Question Bank (Objective 3d lines and plane) objective paper (Level -I)(Om Prakash Srivastava)

Question Bank (Objective 3d lines and plane) Objective paper Level- I

your Name :

Notice:
1. For every 10 Question there are 20 minutes
2. Each correct answer awarded 3 marks.
3. Each incorrect answer awarded -1 marks.

Time:

Accordingly

Each question in this part has four choices out of which just one is correct. Indicate your choice of correct answer for each question by writing one of the letters a, b, c, d whichever is appropriate

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1 The four lines drawn from the vertices of any tetrahedron to the centroid of the opposite faces meet in a point whose distance from each vertex is k times the distance from each vertex to the opposite face, where k is

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{3}{4}$ (d) $\frac{5}{4}$

2 Which of the statement is true ? The coordinate planes divide the line joining the points $(4, 7, -2)$ and $(-5, 8, 3)$

(a) all externally (b) two externally and one internally (c) two internally and one externally (d) none of these

3 The pair of lines whose direction cosines are given by the equations $3l + m + 5n = 0, 6mn - 2nl + 5lm = 0$ are :

(a) parallel (b) perpendicular (c) inclined at $\cos^{-1}\left(\frac{1}{6}\right)$ (d) none of these

4 The distance of the point A $(-2, 3, 1)$ from the line PQ through P$(-3, 5, 2)$ which make equal angles with the axes is

(a) $\sqrt{\frac{2}{3}}$ (b) $\sqrt{\frac{14}{3}}$ (c) $\frac{16}{\sqrt{3}}$ (d) $\frac{5}{\sqrt{3}}$

5 The equation of the plane through the point $(2, 5, -3)$ perpendicular to the planes $x + 2y + 2z = 1$ and $x - 2y + 3z = 4$ is

(a) $3x - 4y + 2z - 20 = 0$ (b) $7x - y + 5z = 30$ (c) $x - 2y + z = 11$ (d) $10x - y - 4z = 27$

6 The equation of the plane through the points $(0, -4, -6)$ and $(-2, 9, 3)$ and perpendicular to the plane $x - 4y - 2z = 8$ is

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

7 The equation of the plane passing through the points $(3, 2, -1), (3, 4, 2)$ and $(7, 0, 6)$ is $5x + 3y - 2z = \lambda$ where λ is

(a) 23 (b) 21 (c) 19 (d) 27

8 A variable plane which remains at a constant distance p from the origin cuts the coordinate axes in

A, B, C. The locus of the centroid of the tetrahedron OABC is $y^2z^2 + z^2y^2 + x^2y^2 = kx^2y^2z^2$ where k is equal to

(a) $9p^2$ (b) $\frac{9}{p^2}$ (c) $\frac{7}{p^2}$ (d) $\frac{16}{p^2}$

9 The line joining the points $(1,1,2)$ and $(3,-2,1)$ meets the plane $3x+2y+z=6$ at the point

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

10 The point on the line $\frac{x-2}{1} = \frac{y+3}{-2} = \frac{x+5}{-2}$ at a distance of 6 from the point $(2,-3,-5)$ is :

(a) $(3,-5,-3)$ (b) $(4,-7,-9)$ (c) $(0,20,-1)$ (d) $(-3,5,3)$

11 The plane passing through the point (5, 1, 2) perpendicular to the line $2(x-2) = y-4 = z-5$ will meet the line in the point

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

12 The point equidistant from the four points $(a,0,0),(0,b,0),(0,0,c)$ and $(0,0,0)$ is :

(a) $\left(\frac{a}{3},\frac{b}{3},\frac{c}{3}\right)$ (b) $(a.b.c)$ (c) $\left(\frac{a}{2},\frac{b}{2},\frac{c}{2}\right)$ (d) None of these

13 P, Q, R, S are four coplanar points on the sides AB, BC, CD, DA of a skew quadrilateral. $\frac{AP}{PB} \cdot \frac{BQ}{QC} \cdot \frac{CR}{RD} \cdot \frac{DS}{SA}$ equals

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

14 The angle between any two diagonals of a cube is

(a) $\cos\theta = \frac{\sqrt{3}}{2}$ (b) $\cos\theta = \frac{1}{\sqrt{2}}$ (c) $\cos\theta = \frac{1}{3}$ (d) $\cos\theta = \frac{1}{\sqrt{6}}$

15 The acute angle between two lines whose direction cosines are given by the relation 2 2 2between $l+m+n=0$ and $l^2+m^2-n^2=0$ is

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) None of these

16 The lines $\frac{x-1}{1} = \frac{y-1}{2} = \frac{x-2}{-1}$ and $\frac{x-1}{2} = \frac{y}{1} = \frac{x+1}{4}$

(a) parallel lines (b) intersecting lines (c) perpendicular skew lines (d) None of these

17 The direction consines of the line drawn from $P(-5,3,1)$ to $Q(1,5,-2)$ is

(a) $(6,2,-3)$ (b) $(2,-4,1)$ (c) $(-4,8,-1)$ (d) $\left(\frac{6}{7},\frac{2}{7},-\frac{3}{7}\right)$

18 The coordinates of the centroid of triangle ABC where A,B,C are the points of intersection of the plane $6x+3y-2z=18$ with the coordinate axes are

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

19 The intercepts made on the axes by the plane which bisects the line joining the points $(1,2,3)$ and $(-3,4,5)$ at right angles are

(a) $\left(-\frac{9}{2},9,9\right)$ (b) $\left(\frac{9}{2},9,9\right)$ (c) $\left(9,-\frac{9}{2},9\right)$ (d) $\left(9,\frac{9}{2},9\right)$

20 A line makes angles $\alpha,\beta,\gamma,\delta$ with the four diagonals of a cube. Then $\cos^2\alpha + \cos^2\beta + \cos^2\gamma + \cos^2\delta$ is

(a) 4/3 (b) 2/3 (c) 3 (d) None of these

21 A variable plane passes through the fixed point (a, b, c) and meets the axes at A, B, C.The locus of the point of intersection of the planes through A, B, C and parallel to the coordinate planes is

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

22 A plane moves such that its distance from the origin is a constant p. If it intersects the coordinate axes at A, B,C then the locus of the centroid of the triangle ABC is

(a) $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{1}{p^2}$ (b) $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{9}{p^2}$ (c) $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{2}{p^2}$ (d) $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{4}{p^2}$

23 The distance between two points P and Q is d and the length of their projections of PQ on the coordinate planes are d_1, d_2, d_3. Then $d_1^2+d_2^2=Kd^2$ where K is

(a) 1 (b) 5 (c) 3 (d) 2

24 The line $\frac{x-1}{2}=-\frac{y}{3}=\frac{z}{1}$ is vertical. The direction cosines of the line of greatest slope in the plane $3x-2y+z=5$ are Proportional to

(a) $(16,11,-1)$ (b) $(-11,16,1)$ (c) $(16,11,1)$ (d) $(11,16,-1)$

25 The symmetric form of the equations of the line $x+y-z=1, 2x-3y+z=2$ is

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

26 The equation of the plane which passes through the x-axis and perpendicular to the line $\frac{x-1}{\cos\theta}=\frac{y+2}{\sin\theta}=\frac{z-3}{0}$ is

(a) $x\tan\theta+y\sec\theta=0$ (b) x sec θ + y tan θ = 0 (c) x cos θ + y sin θ = 0 (d) x sin θ - y cos θ = 0

27 The edge of a cube is of length of a. The shortest distance between the diagonal of a cube and an edge skew to it is

(a) $a\sqrt{2}$ (b) a (c) $\frac{\sqrt{2}}{a}$ (d) $\frac{a}{\sqrt{2}}$

28 The equation of the plane passing through the intersection of the planes $2x-5y+z=3$ and $x+y+4z=5$ and parallel to the plane $x+3y+6z=1$ is $x+3y+6z=k$, where k is :

(a) 5 (b) 3 (c) 7 (d) 2

29 The lines which intersect the skew lines $y=mx, z=c$; $y=-mx, z=-c$ and the x-axis lie on the surface

(a) $cz=mxy$ (b) $cy=mxz$ (c) $xy=cmz$ (d) None of these

30 The equation of the line passing through the point $(1,1,-1)$ and perpendicular to the plane $x-2y-3z=7$ is

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

31 The plane $4x+7y+4z+81=0$ is rotated through a right angle about its line of intersection with the plane $5x+3y+10z=25$. The equation of the plane in its new position is $x-4y+6z=k$, where k is

(a) 106 (b) -89 (c) 73 (d) 37

32 A plane meets the coordinate axes in A, B, C such that the centroid of the triangle ABC is the point (a, a, a). Then the equation of the plane is $x + y + z = p$ where p is

(a) a (b) 3/a (c) a/3 . (d) 3a

33 If from the point P (a, b, c) perpendiculars PL, PM be drawn to YOZ and ZOX planes, then the equation of the plane OLM is

(a) $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 0$ (b) $\frac{x}{a} - \frac{y}{b} + \frac{z}{c} = 0$ (c) $\frac{x}{a} + \frac{y}{b} - \frac{z}{c} = 0$ (d) $\frac{x}{a} - \frac{y}{b} - \frac{z}{c} = 0$

34 A variable plane makes with the coordinate planes, a tetrahedron of constant volume 64 k^3. Then the locus of the centroid of tetrahed-ron is the surface

(a) $xyz = 6k^2$ (b) $xy + yz + zx = 6k^2$ (c) $x^2 + y^2 + z^2 = 8k^2$ (d) none of these

35 The plane $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = k$, meets the co-ordinate axes at A, B, C such that the centroid of the triangle ABC is the point (a, b, c). Then k is :

(a) 3 (b) 2 (c) 1 (d) 5

36 The perpendicular distance of the origin from the plane which makes intercepts 12, 3 and 4 on x, y, z axes respectively, is

(a) 13 (b) 11 (c) 17 (d) none of these

37 A plane meets the coordinate axes at A, B, C and the foot of the perpendicular from the origin O to the plane is P, OA = a, OB = b, OC = c. If P is the centroid of the triangle ABC, then

(a) $a + b + c = 0$ (b) I a I = I b I = I c I (c) $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$ (d) none of these abc

38 A, B, C, D is a tetrahedron. A_1, B_1, C_1, D_1 are respectively the centroids of the triangles BCD, ACD, ABD and ABC ; AA_1, BB_1, CC_1, DD_1 divide one another in the ratio

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

39 A plane makes intercepts OA, OB, OC whose measurements are a, b, c on the axes OX, OY, OZ. The area of the triangle ABC is

(a) $\frac{1}{2}(ab + bc + ca)$ (b) $\frac{1}{2}(a^2b^2 + b^2c^2 + c^2a^2)^{1/2}$ (c) $\frac{1}{2}abc(a + b + c)$ (d) $\frac{1}{2}(a + b + c)^2$

40 The projections of a line on the axes are 9, 12 and 8. The length of the line is

(a) 7 (b) 17 (c) 21 (d) 25

41 If P, Q, R, S are the points (4, 5, 3), (6, 3, 4), (2, 4, -1), (0, 5, 1), the length of projection of RS on PQ is :

(a) $\frac{4}{3}$ (b) $\frac{2}{3}$ (c) 4 (d) 6

42 The distance of the point P $(-2, 3, 1)$ from the line QR, through Q $(-3, 6, 2)$ which makes equal angles with the axes is

(a) 3 (b) 8 (c) $\sqrt{2}$ (d) $2\sqrt{2}$

43 The direction ratios of the bisector of the angle between the lines whose direction cosines are l_1, m_1, n_1 and l_2, m_2, n_2 are

(a) $l_1 + l_2, m_1 + m_2, n_1 + n_2$ (b) $l_1m_2 - l_2m_1,\ m_1n_2 - m_2n_1, n_1l_2 - n_2l_1$ (c) $l_1m_2 + l_2m_1,\ m_1n_2 + m_2n_1, n_1l_2 + n_2l_1$ (d) none of these

44 The points $(8, -5, 6), (11, 1, 8), (9, 4, 2)$ and $(6, -2, 0)$ are the vertices of a

(a) rhombus (b) square (c) rectangle (d) parallelogram

45 The straight lines whose direction cosines are given by $al + bm + cn = 0, fmn + gnl + him = 0$ are perpendicular if

(a) $\frac{f}{a} + \frac{g}{b} + \frac{h}{c}\hat{} = 0$ (b) $\frac{a^2}{f} + \frac{b^2}{g} + \frac{c^2}{h} = 0$ (c) $a^2(g + h) + b^2(h + f) + c^2(f + g) = 0$ (d) none of these

46 The three planes $4y + 6z = 5; 2x + 3y + 5z = 5; 6x + 5y + 9z = 10$

(a) meet in a point (b) have a line in common (c) form a triangular prism (d) none of these

47 The line $\frac{x+1}{2} = \frac{y+1}{3} = \frac{z+1}{4}$ meets the plane $x + 2y + 3z = 14$, in the point :

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

48 The foot of the perpendicular from P (1, 0, 2) to the line $\frac{x+1}{3} = \frac{y-2}{-2} = \frac{z+1}{-1}$ is the point :

(a) $(1, 2, -3)$ (b) $\left(\frac{1}{2}, 1, -\frac{3}{2}\right)$ (c) $(2, 4, -6)$ (d) $(2, 3, 6)$

49 The length of the perpendicular from $(1, 0, 2)$ on the line $\frac{x+1}{3} = \frac{y-2}{-2} = \frac{z+1}{-1}$ is:

(a) $\frac{3\sqrt{6}}{2}$ (b) $\frac{6\sqrt{3}}{5}$ (c) $3\sqrt{2}$ (d) $2\sqrt{3}$

50 The plane containing the two lines $\frac{x-3}{1} = \frac{y-2}{4} = \frac{z-1}{5}$ and $\frac{x-2}{1} = \frac{y+3}{-4} = \frac{z+1}{5}$ is $11x + my + nz = 28$ where

(a) $m = -1, n = 3$ (b) $m = 1, n = -3$ (c) $m = -1, n = -3$ (d) $m = 1, n = 3$