Straight Lines

Type – 1

Choose the most appropriate option (a, b, c or d).

Q 1. The direction cosines of a line whose equations are $\frac{x-1}{2}=\frac{y+3}{4}=\frac{z-2}{-3}$ are

(a) $\frac{1}{\sqrt{14}},\frac{-3}{\sqrt{14}},\frac{2}{\sqrt{14}}$ (b) $\frac{2}{\sqrt{29}},\frac{4}{\sqrt{29}},\frac{-3}{\sqrt{29}}$ (c) $\frac{1}{\sqrt{29}},\frac{-3}{\sqrt{29}},\frac{2}{\sqrt{29}}$ (d) 2, 4, – 3

Q 2. The equations of the line passing through the point (1, 2, 3) having the direction ratios 3, 2,1 are

(a) $\frac{x-1}{1}=\frac{y-2}{2}=\frac{z-3}{3}$ (b) $\frac{x}{3}=\frac{y}{6}=\frac{z}{9}$ (c) $\frac{x+2}{3}=\frac{y}{2}=\frac{z-2}{1}$ (d) none of these

Q 3. The equations of the line passing through the points (-2,1,0) and (3, 4,-1) are

(a) $\frac{x+7}{5}=\frac{y+2}{3}=\frac{z-1}{-1}$ (b) $\frac{x+2}{-1}=\frac{y-1}{3}=\frac{z}{5}$ (c) $\frac{x+3}{5}=\frac{y+4}{3}=\frac{z-1}{-1}$ (d) none of these

Q 4. The coordinates of a point on the line $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z}{\sqrt{3}}$ at a distance 1 unit from the point (-1,-1,-$\sqrt{3}$) are

(a) $\left(-\frac{3}{2},-\frac{7}{4}-\frac{5}{4}\sqrt{3}\right)$ (b) $\left(\frac{3}{2},\frac{11}{4},\frac{\sqrt{3}}{4}\right)$ (c) $\left(\frac{1}{2},\frac{5}{4},\frac{\sqrt{3}}{4}\right)$ (d) none of these

Q 5. The equation of the locus of the point $\left(1+\frac{r}{4},-1+\frac{r}{3},2\right)$, where $r \in R$, is given by

(a) $\frac{x-1}{4}=\frac{y+1}{3}=\frac{z-2}{0}$ (b) $\frac{x-1}{3}=\frac{y+1}{4}=\frac{z-2}{0}$ (c) $4x - 3y = 7$ (d) $z = 2$

Q 6. The lines $\frac{x+3}{-2}=\frac{y}{1}=\frac{z-4}{3}$ and $\frac{x}{\lambda}=\frac{y-1}{\lambda+1}=\frac{z}{\lambda+2}$ are perpendicular to each other. Then λ is equal to

(a) $-\frac{5}{3}$ (b) 4 (c) $-\frac{1}{4}$ (d) – 4

Q 7. If the lines $\frac{x+2}{4\lambda+1}=\frac{y-1}{4}=\frac{z}{-18}$ and $\frac{x}{-3}=\frac{y+1}{5\mu-3}=\frac{z-1}{6}$ are parallel to each other then the value of the pair (λ, μ) is

(a) $\left(-2,\frac{1}{3}\right)$ (b) $\left(2,-\frac{1}{3}\right)$ (c) $\left(2,\frac{1}{3}\right)$ (d) none of these

Q 8. The angle between the lines $\frac{x+2}{1}=\frac{y+3}{-2}=\frac{z-4}{1}$ and $\frac{x+1}{-1}=\frac{y}{1}=\frac{z}{0}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) 0

Q 9. If $\frac{\alpha}{\alpha'},\frac{\beta}{\beta},\frac{\gamma}{\gamma'}$ are not equal, then point of intersection of the lines $\frac{x-\alpha'}{\alpha}=\frac{y-\beta'}{\beta}=\frac{z-\gamma'}{\gamma}$ and $\frac{x-\alpha}{\alpha'}=\frac{y-\beta}{\beta'}=\frac{z-\gamma}{\gamma'}$ is

(a) $(\alpha - \alpha', \beta', \gamma - \gamma')$ (b) $(\alpha + \alpha', \beta + \beta', \gamma + \gamma')$

(c) $(\alpha\alpha', \beta\beta', \gamma\gamma')$ (d) none of these because they are nonintersecting

Q 10. The equation of the straight line passing through the origin and perpendicular to the lines $\frac{x+1}{-3}=\frac{y-2}{2}=\frac{z}{1}$ and $\frac{x-1}{1}=\frac{y}{-3}=\frac{z+1}{2}$ has the equation

(a) x = y = z (b) $\frac{x}{4}=\frac{y}{3}=\frac{z}{6}$ (c) $\frac{x}{3}=\frac{y}{1}=\frac{z}{0}$ (d) none of these

Q 11. The shortest distance between the line $\frac{x-3}{3}=\frac{y}{0}=\frac{z}{-4}$ and the y-axis is

(a) $\frac{1}{5}$ (b) 1 (c) 0 (d) $\frac{12}{5}$

Q 12. The equations of the line of shortest distance between the lines $\frac{x+4}{4}=\frac{y-3}{0}$ and $\frac{x-5}{4}=\frac{y-3}{3}=\frac{z}{0}$ are

(a) $\frac{x+4}{0}=\frac{y-2}{0}=\frac{z-3}{1}$ (b) $\frac{x-5}{0}=\frac{y-3}{0}=\frac{z}{1}$ (c) $\frac{x}{0}=\frac{y}{0}=\frac{z-3}{1}$ (d) none of these

Q 13. The projection of the line segment joining the point (6,-2,1) and the origin on the line $\frac{x-2}{4}=\frac{y+1}{-3}=\frac{z-1}{0}$ is

(a) 30 (b) 6 (c) 5 (d) none of these

Q 14. If A = (p, q, r) and B = (p', q', r') are two points on the line Ax = uy = vz such that OA = a, OB = b then pp' + qq' + rr' is equal to

(a) a + b (b) ab (c) $\sqrt{a^2+b^2}$ (d) none of these

Q 15. The number of real values of k for which the lines $\frac{x-k}{4}=\frac{y-1}{2}=\frac{z+1}{1}$ and $\frac{x(k+1)}{1}=\frac{y}{-1}=\frac{z-1}{2}$ are intersecting, is

(a) 0 (b) 2 (c) 1 (d) infinite

Q 16. The distance between the lines $\frac{x-4}{2}=\frac{y+1}{-3}=\frac{z}{6}$ and $\frac{x}{-1}=\frac{y-1}{3/2}=\frac{z+1}{-3}$ is

(a) $\sqrt{\frac{629}{7}}$ (b) $\sqrt{\frac{39}{7}}$ (c) $\frac{\sqrt{629}}{7}$ (d) none of these

Q 17. The point A(3, -2, 4) is shifted parallel to the line $\frac{x}{\sqrt{3}}=\frac{y-1}{2}=\frac{z+1}{3}$ by a distance 1. The coordinates of P in the new position are

(a) $\left(\frac{12-\sqrt{3}}{4},-\frac{5}{2},\frac{13}{4}\right)$ (b) (3 + $\sqrt{3}$,3,2) (c) (3 - $\sqrt{3}$, -1, -4) (d) none of these

Q 18. The image of the origin in the line $\frac{x+1}{2}=\frac{y-2}{3}=\frac{z}{\sqrt{3}}$ is

(a) $\left(-1,\frac{11}{2},\frac{\sqrt{3}}{2}\right)$ (b) $\left(3,\frac{-5}{2},\frac{\sqrt{3}}{2}\right)$ (c) $\left(-3,\frac{5}{2},-\frac{\sqrt{3}}{2}\right)$ (d) $\left(1,\frac{11}{2},-\frac{\sqrt{3}}{2}\right)$

Q 19. The distance of the point (1,2, λ) from the line $\frac{x}{3}=\frac{y}{0}=\frac{z}{4}$ is 2. Then λ is

(a) $\frac{4}{3}$ (b) $\frac{3}{4}$ (c) 1 (d) nonexistent

Q 20. If the lines $\frac{x}{1}=\frac{y}{2}=\frac{z}{3},\frac{x-1}{3}=\frac{y-2}{-1}=\frac{z-3}{4}$ and $\frac{x+k}{3}=\frac{y-1}{2}=\frac{z-2}{h}$ are concurrent then

(a) h = -2,k = -6 (b) h = $\frac{1}{2}$, k = 2 (c) h = 6, k = 2 (d) h = 2, k = $\frac{1}{2}$

Q 21. The number of real values of k for which the lines $\frac{x-1}{4}=\frac{y+1}{3}=\frac{z}{k}$ and $\frac{x}{1}=\frac{y-k}{3}=\frac{z-1}{-2}$ are coplanar, is

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

Type 2

Choose the correct options. One or more options may be correct.

Q 22. A point on the line $\frac{x-1}{1}=\frac{y-2}{2}=\frac{z+1}{3}$ at a distance $\sqrt{6}$ from the origin is

(a) $\left(\frac{-5}{7},\frac{-10}{7},\frac{13}{7}\right)$ (b) (1, 2, –1) (c) $\left(\frac{5}{7},\frac{10}{7},\frac{-13}{7}\right)$ (d) (–1, –2, 1)

Q 23. The direction cosines of a line passing through the origin and cutting the line $\frac{x+2}{1}=\frac{y-1}{2}=\frac{z}{-1}$ at $\cos^{-1}\sqrt{\frac{6}{11}}$ are

(a) $\frac{-1}{\sqrt{11}},\frac{3}{\sqrt{11}},\frac{-1}{\sqrt{11}}$ (b) $\frac{1}{\sqrt{11}},\frac{3}{\sqrt{11}},\frac{1}{\sqrt{11}}$ (c) $\frac{-1}{\sqrt{6}},\frac{2}{\sqrt{6}},\frac{1}{\sqrt{6}}$ (d) $\frac{-3}{\sqrt{11}},\frac{-1}{\sqrt{11}},\frac{1}{\sqrt{11}}$

Answers

1b	2c	3a	4a	5b	6d	7c	8a	9b	10a
11d	12c	13b	14b	15d	16c	17a	18c	19a	20d
21a	22bc	23ad							