Choose the correct answer

(1) If $C(-1 , 6 , -5)$ is the midpoint of $\overline{AB}$ where $A(k-2 , -1 , m+3)$ and $B(2 , n-7 , -2)$, then $k + m + n =$…………

ⓐ 2 ⓑ 7 ⓒ -4 ⓓ 5

----

(2) If $\overrightarrow{A} = (\frac{-1}{2} , \frac{3}{4} , k)$ is a unit vector then $k =$……..

ⓐ $\pm\frac{3}{4}$ ⓑ $\pm\frac{\sqrt{3}}{4}$ ⓒ $\pm\frac{\sqrt{2}}{4}$ ⓓ $\pm\frac{\sqrt{5}}{4}$

----

(3) If $A(-1 , 4 , k)$, $B(2 , 2 , 1)$ and the length of $\overrightarrow{AB}$ is $\sqrt{77}$ then one of the values of k is ….

ⓐ 2 ⓑ 4 ⓒ 6 ⓓ 9

----

(4) The equation of the sphere whose center is (2 , -3 , 1) and the length of its radius equals $5\sqrt{2}$ is.....

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

ⓒ $(x-2)^2+(y+3)^2+(z-1)^2=50$ ⓓ $(x+2)^2+(y-3)^2+(z+1)^2=50$

----

(5) The equation of a sphere with center (2 , -3 , 4) and touches xy-plane is ……

ⓐ $(x-2)^2+(y+3)^2+(z-4)^2=4$ ⓑ $(x-2)^2+(y+3)^2+(z-4)^2=9$

ⓒ $(x-2)^2+(y+3)^2+(z-4)^2=16$ ⓓ $(x+2)^2+(y-3)^2+(z+4)^2=16$

----

(6) If $3x^2+3y^2+3z^2+18x-12y+30z-24=0$ is the equation of a sphere its center is M then M is ……..

ⓐ (3 , -2 , 5) ⓑ (−3 , 2 , -5) ⓒ (9 , -6 , 15) ⓓ (−9 , 6 , -15)

----

(7) If the length of the diameter of the sphere $x^2+y^2+z^2-4kx+4y-8z+2k=0$ equals $4\sqrt{5}$ where $k \in \mathbb{R}^+$ then $k =$.....
……

ⓐ 2 ⓑ $\frac{1}{2}$ ⓒ $\frac{3}{2}$ ⓓ $\frac{2}{3}$

----

(8) If the point $(-2 , 4 , m)$ lies on the Sphere $(x+2)^2+(y-1)^2+(z-3)^2=25$
Then one of the values of m is ……

ⓐ 6 ⓑ 7 ⓒ 8 ⓓ 9

---

(9) If the X-axis cut the sphere whose center is $(3\ ,\ -4\ ,\ 12)$ and its radius length **13**cm at the two points **A** and **B** then $\overline{AB}$ length equals …….

ⓐ 3 ⓑ 12 ⓒ 8 ⓓ 6

---

(10) If **ABC** is a triangle where $A(1\ ,\ 2\ ,\ 3)$, $B(0\ ,\ 1\ ,\ 2)$ and $C(2\ ,\ 1\ ,\ 0)$, then the length of the median drawn from **A** equals ……length unit

ⓐ $\sqrt{5}$ ⓑ $2\sqrt{5}$ ⓒ 5 ⓓ 10

---

(11) $\overline{AB}$ is a diameter in the sphere $(x-5)^2+(y+2)^2+(z-1)^2=25$ and where $A(8\ ,-1\ ,\ 2)$ then the coordinates of **B** is……

ⓐ $(2\ ,\ -3\ ,\ 1)$ ⓑ $(10\ ,\ -4\ ,\ 5)$ ⓒ $(2\ ,\ -3\ ,\ 0)$ ⓓ $(10\ ,\ 3\ ,\ 6)$

---

(12) If $\overrightarrow{A}=(-1\ ,4\ ,2)$, $\overrightarrow{B}=(2\ ,2\ ,1)$ then the component of $\overrightarrow{A}$ in direction of $\overrightarrow{B}$ is….

ⓐ $\frac{8}{3}$ ⓑ $\frac{7}{3}$ ⓒ $\frac{1}{3}$ ⓓ 8

---

(13) If $\overrightarrow{A}=(1\ ,-1\ ,2)$, $\overrightarrow{B}=(0\ ,2\ ,-3)$ and $\overrightarrow{C}=(-2\ ,1\ ,0)$ then $\|3\overrightarrow{A}-\overrightarrow{B}+\overrightarrow{C}\|=$ …….

ⓐ 11 ⓑ $8\sqrt{3}$ ⓒ 12 ⓓ $7\sqrt{2}$

---

(14) The length of the perpendicular from the point $(-2\ ,-3\ ,1)$ to X-axis = …….

ⓐ 2 ⓑ $\sqrt{13}$ ⓒ $\sqrt{10}$ ⓓ 5

---

(15) If $\overrightarrow{A}=(-7\ ,3\ ,10)$ and $\overrightarrow{B}=(-4\ ,-1\ ,-2)$ then the unit vector in direction of $\overrightarrow{AB}$ is………

ⓐ $(\frac{3}{13}\ ,\ \frac{4}{13}\ ,\ \frac{12}{13})$ ⓑ $(\frac{3}{13}\ ,\ \frac{-4}{13}\ ,\ \frac{-12}{13})$ ⓒ $(\frac{-3}{13}\ ,\ \frac{4}{13}\ ,\ \frac{12}{13})$ ⓓ $(\frac{-3}{13},\frac{-4}{13},\frac{-12}{13})$

---

(16) If $\overrightarrow{A}=(1\ ,2\ ,\ -4)$, $\overrightarrow{B}=(1\ ,1\ ,k-1)$ where $k\in\mathbb{Z}^+$ and $\|\overrightarrow{A}+\overrightarrow{B}\|=7$, then the value of k is ……

ⓐ 10 ⓑ 8 ⓒ 11 ⓓ 12

---

(17) If $\overrightarrow{A}=2\hat{i}+3\hat{j}+m\hat{k}$, $\overrightarrow{B}=-6\hat{i}-4\hat{j}+4\hat{k}$ and $\overrightarrow{A}\perp\overrightarrow{B}$ then $m=$ ....

ⓐ 4 ⓑ 6 ⓒ 8 ⓓ 10

(18) If $\overrightarrow{A}=(2\cos\theta\ ,\ \log_5 x\ ,\ \sin\theta)$, $\overrightarrow{B}=(\cos\theta\ ,\ \log_3 27\ ,2\ \sin\theta)$ and $\overrightarrow{A}\bullet\overrightarrow{B}=11$ then the value of $x=$ ......

ⓐ 25 ⓑ 125 ⓒ 625 ⓓ 5

---

(19) If $\overrightarrow{A}=(4\ ,\ k\ ,\ 6)$, $\overrightarrow{B}=(2\ ,\ 2\ ,\ m)$ and $\overrightarrow{A}\,//\,\overrightarrow{B}$ then $k+m=$ ......

ⓐ 1 ⓑ 2 ⓒ -1 ⓓ 7

---

(20) If θ is the measure of the included angle between $\overrightarrow{A}=(-2\ ,\ -6\ ,\ 1)$ and $\overrightarrow{B}=(2\ ,\ 6\ ,\ -1)$

then $\theta=$ ......

ⓐ zero ⓑ 60° ⓒ 120° ⓓ 180°

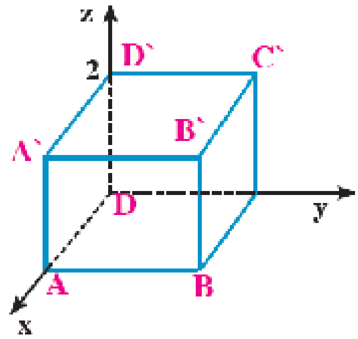
---

(21) ABC is an equilateral triangle with side length 8 cm then $\overrightarrow{BA}\bullet\overrightarrow{CB}=$ .....

ⓐ $-32\sqrt{3}$ ⓑ -32 ⓒ $32\sqrt{3}$ ⓓ 32

---

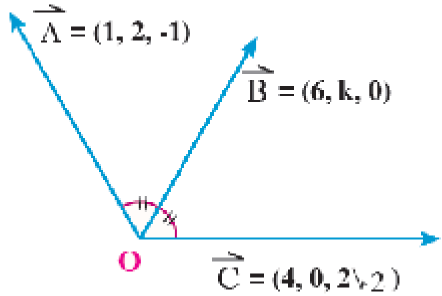
(22) In the opposite figure $ABCDA'B'C'D'$ is a cube of side length 2 units , then $\overrightarrow{AB'}\bullet\overrightarrow{BD}=$ ....



ⓐ 1 ⓑ -1
ⓒ -4 ⓓ $\frac{-1}{2}$

---

(23) In the opposite figure, the value of k = ...



ⓐ 3 ⓑ 6
ⓒ 4 ⓓ 9

---

(24) If the two straight lines : $L_1:\vec{r}=(2,3,-4)+k(2,3,a)$, $L_2:\dfrac{x-5}{b}=\dfrac{y+4}{6}=\dfrac{z-4}{2}$ are parallel then $a+b=$ .....

ⓐ 4 ⓑ 6 ⓒ 8 ⓓ 5

---

(25) The direction cosines of the vector $\overrightarrow{A}=(-2\ ,\ 1\ ,\ 2)$ are .....

ⓐ $(-2\ ,\ 1\ ,\ 2)$ ⓑ $(\frac{-2}{3}\ ,\ \frac{1}{3}\ ,\ \frac{2}{3})$ ⓒ $(\frac{-5}{3}\ ,\ 5\ ,\ \frac{5}{3})$ ⓓ $(-1\ ,\ 1\ ,\ 1)$

(26) A straight line makes an angle of measure 60^{o} with Y-axis and 60^{o} with Z-axis then it makes an angle of measure ……. .with X-axis.

ⓐ **30°** ⓑ **45°** ⓒ **60°** ⓓ **75°**

---

(27) If $\overrightarrow{AB} = -3\hat{i} + 3\hat{j} + 7\hat{k}$, $\overrightarrow{BC} = \hat{j} + 5\hat{k}$ then $\| \overrightarrow{AC} \| = ...$

ⓐ **9** ⓑ **10** ⓒ **13** ⓓ **14**

---

(28) If $\overrightarrow{A} = (1\ ,\ -1\ ,\ 2)$, $\overrightarrow{B} = (3\ ,\ -2\ ,\ 0)$, $\overrightarrow{C} = (0\ ,\ 2\ ,\ 4)$ then $\overrightarrow{A} \bullet \overrightarrow{B} \times \overrightarrow{C} = ...$

ⓐ **10** ⓑ **11** ⓒ **12** ⓓ **13**

---

(29) If $\| \overrightarrow{A} \| = 4$, $\| \overrightarrow{B} \| = 3$, $\| \overrightarrow{C} \| = 12$ and $\overrightarrow{A}$, $\overrightarrow{B}$, $\overrightarrow{C}$ are mutually perpendicular then $\| \overrightarrow{A} + \overrightarrow{B} + \overrightarrow{C} \| = ...$

ⓐ **10** ⓑ **11** ⓒ **12** ⓓ 13

---

(30) **ABCD** is a parallelogram in which $\overrightarrow{AC} = (2\ ,\ 2\ ,\ -1)$, $\overrightarrow{BD} = (-1\ ,\ 2\ ,\ -3)$ then the surface area of the parallelogram equals …… cm^2

ⓐ **6** ⓑ $7\sqrt{2}$ ⓒ $\sqrt{101}$ ⓓ $\frac{1}{2}\sqrt{101}$

---

(31) If $L_1 : \dfrac{x+2}{-1} = \dfrac{y+3}{3} = \dfrac{z+5}{2}$ is perpendicular to the line $L_2 : \dfrac{x}{2} = \dfrac{y-5}{k} = \dfrac{z-6}{m}$ then $3k + 2m = ...$

ⓐ **-1** ⓑ **1** ⓒ **2** ⓓ **3**

---

(32) The measure of the angle between the two straight lines $L_1 : 2x = 3\ y = -z$ and $L_2 : 6x = -\ y = -4z$ is …..

ⓐ **45°** ⓑ **0°** ⓒ **90°** ⓓ **180°**

---

(33) The equation of the plane passing through the point $(1\ ,\ 2\ ,\ 3)$ and parallel to each of X and Y axis is ……

ⓐ $x + y = 3$ ⓑ $z = 3$ ⓒ $x = 1$ ⓓ $y = 2$

---

(34) If $\overrightarrow{A} = (1\ ,-2\ ,\ 1)$, $\overrightarrow{B} = (k\ ,\ -5\ ,\ 3)$ and $\overrightarrow{C} = (5\ ,\ -9\ ,\ 4)$ are coplaner , then $k = ...$

ⓐ **2** ⓑ **-2** ⓒ **3** ⓓ **-3**

(35) The angle between the straight line $L_2 : \frac{x-1}{2} = \frac{y-2}{1} = \frac{z+3}{-2}$ and the plane $x + y + 4 = 0$ is ……

ⓐ 0° ⓑ 45° ⓒ 30° ⓓ 90°

---

(36) If the two planes $3x - y + 2z + 3 = 0$ and $kx - 4y + z - 5 = 0$ are perpendicular then the value of $k = ...$

ⓐ 2 ⓑ -2 ⓒ 3 ⓓ -3

---

(37) If the straight line $x = 3y = az$ is parallel to the plane $x + 3y + 2z + 4 = 0$ then the value of $a = ...$

ⓐ 3 ⓑ 2 ⓒ 1 ⓓ -1

---

(38) The measuer of the angle between the two planes $P_1 : x - z + 1 = 0$ and $P_2 : 2x - 2y - z = 0$ equals ……

ⓐ 30° ⓑ 45° ⓒ 90° ⓓ 60°

---

(39) The length of the perpendicular from the point $(3\ ,\ 0\ ,-5)$ to the Plane $2x + \sqrt{5}y + 4z - 6 = 0$ equals …….length unit

ⓐ 4 ⓑ 5 ⓒ 6 ⓓ 7

---

(40) If the intercepted parts from the coordinate axes by the plane $x + 5y - 6z = 30$ are a , b and c then $a + b + c = ...$

ⓐ 0 ⓑ 30 ⓒ 31 ⓓ 41

---

(41) The equation of the plane passing through point $(1\ ,-2\ ,5)$ and the vector $(2\ ,\ 1\ ,3)$ is perpendicular to it is …….

ⓐ $2x + y + 3z = 1$ ⓑ $2x + y + 3z = 15$

ⓒ $x - 2y + 5z = 15$ ⓓ $x + y + z = 4$

---

(42) If $\vec{A} \perp \vec{B}$, $\vec{A} \perp \vec{C}$ where $\vec{B} = (2\ ,\ 3\ ,\ 2)$, $\vec{C} = (1\ ,\ 2\ ,\ 1)$ and $\|\vec{A}\| = 4\sqrt{2}$ then $\vec{A} = ...$

ⓐ $(2\ ,\ 3\ ,\ 1)$ ⓑ $(-4\ ,\ 0\ ,\ 4)$ ⓒ $(4\ ,\ 4\ ,\ 0)$ ⓓ $(0\ ,\ -4\ ,\ 4)$

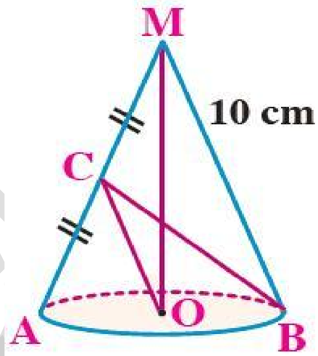
---

(43) If three adjacent sides of a parallelepiped are represented by the vectors $\vec{A} = (2, 1, 3)$, $\vec{B} = (-1 , 3 , 2)$ and $\vec{C} = (1 , 1 , -2)$ then its volume is …..

ⓐ **30** ⓑ **28** ⓒ **14** ⓓ **56**

----

(44) In the opposite figure, a right circular cone ,the perimeter of its base **12π** cm, **C** is the of $\overline{AM}$ then $\overrightarrow{BC} \cdot \overrightarrow{CO} = ...$



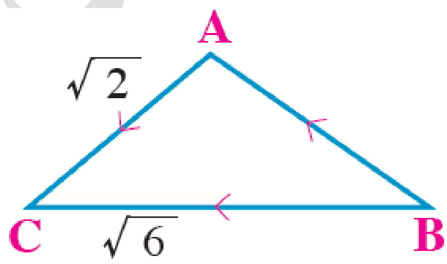
ⓐ **9** ⓑ **36**

ⓒ **-43** ⓓ **54**

----

(45) In the opposite figure, If $\|\overrightarrow{BC}\| = \sqrt{6}$, $\|\overrightarrow{AC}\| = \sqrt{2}$ and $\overrightarrow{BA} = (-1 , 0 , 1)$ then

$\overrightarrow{BA} \cdot \overrightarrow{BC} = ...$



ⓐ **1** ⓑ **2**

ⓒ **3** ⓓ **4**

----

(46) The point lying on the straight line $\vec{r} = (2 , -1 , 3) + k(1 , 2 , -1)$ is ……

ⓐ $(1 , 1 , 1)$ ⓑ $(0 , 2 , -2)$ ⓒ $(3 , 1 , 2)$ ⓓ $(4 , -3 , 0)$

----

(47) The point which lying on the p;ane $\vec{r} = (-1 , 0 , 2) + t_1(0 , 0 , 1) + t_2(1 , 0 , -1)$ is …

ⓐ $(0 , 1 , 2)$ ⓑ $(2 , 1 , 3)$ ⓒ $(3 , 1 , 2)$ ⓓ $(1 , 0 , 1)$

----

(48) The equation of x-axis is the space is ……

ⓐ $x = 0$, $y = 0$ ⓑ $x = 0$, $z = 0$ ⓒ $x = 0$ ⓓ $y = 0$, $z = 0$

Producing answers questions

(1) If $A(4 , 8 , 12)$, $B(2 , 4 , 6)$, $C(3 , 5 , 4)$ and $D(5 , 8 , 5)$ then prove that the points **A , B , C** and **D** are coplaner.

----

(2) If the three vectors $\vec{A} = \hat{i} - \hat{j} + \hat{k}$, $\vec{B} = 3\hat{i} + \hat{j} + 2\hat{k}$ and $\vec{C} = \hat{i} + m\hat{j} - 3\hat{k}$ are coplaner then find the value of k.

----

(3) Find the all different forms of the equation of the straight line passing through the point $(2 , -1 , 2)$ and its direction vector is $(-3 , 4 , 1)$ then find the point of intersection of this line with the XY-plane .

----

(4) Find the all different forms of the equation of the straight line passing through the two points $(2 , 2 , -3)$ and $(1 , -1 , 0)$. Does the point $(1 , 3 , 2)$ belongs to this straight line ?

----

(5) Find the all different forms of the equation of the straight line passes through point $(3 , 2 , 5)$ and makes equal angles with the +ve directions of the coordinated axes.

----

(6) Find the equation of the straight line passing through the Origen point and intersects the straight line $L_1 : \vec{r} = (3 , 1 , 4) + k(2 , 1 , 3)$ orthogonally.

----

(7) Prove that the two straight lines $\begin{cases} x = 2 + k \\ y = 2 + 2k \\ z = -4 - k \end{cases}$, $\dfrac{x-1}{2} = \dfrac{y+5}{4} = \dfrac{z}{-2}$ are coplanar.

----

(8) Prove that the two straight lines L_1 and L_2 are intersected orthogonally where $L_1 : \vec{r} = (3 , -3 , 5) + t_1(0 , -5 , 5)$ and $L_2 : \vec{r} = (-2 , 3 , 1) + t_2(5 , -1 , -1)$.

----

(9) Prove that the two straight lines $\begin{cases} L_1 : \vec{r} = (3 , -1 , 2) + k_1(4 , 1 , 3) \\ L_2 : \vec{r} = (0 , 4 , -1) + k_2(1 , -1 , 2) \end{cases}$ are skew.

----

(10) Find the perpendicular distance from the point $(2 , 1 , -4)$ to the straight line $L_1 : \vec{r} = (1 , -1 , 2) + k(2 , 3 , -2)$.

----

(11) Find the equation of the plane passing through the point $(1\ ,\ -2\ ,\ 4)$ and Perpendicular to the straight line passing through the two points $(3\ ,\ 0\ ,\ -3)$ and $(-1\ ,\ -3\ ,\ 2)$.

----

(12) Find all the different forms of the equation of the plane passing through the point $A(-2\ ,\ 3\ ,\ 4)$ and parallel to each of the two vectors $\overrightarrow{u_1} = (1\ ,\ -2\ ,\ 1)$ and $\overrightarrow{u_2} = (3\ ,\ 2\ ,\ 4)$.

----

(13) Find all the different forms of the equation of the plane passing through the point $A(1\ ,\ -1\ ,\ 1)$ and Perpendicular to each of the planes $x - y + z - 1 = 0$ and $2x + y + z + 1 = 0$

----

(14) Find all the different forms of the equation of the plane passing through the three points $A(3\ ,\ 1\ ,\ 0)$, $B(0\ ,\ 7\ ,\ 2)$ and $C(4\ ,\ 1\ ,\ 5)$.

----

(15) If the plane $3x + 2y + 4z - 12 = 0$ intersects the coordinate axes x , y , z at the points A , B and C respectively, find the area of the triangle A B C.

----

(16) Find the equation of the plane which contains the straight line $\frac{x+1}{2} = y = \frac{z-4}{-3}$ and passes through the Origen point.

----

(17) Prove that the two straight lines $2x = 3y = 4z$ and $3x = 2y = 5z$ are intersecting, then find the equation of the plane containing them.

----

(18) Prove that the two straight lines $\begin{cases} x = 4 - 2t_1 \\ y = 3 + t_1 \\ z = 1 + 3t_1 \end{cases}$ and $\begin{cases} x = 5 + 2t_2 \\ y = 1 - t_2 \\ z = 1 - 3t_2 \end{cases}$ are parallel then find the equation of the plane containing them.

----

(19) If $P_1 : 2x - y - z + 7 = 0$, $P_2 : x - 5y + 3z = 0$ and $L : \frac{x-1}{2} = -y - 3 = \frac{z}{5}$ then find the measuer between: ⓐ P_1 and P_2 ⓑ P_1 and L

----

(20) Prove that the two planes $3x+6y+6z=4$, $x+2y+2z=1$ are parallel, then find the distance between them.

----

(21) Find the projection of the point $A(0\ ,\ 9\ ,\ 6)$ on the straight line $\overleftrightarrow{BC}$ where $B(1\ ,\ 2\ ,\ 3)$ and $C(7\ ,\ -2\ ,\ 5)$.

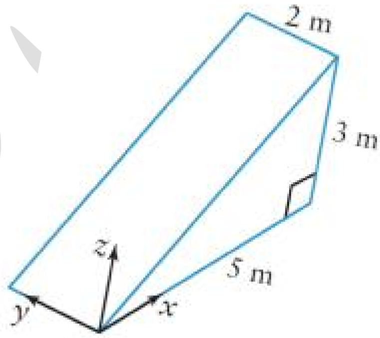
(22) Find the point of intersection of the line $x=2+3k$, $y=-4k$, $z=5+k$ and the plane $4x+5y-2z=18$ then find the measure of the angle between them.

----

(23) Find the equation of the plane which containing the straight line $\vec{r_1}=(1\ ,2\ ,\ 4)+k_1(4\ ,\ 1\ ,\ 11)$ and perpendicular to $\vec{r_2}=(4\ ,15\ ,\ 8)+k_2(2\ ,\ 3\ ,\ -1)$

----

(24) By using the opposite figure:
find the equation of the inclined plane



----

(25) Find the equation of the line of intersection of the two planes $x+y+z=1$ and $x+z=0$

----

(26) Find the equation of the plane which contains the straight line L_1 and parallel to the straight line L_2 where $\begin{cases} L_1 : \vec{r}=(0\ ,3\ ,\ -5)+k_1(6\ ,\ -2\ ,\ -1) \\ L_2 : \vec{r}=(1\ ,7\ ,\ -4)+k_2(1\ ,\ -3\ ,\ 3) \end{cases}$

----

(27) Find the equation of the straight line which passes through the point $(2\ ,4\ ,\ 1)$ and perpendicular to the plane $3x-y+5z=77$

----

(28) If the point on the plane **P** which is closest to the point $(1\ ,\ 0\ ,\ \text{-}1)$ where $P : 2x+y-2z=1$

----

(29) Find the equation of the sphere whose center is $(-2\ ,\ 1\ ,\ \text{-}1)$ and touches the plane $2x+2y+z=3$

(30) Find the equation of the plane passing through the point **(1 , -1 , 1)** and Perpendicular to each of the two planes $x - y + z = 1$, $2x + y + z + 1 = 0$

$7x + y + 2z = 6$, $3x + 5y - 6z = 8$

Multiple choice answers

(1)	ⓑ	(2)	ⓑ	(3)	ⓓ	(4)	ⓒ	(5)	ⓒ	(6)	ⓑ
(7)	ⓑ	(8)	ⓑ	(9)	ⓓ	(10)	ⓐ	(11)	ⓒ	(12)	ⓐ
(13)	ⓓ	(14)	ⓒ	(15)	ⓑ	(16)	ⓒ	(17)	ⓑ	(18)	ⓑ
(19)	ⓓ	(20)	ⓓ	(21)	ⓑ	(22)	ⓒ	(23)	ⓐ	(24)	ⓓ
(25)	ⓑ	(26)	ⓑ	(27)	ⓒ	(28)	ⓓ	(29)	ⓓ	(30)	ⓓ
(31)	ⓒ	(32)	ⓒ	(33)	ⓑ	(34)	ⓐ	(35)	ⓑ	(36)	ⓑ
(37)	ⓓ	(38)	ⓑ	(39)	ⓐ	(40)	ⓒ	(41)	ⓑ	(42)	ⓑ
(43)	ⓑ	(44)	©	(45)	ⓒ	(46)	ⓒ	(47)	ⓓ	(48)	ⓓ