~perpendicular~~ proportional to a_1, b_1, c_1 and a_2, b_2, c_2 then the lines are perpendicular if

a) $a_1 a_2 + b_1 b_2 - c_1 c_2 = 0$
b) $a_1 a_2 + b_1 b_2 + c_1 c_2 = 0$
c) $a_1 a_2 - b_1 b_2 + c_1 c_2 = 0$
d) $a_1 a_2 - b_1 b_2 - c_1 c_2 = 0$

(14) The lines with direction Cosines (l_1, m_1, n_1) and (l_2, m_2, n_2) are parallel if
a) the lines through the origin drawn parallel to the lines coincide.
b) the direction Cosines of the lines are the same
c) the direction ratios of the lines are proportional
d) All of the above.

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(15) The equation of the plane $2x+3y+4z=7$ referred to the point $(2,-3,4)$ as origin directions of the axes remaining the same, is _____

a) $2x+3y+4z+4=0$ ✓b) $2x+3y+11=0$
c) $2x+3y+4z+21=0$ d) $2x+3y-11=0$

(16) The degree of an equation is _____ by any transformation of axes.

a) altered ✓b) unaltered
c) ~~can't say~~ undetermined d) None of these.

(17) If l_1, m_1, n_1; l_2, m_2, n_2; l_3, m_3, n_3 be the direction cosines of three mutually perpendicular straight lines, then

a) $\begin{vmatrix} l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \\ l_3 & m_3 & n_3 \end{vmatrix} = 1$ b) $\begin{vmatrix} l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \\ l_3 & m_3 & n_3 \end{vmatrix} = -1$

c) $\begin{vmatrix} l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \\ l_3 & m_3 & n_3 \end{vmatrix} = \pm 1$ d) $\begin{vmatrix} l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \\ l_3 & m_3 & n_3 \end{vmatrix} = 0$

(18) The direction cosines of the line joining the two points (x_1, y_1, z_1) & (x_2, y_2, z_2) are

✓a) $x_2-x_1, y_2-y_1, z_2-z_1$ b) $x_1-x_2, y_1-y_2, z_1-z_2$
c) $x_2-x_1, y_1-y_2, z_2-z_1$ d) $x_2-x_1, y_2-y_1, z_1-z_2$

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19) The projection of a line on the axes are 2, 3, 6, then what is the length of the line ?

a) 7 b) 10 c) 13 d) 3

20) A line makes angles $\alpha, \beta, \gamma, \delta$ with the four diagonals of a cube then

a) $\cos^2\alpha + \cos^2\beta + \cos^2\gamma + \cos^2\delta = \frac{1}{3}$

b) $\cos^2\alpha + \cos^2\beta + \cos^2\alpha + \cos^2\delta = \frac{4}{3}$

c) $\cos^2\alpha + \cos^2\beta + \cos^2\gamma + \cos^2\delta = \frac{2}{3}$

d) None of these.

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Unit-II

(1) Every equation of the first degree in x, y, z represents _____

a) a plane b) a line in 2D
c) both a) & b) d) none of these.

(2) Equation of every plane is of the first degree i.e, of the form _____

a) $ax+by+cz+d=0$; $a^2+b^2+c^2 \neq 0$
b) $ax+by+cz+d=0$
c) $ax+by+c=0$
d) none of the above.

(3) Normal form of the equation of a plane is _____.

a) $lx+my+nz=p$ b) $lx+my+nz=p^2$
c) $lx-my-nz=p$ d) none of these.

(4) _____ are the direction ratios of the normal to the plane $ax+by+cz+d=0$.

a) $a, b, -c$ b) a, b, c
c) $-a, b, -c$ d) $a, -b, c$

(5) Direction cosines of the normal to the plane $2x-3y+6z=7$ are _____

a) $\frac{-2}{7}, \frac{3}{7}, \frac{-6}{7}$ b) $\frac{2}{7}, \frac{-3}{7}, \frac{6}{7}$
c) $\frac{-2}{7}, \frac{-3}{7}, \frac{6}{7}$ d) None of these.

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(6) Angle between two planes is equal to the angle between _____ to them from any point.

a) Normals b) tangents
c) both a) & b) d) none of a) & b)

(7) Angle between two planes with direction ratios a, b, c & a_1, b_1, c_1 is _____

a) $\cos^{-1}\left\{\frac{aa_1+bb_1+cc_1}{\sqrt{\Sigma a^2}\cdot\sqrt{\Sigma a_1^2}}\right\}$

b) $\sin^{-1}\left\{\frac{aa_1+bb_1+cc_1}{\sqrt{\Sigma a^2}\cdot\sqrt{\Sigma a_1^2}}\right\}$

c) $\tan^{-1}\left\{\frac{aa_1+bb_1+cc_1}{\sqrt{\Sigma a^2}\cdot\sqrt{\Sigma a_1^2}}\right\}$

d) none of these.

(8) Two planes $ax+by+cz+d=0$, $a_1x+b_1y+c_1z+d=0$ will be parallel if a, b, c & a_1, b_1, c_1 are direction ratios of _____

a) different lines b) same line
c) normal d) none of these.

(9) Two planes $ax+by+cz+d=0$; $a_1x+b_1y+c_1z+d=0$ will be perpendicular if

a) $aa_1+bb_1+cc_1=0$
b) $aa_1-bb_1-cc_1=0$
c) $aa_1+bb_1-cc_1=0$
d) $aa_1-bb_1+cc_1=0$

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10) Angle between the planes $2x-y+z=6$ & $x+y+2z=7$ is

a) $\pi/6$ b) $\pi/2$ c) $\pi/3$ d) π

11) Angle between the planes $3x-4y+5z=0$ & $2x-y-2z=5$ is

a) $\pi/6$ b) $\pi/2$ c) $\pi/3$ d) π

12) The equation of plane in terms of the intercepts a, b, c which it makes on the axes is

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

c) $\frac{x}{a}-\frac{y}{b}+\frac{z}{c}=1$ d) $\frac{x}{a}+\frac{y}{b}-\frac{z}{c}=1$

13) The equation of plane through three non-collinear points (x_1, y_1, z_1), (x_2, y_2, z_2) and (x_3, y_3, z_3) is given by

a) $\begin{vmatrix} x & y & z & 1 \\ x_1 & y_1 & z_1 & 1 \\ x_2 & y_2 & z_2 & 1 \\ x_3 & y_3 & z_3 & 1 \end{vmatrix} = 0$ b) $\begin{vmatrix} x & y & z & 1 \\ x_1 & y_1 & z_1 & 1 \\ x_2 & y_2 & z_2 & 1 \\ x_3 & y_3 & z_3 & 1 \end{vmatrix} = 1$

c) $\begin{vmatrix} x & y & z & 1 \\ x_1 & y_1 & z_1 & 1 \\ x_2 & y_2 & z_2 & 1 \\ x_3 & y_3 & z_3 & 1 \end{vmatrix} = 2$ d) $\begin{vmatrix} x & y & z & 1 \\ x_1 & y_1 & z_1 & 1 \\ x_2 & y_2 & z_2 & 1 \\ x_3 & y_3 & z_3 & 1 \end{vmatrix} = -1$

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14) The equation of plane through the points $P(2,2,-1)$, $Q(3,4,2)$, $R(7,0,6)$ is

a) $5x+2y-3z+17=0$ b) $5x+2y-3z-17=0$
c) $5x-2y+3z-17=0$ d) $5x-2y+3z+17=0$

15) If k is a parameter then the equation $ax+by+cz+k=0$ represents the system of planes _____ to a given plane.

a) $ax+by+cz+d=0$.

a) perpendicular b) not perpendicular
c) parallel d) not parallel

16) The equation _____ represents the system of planes through the line of intersection of the planes $ax+by+cz+d=0$ and $a_1x+b_1y+c_1z+d_1=0$.

a) $(ax+by+cz+d)+k(a_1x+b_1y+c_1z+d_1)=0$
b) $(ax+by+cz+d)\cdot(a_1x+b_1y+c_1z+d_1)=0$
c) both a) & b)
d) none of a) & b)

17) The equation of the plane passing through the intersection of the planes $x+y+z=6$ and $2x+3y+4z+5=0$ and the point $(1,1,1)$ is _____.

a) $20x+23y+26z+69=0$
b) $20x+23y+26z-69=0$
c) $20x-23y+26z+69=0$
d) $20x+23y-26z-69=0$

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18) Two points $A(x_1, y_1, z_1)$, $B(x_2, y_2, z_2)$ lie on the same side of the plane $ax+by+cz+d=0$ if $ax_1+by_1+cz_1+d_1$ and $ax_2+by_2+cz_2+d_2$ have

a) different signs b) same signs
c) always on the same side d) none of these.

19) The length of the perpendicular from the point (x_1, y_1, z_1) to the plane as $ax+by+cz+d=0$ is

a) $\pm \frac{ax_1+by_1+cz_1+d}{\sqrt{a^2+b^2+c^2}}$ b) $\pm \frac{ax_1-by_1+cz_1+d}{\sqrt{a^2+b^2+c^2}}$

c) $\pm \frac{ax_1+by_1-cz_1+d}{\sqrt{a^2+b^2+c^2}}$ d) $\pm \frac{ax_1+by_1+cz_1-d}{\sqrt{a^2+b^2+c^2}}$

20) If $ax+by+cz+d=0$ & $a_1x+b_1y+c_1z+d_1=0$ are two plane then the equation of bisecting planes is

a) $\frac{ax+by+cz+d}{\sqrt{a^2+b^2+c^2}} = \frac{a_1x+b_1y+c_1z+d_1}{\sqrt{a_1^2+b_1^2+c_1^2}}$

b) $\frac{ax+by+cz+d}{\sqrt{a^2+b^2+c^2}} = -\frac{ax+b_1y+c_1z+d_1}{\sqrt{a_1^2+b_1^2+c_1^2}}$

c) $\frac{ax+by+cz+d}{\sqrt{a^2+b^2+c^2}} = \pm \frac{a_1x+b_1y+c_1z+d_1}{\sqrt{a_1^2+b_1^2+c_1^2}}$

d) none of these.

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Unit - III

1) The equation of line passing through a given point $A(x_1, y_1, z_1)$ and having direction cosines l, m, n ~~are~~ is ——.

a) $\frac{x-x_1}{l} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$

b) $\frac{x-x_1}{l^2} = \frac{y-y_1}{m^2} = \frac{z-z_1}{n^2}$

c) $\frac{x-x_1}{l} + \frac{y-y_1}{m} + \frac{z-z_1}{n} = 0$

d) none of these.

2) The equations of the line through two points (x_1, y_1, z_1) & (x_2, y_2, z_2) is

a) $\frac{x-x_1}{x_1-x_2} = \frac{y-y_1}{y_2-y_1} = \frac{z-z_1}{z_2-z_1}$

b) $\frac{x-x_1}{x_2-x_1} = \frac{y-y_1}{y_2-y_1} = \frac{z-z_1}{z_2-z_1}$

c) $\frac{x_1-x}{x_2-x_1} = \frac{y-y_1}{y_2-y_1} = \frac{z-z_1}{z_2-z_1}$

d) none of these.

3) To transform the equations $ax+by+cz+d=0$, $a_1x+b_1y+c_1z+d_1=0$ to symmetrical form we require,

a) the direction ratios of the line and
b) the co-ordinates of any one point on it.
c) both a) & b) d) none of these.

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4) The angle between the line and the plane (where line is given by $\frac{x-x_1}{l} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$ & plane is given by $ax+by+cz+d=0$) is

a) $\cos\theta = \frac{al+bm+cn}{\sqrt{a^2+b^2+c^2}\cdot\sqrt{l^2+m^2+n^2}}$

b) $\sin\theta = \frac{al+bm+cn}{\sqrt{a^2+b^2+c^2}\cdot\sqrt{l^2+m^2+n^2}}$

c) $\tan\theta = \frac{al+bm+cn}{\sqrt{a^2+b^2+c^2}\cdot\sqrt{l^2+m^2+n^2}}$

d) none of these.

5) If the straight line is parallel to the plane then

a) $al+bm+cn=0$ b) $al-bm-cn=0$

b) $al-bm+cn=0$ d) $al+bm-cn=0$

6) Conditions for the line $\frac{x-x_1}{l} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$ to lie in the plane $ax+by+cz+d=0$ are

a) $al+bm+cn=0$ b) $ax_1+by_1+cz_1+d=0$

c) both a) & b) d) none of a) & b)

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7) The general equation of a plane containing the line $\frac{x-x_1}{l} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$ is

a) $A(x-x_1) + B(y-y_1) + C(z-z_1) = 0$
b) $A(x-x_1) + B(y_1-y) + C(z-z_1) = 0$
c) both a) & b)
d) none of a) & b)

8) Which of the following equation represents the plane which passes through the line $\frac{x-x_1}{l_1} = \frac{y-y_1}{m_1} = \frac{z-z_1}{n_1}$ and parallel to $\frac{x-x_2}{l_2} = \frac{y-y_2}{m_2} = \frac{z-z_2}{n_2}$, ~~is given by~~

a) $\begin{vmatrix} x-x_1 & y-y_1 & z-z_1 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix} = 0$ b) $\begin{vmatrix} x-x_2 & y-y_2 & z-z_2 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix} = 0$

c) both a) & b) d) None of a) & b)

9) Which of the following equation represents the plane which passes through the line $\frac{x-x_2}{l_2} = \frac{y-y_2}{m_2} = \frac{z-z_2}{n_2}$ and parallel to $\frac{x-x_1}{l_1} = \frac{y-y_1}{m_1} = \frac{z-z_1}{n_1}$.

a) $\begin{vmatrix} x-x_1 & y-y_1 & z-z_1 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix} = 0$ b) $\begin{vmatrix} x-x_2 & y-y_2 & z-z_2 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix} = 0$

c) both a) & b) d) none of a) & b)

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10) The equation of straight line involve ~~no~~ arbitary constants ?

a) one b) two c) three ~~d)~~ four

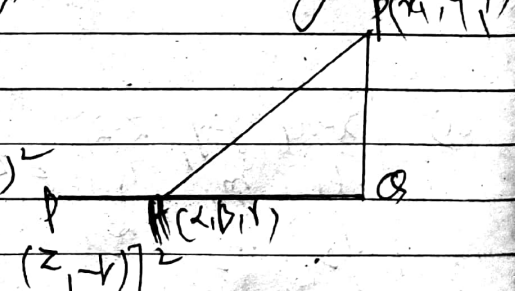
11) If $u_1 = 0 = v_1$ & $u_2 = 0 = v_2$ be two straight lines, then the general equation of a straight line intersecting them both are

a) $u_1 + \lambda_1 v_1 = 0 = u_2 + \lambda_2 v_2$
b) $u_1 + \lambda v_1 = 1 = u_2 + \lambda_2 v_2$
c) $u_1 + \lambda u_1 = 2 = u_2 + \lambda v_2$
d) none of these.

12) The magnitude and the equation of the line of shortest distance between the lines $\frac{x-8}{3} = \frac{y+9}{-16} = \frac{z-10}{7}$ & $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$ is

a) 14 and $117x + 44y - 41z - 490 = 0 = 9x - 4y - z = 14$
b) 13 and $117x - 44y + 41z + 490 = 0 = 9x - 4y - z = 4$
c) 12 and $117x + 44y - 41z - 490 = 0 = 9x - 4y - z = 14$
d) none of these.

13) The length of the perpendicular from a given point $P(x_1, y_1, z_1)$ to a given line $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$



a) $PQ^2 = (x_1-\alpha)^2 + (y_1-\beta)^2 + (z_1-\gamma)^2 - [l(x_1-\alpha) + m(y_1-\beta) + n(z_1-\gamma)]^2$

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14) The perpendicular distance of P(1,2,3) from the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{z-7}{-2}$ is _____.

a) 5 b) 6 c) 7 d) 8

15) Equation of straight line ~~in Symmetrical~~ $3x+2y-z-4=0$; $4x+y-2z+3=0$ in the symmetrical form is

a) $\frac{x-2}{3} = \frac{y-5}{2} = \frac{z}{5}$ b) $\frac{x+2}{3} = \frac{y-5}{-2} = \frac{z}{5}$

c) $\frac{x+2}{3} = \frac{y-5}{2} = \frac{z}{5}$ d) none of these.

16) Length of the shortest distance between the lines

$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$

a) $3\sqrt{30}$ b) $3/\sqrt{30}$ c) $\sqrt{30}$ d) none of these

17) The distance of the point of intersection of the line $\frac{x-3}{2} = \frac{y-4}{2} = \frac{z-5}{2}$ and the plane $x+y+z=17$ from the point $(3,4,5)$, is given by

a) 3 b) $3/2$ c) $\sqrt{3}$ d) none of these.

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18) The ~~three~~ lines $\frac{x-1}{2} = \frac{y-2}{4} = \frac{z-2}{7}$ and $\frac{x-1}{4} = \frac{y-2}{5} = \frac{z-3}{7}$ are

a) parallel b) intersecting
c) skew d) perpendicular

19) The equations of the line through the point $(2, 3, -5)$ and equally inclined to the axes are

a) $x-2 = y-3 = z+5$ b) $\frac{x-1}{2} = \frac{y-1}{3} = \frac{z+1}{-5}$

c) $\frac{x}{2} = \frac{y}{3} = \frac{z}{-5}$ d) none of them

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

a) $2x+y-2z = 0$ b) $3x+4y+5z = 7$
c) $x+y+z = 2$ d) $2x+3y+6z = 0$.

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Unit-IV

1) The radius of the sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ is

a) $\sqrt{u^2+v^2+w^2-d}$ b) $\sqrt{u^2-v^2+w^2-d}$

c) $\sqrt{u^2+v^2-w^2-d}$ d) $\sqrt{u^2+v^2+w^2+d}$

2) Centre of the sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ is

a) (u, v, w) b) $(-u, -v, -w)$

c) $(u, v, -w)$ d) $(-u, v, w)$

3) Equation to a sphere on the joining (x_1, y_1, z_1), (x_2, y_2, z_2) as diameter is

a) $(x-x_1)(x-x_2)+(y-y_1)(y-y_2)+(z-z_1)(z_2-z)=0$

b) $(x+x_1)(x+x_2)+(y-y_1)(y-y_2)+(z-z_1)(z-z_2)=0$

c) $(x-x_1)(x-x_2)+(y-y_1)(y-y_2)+(z-z_1)(z-z_2)=0$

d) none of these.

4) Equation to the sphere through the points $(0,0,0)$, $(0,1,-1)$, $(-1,2,0)$, $(1,2,3)$ is

a) $7(x^2+y^2+z^2)+15x+25y+11z=0$

b) $7(x^2+y^2+z^2)+15x-25y+11z=0$

c) $7(x^2+y^2+z^2)+15x+25y-11z=0$

d) $7(x^2+y^2+z^2)-15x-25y-11z=0$

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5) The sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ will intersect the plane $lx+my+nz=p$ if and only if

a) $(ul+vm+wn+p)^2 \leq (l^2+m^2+n^2)(u^2+v^2+w^2-d)$

b) $(ul+vm+wn+p)^2 \geq (l^2+m^2+n^2)(u^2+v^2+w^2-d)$

c) $(ul+vm+wn+p)^2 = (l^2+m^2+n^2)(u^2+v^2+w^2-d)$

d) none of these.

6) The equations $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ and $lx+my+nz=p$ together represent a _____.

a) line b) Circle c) Cone d) Cylinder.

7) The equation of the sphere through the circle $x^2+y^2+z^2=9$, $2x+3y+4z=5$ and the point $(1,2,3)$ is

a) $3(x^2+y^2+z^2)-2x-3y-4z-22=0$
b) $3(x^2+y^2+z^2)+2x+3y+4z+22=0$
c) $3(x^2+y^2+z^2)-2x+3y-4z-22=0$
d) none of these.

8) Equation of the tangent plane at any point (α,β,γ) of the sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ is

a) $(x+u)x+(\beta+v)y+(\gamma-w)z+(u\alpha+v\beta+w\gamma+d)=0$
b) $(x+u)x-(\beta+v)y+(\gamma-w)z+(u\alpha+v\beta+w\gamma+d)=0$
c) $(x+u)x+(\beta+v)y+(\gamma+w)z+(u\alpha+v\beta+w\gamma+d)=0$
d) none of these.

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9) The pole of the plane $lx+my+nz=p$ with respect to the sphere $x^2+y^2+z^2=a^2$ is

a) $\left(\frac{a^2l}{p}, \frac{a^2m}{p}, \frac{a^2n}{p}\right)$ b) $\left(\frac{l}{p}, \frac{m}{p}, \frac{n}{p}\right)$

c) $\left(\frac{al}{p}, \frac{am}{p}, \frac{an}{p}\right)$ d) $\left(\frac{a}{p}, \frac{m}{p}, \frac{n}{p}\right)$

10) Two planes such that the pole of either lies on the other are called _____

a) Symmetric planes b) normal planes
c) Conjugate planes d) none of these.

11) The conditions for the two ~~planes~~ spheres $x^2+y^2+z^2+2u_1x+2v_1y+2w_1z+d_1=0$ & $x^2+y^2+z^2+2u_2x+2v_2y+2w_2z+d_2=0$ to be orthogonal is

a) $2u_1u_2+2v_1v_2+2w_1w_2 = d_1+d_2$
b) $2u_1u_2+2v_1v_2+2w_1w_2 = d_1-d_2$
c) $2u_1u_2-2v_1v_2-2w_1w_2 = d_1+d_2$
d) none of these.

12) The surface generated by a line which passes through a fixed point, and makes a constant angle with a fixed line through the fixed point is called _____

a) Cylinder b) sphere c) Right Circular Cone
d) none of these.

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13) The surface generated by a straight line which is always parallel to a fixed line and ____ intersect a given curve is called ____

a) cylinder b) cone c) sphere d) line

14) The equation of the cylinder whose generators intersect the conic $ax^2+2hxy+by^2+2gx+2fy+c=0,\ z=0$ and parallel to the line $\frac{x}{l}=\frac{y}{m}=\frac{z}{n}$ is

a) $a(ny-lz)^2+2h(nx-lz)(ny-mz)+b(ny-mz)^2+2gn(nx-lz)+2fn(ny-mz)+cn^2=0$

b) $x^2+y^2+z^2=1$

c) both a) & b)

d) none of a) & b)

15) The surface generated by a line which intersect a fixed circle called the guiding circle, and is perpendicular to its plane is called ____

a) cone b) right circular cylinder

c) sphere d) none of these.

16) The equation of right circular cylinder whose axis is the line $\frac{x-\alpha}{l}=\frac{y-\beta}{m}=\frac{z-\gamma}{n}$ and whose radius is r is given by

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a) $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$; where a, b, c are d.r's.

b) $(x-\alpha)^2+(y-\beta)^2+(z-\gamma)^2-\frac{[l(x-\alpha)+m(y-\beta)+n(z-\gamma)]^2}{l^2+m^2+n^2}=r^2$

c) both a) & b) d) none of a) & b)

17) The line which generates the surface of the cylinder is called ——.

a) generator b) axis c) guiding line d) none of these.

18) Guiding curve of a right circular cylinder is ——.

a) ellipse b) circle
c) pair of straight lines d) any closed curve

19) The radius of the sphere $x^2+y^2+z^2-2x+4y-6z+7=0$ is

a) 49 b) 5 c) −7 d) $\sqrt{7}$

20) The equation of the sphere with centre at (2, 3, −4) and touching the plane $2x+6y-3z+15=0$ is

a) $x^2+y^2+z^2-4x-6y+8z-20=0$
b) $x^2+y^2+z^2+4x-6y-8z-20=0$
c) $x^2+y^2+z^2-4x-6y+8z+20=0$
d) none of these.