MATHS

BOOKS - KC SINHA ENGLISH

VECTOR AND 3D - JEE MAINS AND ADVANCED QUESTIONS

Exercise

1. Given, two vectors are $\hat{i} - \hat{j}$ and $\hat{i} + 2\hat{j}$, the unit vector coplanar with the two vectors and perpendicular to first is:

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2. The vector $\hat{i} + x\hat{j} + 3\hat{k}$ is rotated through an angle θ and is doubled in magnitude. It now becomes $4\hat{i} + (4x - 2)\hat{j} + 2\hat{k}$. The values of x are

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3. If the vectors $\overrightarrow{a}, \overrightarrow{b}$ and $\overrightarrow{c}$ form the sides, BC , CA and AB, respectively, of triangle ABC, then

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4. If the vectors $\overrightarrow{c}, \overrightarrow{a} = x\hat{i} + y\hat{j} + z\hat{k}$ and $\overrightarrow{b} = \hat{j}$ are such that $\overrightarrow{a}, \overrightarrow{c}$ and $\overrightarrow{b}$ form a right handed system then $\overrightarrow{c}$ is

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5. If $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$ and vectors $(1, a, a^2)$, $(1, b, b^2)$ and $(1, c, c^2)$ are non-coplanar, then the product abc equal to:

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6. $\vec{a}, \vec{b}, \vec{c}$ are 3 vectors, such that $\vec{a} + \vec{b} + \vec{c} = 0, \left|\vec{a}\right| = 1, \left|\vec{b}\right| = 2, \left|\vec{c}\right| = 3, then \vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.$ is equal to (A) 0 (B) -7 (C) 7 (D) 1

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7. If $\vec{u}, \vec{v}$ and $\vec{w}$ are three non coplanar vectors then $\left(\vec{u} + \vec{v} - \vec{w}\right).\left(\vec{u} - \vec{v}\right) \times \left(\vec{v} - \vec{w}\right)$ equals (A) $\vec{u}.\left(\vec{v} \times \vec{w}\right)$ (B) $\vec{u}.\vec{w} \times \vec{v}$ (C) $2\vec{u}.\left(\vec{v} \times \vec{w}\right)$ (D) 0

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8. Consider points A,B,C annd D with position vectors $7\hat{i} - 4\hat{j} + 7\hat{k}, \hat{i} - 6\hat{j} + 10\hat{k}, -1\hat{i} - 3\hat{j} + 4\hat{k}$ and $5\hat{i} - \hat{j} + 5\hat{k}$, respectively. Then, ABCD is

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9. If vectors $\overrightarrow{AB} = -3\hat{i} + 4\hat{k}$ and $\overrightarrow{AC} = 5\hat{i} - 2\hat{j} + 4\hat{k}$ are the sides of a ΔABC, then the length of the median throught A is

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10. Let $\overrightarrow{u} = \hat{i} + \hat{j}, \overrightarrow{v} = \hat{i} - \hat{j}$ and $\overrightarrow{w} = \hat{i} + 2\hat{j} + 3\hat{k}$. If $\widehat{n}$ is a unit vector such that $\overrightarrow{u}.\widehat{n} = 0$ and $\overrightarrow{v}.\widehat{n} = 0, \left|\overrightarrow{w}.\widehat{n}\right|$ is equal to (A) 0 (B) 1 (C) 2 (D) 3

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11. If $\overrightarrow{a}, \overrightarrow{b}$ and $\overrightarrow{}$ are non-coplanar vectors and λ is a real number, then the vectors $\overrightarrow{a} + 2\overrightarrow{b} + 3\overrightarrow{c}, \lambda\overrightarrow{b} + \mu\overrightarrow{c}$ and $(2\lambda - 1)\overrightarrow{c}$ are coplanar when

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12. Let $\overrightarrow{u}, \overrightarrow{v}$ and $\overrightarrow{w}$ be such that $\left|\overrightarrow{u}\right| = 1, \left|\overrightarrow{v}\right| = 2$ and $\left|\overrightarrow{w}\right| = 3$ if the projection of $\overrightarrow{v}$ along $h\overrightarrow{u}$ is equal to that of $\overrightarrow{w}$ along $\overrightarrow{u}$ and vectors $\overrightarrow{v}$ and $\overrightarrow{w}$ are perpendicular to each other then $\left|\overrightarrow{u} - \overrightarrow{v} + \overrightarrow{w}\right|$ equals

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13. Let $\overrightarrow{a}, \overrightarrow{b}$ and $\overrightarrow{c}$ be three non-zero vectors which are positive non-collinear. If $\overrightarrow{a} + 3\overrightarrow{b}$ is collinear with $\overrightarrow{c}$ and $\overrightarrow{b} + 2\overrightarrow{c}$ is collinear with $\overrightarrow{a}$ then $\overrightarrow{a}$ then $\overrightarrow{a} + 3\overrightarrow{b} + 6\overrightarrow{c}$ is:

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14. If C is the mid point of AB and P is any point outside AB then (A) $\overrightarrow{PA} + \overrightarrow{PB} + \overrightarrow{PC} = 0$ (B) $\overrightarrow{PA} + \overrightarrow{PB} + 2\overrightarrow{PC} = \overrightarrow{0}$ (C) $\overrightarrow{PA} + \overrightarrow{PB} = \overrightarrow{PC}$ (D) $\overrightarrow{PA} + \overrightarrow{PB} = 2\overrightarrow{PC}$

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15. For any vector $\vec{a}$ the value of $\left(\vec{a} \times \hat{i}\right)^2 + \left(\vec{a} \times \hat{j}\right)^2 + \left(\vec{a} \times \hat{k}\right)^2$ is equal to

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16. Let $\vec{a} = \vec{i} - \vec{k}, \vec{b} = x\vec{i} + \vec{j} + (1-x)\vec{k}$ and $\vec{c} = y\vec{i} + x\vec{j} + (1+x-y)\vec{k}$. Then $\left[\vec{a}\,\vec{b}\,\vec{c}\right]$ depends on

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17. The value of a, for which the points A, B, C with position vectors $2\hat{i} - \hat{j} + \hat{k}, \hat{i} - 3\hat{j} - 5\hat{k}$ and $a\hat{i} - 3\hat{j} + \hat{k}$ respectively are the vertices of a right angled triangles with $C = \frac{\pi}{2}$ are

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18. Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}, \vec{b} = \hat{i} - \hat{j} + 2\hat{k}$ and $\vec{c} = x\hat{i} + (x-2)\hat{j} - \hat{k}$. If the vector $\vec{c}$ lies in the plane of $\vec{a}$ and $\vec{b}$, then x is equal to:

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19. The non-zero vectors $\vec{a}, \vec{b}$ and $\vec{c}$ are related by $\vec{a} = 8\vec{b}$ and $\vec{c} = -7\vec{b}$ angle between $\vec{a}$ and $\vec{c}$ is

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20. If $\vec{u}, \vec{v}, \vec{w}$ are noncoplanar vectors and p, q are real numbers, then the equality $\left[3\vec{u}, p\vec{v}, p\vec{w}\right] - \left[p\vec{v}, \vec{w}, q\vec{u}\right] - \left[2\vec{w}, q\vec{v}, q\vec{u}\right] = 0$ holds for (1) exactly one value of (p, q) (2) exactly two values of (p, q) (3) more than two but not all values of (p, q) (4) all values of (p, q)

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21. If the vectors $a = \hat{i} - \hat{j} + 2\hat{k}, b = 2\hat{i} + 4\hat{j} + \hat{k}$ and $c = \lambda\hat{i} + \hat{j} + \mu\hat{k}$ are mutually orthogonal, then (λ, μ) is equal to

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22. The vectors $\overrightarrow{a}$ and $\overrightarrow{b}$ are not perpendicular and $\overrightarrow{c}$ and $\overrightarrow{d}$ are two vectors satisfying : $\overrightarrow{b} \times \overrightarrow{c} = \overrightarrow{b} \times \overrightarrow{d}$ and $\overrightarrow{a} . \overrightarrow{d} = 0$. Then the $\overrightarrow{d}$ is equal to (A) $\overrightarrow{c} + \frac{\overrightarrow{a} . \overrightarrow{c}}{\overrightarrow{a} . \overrightarrow{b}} \overrightarrow{b}$ (B) $\overrightarrow{b} + \frac{\overrightarrow{b} . \overrightarrow{c}}{\overrightarrow{a} . \overrightarrow{b}} \overrightarrow{c}$ (C) $\overrightarrow{c} - \frac{\overrightarrow{a} . \overrightarrow{c}}{\overrightarrow{a} . \overrightarrow{b}} \overrightarrow{b}$ (D) $\overrightarrow{b} - \frac{\overrightarrow{b} . \overrightarrow{c}}{\overrightarrow{a} . \overrightarrow{b}} \overrightarrow{c}$

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23. If the vectors $p\hat{i} + \hat{j} + \hat{k}, \hat{i} + q\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} + \hat{k}$ (where, $p \neq q \neq r \neq 1$ are coplanar), then the valueof $pqx - \{p + q - r\}$ is:

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24. Let a and b be two unit vectors. If the vectors c=a+2b and d=5a-4a are perpendicular to each other, then the angle between a and b is

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25. Let ABCD be a parallelogram such that $\overrightarrow{A}B = \overrightarrow{q}, \overrightarrow{A}D = \overrightarrow{p} and \angle BAD$ be an acute angle. If $\overrightarrow{r}$ is the vector that coincides with the altitude directed from the vertex B to the side AD, then $\overrightarrow{r}$ is given by (1) $\overrightarrow{r} = 3\overrightarrow{q} - \frac{3\left(\overrightarrow{p}\dot{\overrightarrow{q}}\right)}{\left(\overrightarrow{p}\dot{\overrightarrow{p}}\right)}\overrightarrow{p}$ (2) $\overrightarrow{r} = -\overrightarrow{q} + \left(\frac{\overrightarrow{p}\dot{\overrightarrow{q}}}{\overrightarrow{p}\dot{\overrightarrow{p}}}\right)\overrightarrow{p}$ (3) $\overrightarrow{r} = \overrightarrow{q} + \left(\frac{\overrightarrow{p}\dot{\overrightarrow{q}}}{\overrightarrow{p}\dot{\overrightarrow{p}}}\right)\overrightarrow{p}$ (4) $\overrightarrow{r} = -3\overrightarrow{q} + \frac{3\left(\overrightarrow{p}\dot{\overrightarrow{q}}\right)}{\left(\overrightarrow{p}\dot{\overrightarrow{p}}\right)}\overrightarrow{p}$

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26. If vectors $\overrightarrow{AB} = -3\hat{i} + 4\hat{k}$ and $\overrightarrow{AC} = 5\hat{i} - 2\hat{j} + 4\hat{k}$ are the sides of a ΔABC, then the length of the median throught A is

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27. If $\left[\vec{a}\times\vec{b}\,\vec{b}\times\vec{c}\,\vec{c}\times\vec{a}\right]=\lambda\left[\vec{a}\,\vec{b}\,\vec{c}\right]^2 then\lambda$ is equal to (A) 1 (B) 2 (C) 3 (D) 0

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28. Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be non-zero vectors such that no two are collinear and $\left(\vec{a}\times\vec{b}\right)\times\vec{c}=\frac{1}{3}\left|\vec{b}\right|\left|\vec{c}\right|\vec{a}$ if θ is the acute angle between vectors $\vec{b}$ and $\vec{c}$ then find value of $\sin\theta$.

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29. let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three unit vectors such that $\vec{a}\times\left(\vec{b}\times\vec{c}\right)=\frac{\sqrt{3}}{2}\left(\vec{b}+\vec{c}\right)$. If $\vec{b}$ is not parallel to $\vec{c}$, then the angle between $\vec{a}$ and $\vec{b}$ is:

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30. Let $\overrightarrow{a} = 2\hat{i} + \hat{j} - 2\hat{k}$ and $\overrightarrow{b} = \hat{i} + \hat{j}$. Let $\overrightarrow{c}$ be a vector such that $\left|\overrightarrow{c} - \overrightarrow{a}\right| = 3, \left|\left(\overrightarrow{a} \times \overrightarrow{b}\right) \times \overrightarrow{c}\right|$ = 3 and the angle between $\overrightarrow{c}$ and $\overrightarrow{a} \times \overrightarrow{b}$ is 30° Find $\overrightarrow{a} . \overrightarrow{c}$

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31. $Let \overrightarrow{a}, \overrightarrow{b},$ and $\overrightarrow{c}$ be three non-coplanar ubit vectors such the angle between every pair of them is $\frac{\pi}{3}$. if $\overrightarrow{a} \times \overrightarrow{b} + \overrightarrow{b} \times \overrightarrow{c} = p\overrightarrow{a} + q\overrightarrow{b} + r\overrightarrow{c}$, where p,q and r are scalars , then the value of $\frac{p^2 + 2q^2 + r^2}{q^2}$ is

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32. If R^2 if the magnitude of the projection vector of the vecrtor $\alpha\hat{i} + \beta\hat{j} on \sqrt{3}\hat{i} + \hat{j} is \sqrt{3}$ and if $\alpha = 2 + \sqrt{3}\beta$ then possible value (s) of $|\alpha|$ is /are

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33. Let $\sqrt{3}\hat{i}+\hat{j}, \hat{i}+\sqrt{3}\hat{j}$ and $\beta\hat{i}+(1-\beta)\hat{j}$ respectively be the position vedors of the points A, B and C with respect the origin O. If the distance of C from the bisector of the acute angle between OA and OB is $\frac{3}{\sqrt{2}}$, then the sum all possible values of β is ________.

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34. If the four points with position vectors $-2\hat{i}+\hat{j}+\hat{k}, \hat{i}+\hat{j}+\hat{k}, \hat{j}-\hat{k}$ and $\lambda\hat{j}+\hat{k}$ are coplanar then $\lambda=$ (A) 1 (B) 2/3 (C) -1 (D) 0

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35. Let O be the origin and let PQR be an arbitrary triangle. The point S is such that $\vec{O}P\dot{\vec{O}}Q+\vec{O}R\dot{\vec{O}}S=\vec{O}R\dot{\vec{O}}P+\vec{O}Q\dot{\vec{O}}S=\vec{O}Q$. $\vec{O}R+\vec{O}P\dot{\vec{O}}S$ Then the triangle PQ has S as its: circumcentre (b) orthocentre (c) incentre (d) centroid

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36. A plane which passes through the point (3,2,0) nd the line $\frac{x-4}{1}=\frac{y-7}{5}=\frac{z-4}{4}$ is (A) $x-y+z=1$ (B) x+y+z=5(C)x+2y-z=1 (D)2x-y+z=5`

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37. A rectangular parallelepiped is formed by planes drawn through the points $(2, 3, 5)$ and $(5, 9, 7)$ parallel to the coordinate planes. The length of a diagonal of the parallelepiped is

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

$a(x - x_1) + b(y - y_1) + c(z - z_1) = 0,$ where $ax_1 + by_1 + cz_1 = 0$ b. $al + bm + cn = 0$ c. $\frac{a}{l} = \frac{b}{m} = \frac{c}{n}$ d. $lx_1 + my_1 + nz_1 = 0$

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39. The radius of the circle in which the sphere $x^2 = y^2 + z^2 + 2z - 2y - 4z - 19 = 0$ is cut by the plane $x + 2y + 2z + 7 = 0$ is

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40. 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

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41. The two lines $x = ay + b, z = cy + d$ and $x = a'y + b', z = c'y + d'$ are pendicular to each other if

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42. The shortest distance from the plane $12x + y + 3z = 327$to the sphere $x^2 + y^2 + z^2 + 4x - 2y - 6z = 155$ is

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43. Two systems of rectangular axes have the same origin. If a plane cuts them at distance $a, b, c and d, b', c'$ from the origin, then a. $\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} + \frac{1}{a'^2} + \frac{1}{b'^2} + \frac{1}{c'^2} = 0$ b. $\frac{1}{a^2} - \frac{1}{b^2} - \frac{1}{c^2} + \frac{1}{a'^2} - \frac{1}{b'^2} - \frac{1}{c'^2} = 0$ c. $\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} - \frac{1}{a'^2} - \frac{1}{b'^2} - \frac{1}{c'^2} = 0$ d. $\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} + \frac{1}{a'^2} + \frac{1}{b'^2} + \frac{1}{c'^2} = 0$

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44. A tetrahedron has vertices O (0,0,0), A(1,2,1,), B(2,1,3) and C(-1,1,2), the angle between faces OAB and ABC will be

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45. Distance between two parallel planes $2x + y + 2z = 8$ and $4x + 2y + 4z + 5 = 0$ is

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46. A line makes an angle θ with each of the x-and z-axes. If the angle β, 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. $\frac{2}{5}$

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47. A line with direction cosines proportional to 2,1,2 meet each of the lines $x = y + a = z$ and $x + a = 2y = 2z$. The coordinastes of each of the points of intersection are given by (A) $(3a, 2a, 3a), (a, a, 2a)$ (B) $(3a, 2a, 3a), (a, a, a0$ (C) $(3a, 3a, 3a), (a, a, a)$ (D) `92a,3a,3a),(2a,a,a)

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48. If the straight lines $x = -1 + s, y = 3 - \lambda s, z = 1 + \lambda s$ and $x = \frac{t}{2}, y = 1 + t, z = 2 - t$, with parameters s and t, respectively, are coplanar, then find λ.

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49. The intersection of the spheres $x^2 + y^2 + z^2 + 7x - 2y - z = 13 and x^2 + y^2 + z^2 - 3x + 3y + 4z = 8$ is the same as the intersection of one of the spheres and the plane a. $x - y - z = 1$ b. $x - 2y - z = 1$ c. $x - y - 2z = 1$ d. $2x - y - z = 1$

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50. If the plane $2ax - 3ay + 4az + 6 = 0$ passes through the mid point of the line joining the centre of the spheres $x^2 + y^2 + z^2 + 6x - 8y - 2z = 13$ and $x^2 + y^2 + z^2 - 10x + 4y - 2z = 8$, then α equals

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51. The perpendicular distance between the line $\vec{r} = 2\hat{i} - 2\hat{j} + 3\hat{k} + \lambda\left(\hat{i} - \hat{j} + 4\hat{k}\right)$ and the plane $\vec{r}.\left(\hat{i} + 5\hat{j} + \hat{k}\right) = 5$ is :

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52. If $\angle\theta$ between the line $\frac{x+1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$ and the plane $2x - y + \sqrt{\lambda}z + 4 = 0$ is such that $\sin\theta = \frac{1}{3}$, the value of λ is

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53. The angle between the lines $2x = 3y = -z$ and $6x = -y = -4z$ is

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54. The plane $x + 2y - z = 4$ cuts the sphere $x^2 + y^2 + z^2 - x + z - 2 = 0$ in a circle of radius

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55. The two lines $x = ay + b, z = cy + d$ and $x = a'y + b', z = c'y + d'$ are pendicular to each other if

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56. the image of the point $(-1, 3, 4)$ in the plane $x-2y=0$ a. $\left(-\frac{17}{3}, \frac{19}{3}, 4\right)$ b.(15,11,4) c.$\left(-\frac{17}{3}, \frac{19}{3}, 1\right)$ d.$\left(\frac{9}{5}, -\frac{13}{5}, 4\right)$

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57. If a line makes an angle of $\frac{\pi}{4}$ with the positive directions of each of x-axis and y-axis, then the angle that the line makes with the positive direction of the z-axis is (1) $\frac{\pi}{6}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{4}$ (4) $\frac{\pi}{2}$

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58. If (2, 3, 5) is one end of a diameter of the sphere $x^2+y^2+z^2-6x-12y-2z+20=0$, then the coordinates of the other end of the diameter are (1) $(4, 9, -3)$ (2) $(4, -3, 3)$ (3) $(4, 3, 5)$ (4) $(4, 3, -3)$

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59. Let L be the line of intersection of the planes $2x + 3y + z = 1$ and $x + 3y + 2z = 2$. If L makes an angles α with the positive x-axis, then cos α equals a.$\frac{1}{\sqrt{3}}$ b. $\frac{1}{2}$ c. 1 d.$\frac{1}{\sqrt{2}}$

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60. The line passing through the points (5, 1, a) and (3, b, 1) crosses the yzplane at the point $\left(0, \frac{17}{2}, \frac{-13}{2}\right)$ .Then (1) $a = 2, b = 8$ (2) $a = 4, b = 6$ (3) $a = 6, b = 4$ (4) $a = 8, b = 2$

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61. If the straight lines $\frac{x-1}{k} = \frac{y-2}{2} = \frac{z-3}{3}$ and $\frac{x-2}{3} = \frac{y-3}{k} = \frac{z-1}{2}$ intersect at a point, then the integer k is equal to (1) -5 (2) 5 (3) 2 (4) -2

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62. Let the line $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$ lies in the plane $x + 3y - \alpha z + \beta = 0$. Then, (α, β) equals

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63. The projections of a vector on the three coordinate axis are 6, 3 , 2 respectively. The direction cosines of the vector are (1) $6, -3, 2$ (2) $\frac{6}{5}, \frac{-3}{5}, \frac{2}{5}$ (3) $\frac{6}{7}, \frac{-3}{7}, \frac{2}{7}$ (4) $\frac{-6}{7}, \frac{-3}{7}, \frac{2}{7}$

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64. A line AB in three-dimensional space makes angles 45° and 120° with the positive X-axis and The positive Y-axis, respectively. If AB makes an acute angleθ with the positive Z-axis, then θ equals

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65. Asertion: The point $A(3, 1, 6)$ is the mirror image of the point $B(1, 3, 4)$ in the plane $x - y + z = 5$. Reason: The plane $x - y + z = 5$ bisects he segment joining `A(3,1,6) and B(1,3,4). (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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66. If the angle between the line $x = \frac{y-1}{2} = (z-3)(\lambda)$ and the plane $x + 2y + 3z = 4is \cos^{-1}\left(\sqrt{\frac{5}{14}}\right)$, then λ equals

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67. Statement-I The point $A(1, 0, 7)$ is the mirror image of the point $B(1, 6, 3)$ in the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$.

Statement-II The line $\frac{x}{1}=\frac{y-1}{2}=\frac{z-2}{3}$ bisect the line segment joining $A(1, 0, 7)$ and $B(1, 6, 3)$.

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68. The distance of the point $(1, -5, 9)$ from the plane $x-y+z=5$ measured along the line $x=y=z$ is

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69. The length of the perpendicular drawn from the point $(3, -1, 11)$ to the line $\frac{x}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ is

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70. If the 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, then the value of k is

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71. An equation of the plane through the point $(1, 0, 0)$ and $(0, 2, 0)$ and at a distance $\frac{6}{7}$ units from origin is (A) $x - 2y + 2z + 1 = 0$ (B) $x - 2y + 2z - 1 = 0(C)$x-2y+2z+5=0(D)None of above`

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72. Distance between two parallel planes $2x + y + 2z = 8$ and $4x + 2y + 4z + 5 = 0$ is

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73. If 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, then k can have

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74. The image of the line $\frac{x-1}{3}=\frac{y-3}{1}=\frac{z-4}{-5}$ in the plane $2x-y+z+3=0$ is the line

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75. The angle between the lines whose direction cosines satisfy the equations $l+m+n=0$ and $l^2=m^2+n^2$ is

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76. The disatance of the point $(1, 0, 2)$ from the point of intersection of the line $\frac{x-2}{3}=\frac{y+1}{4}=\frac{z-2}{12}$ and the plane $x-y+z=16$, is

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77. The equation of the plane containing the line $2x-5y+z=3; x+y+4z=5$, and parallel to the plane,

$x + 3y + 6z = 1$, is : (1) $2x + 6y + 12z = 13$ (2) $x + 3y + 6z = -7$ (3) $x + 3y + 6z = 7$ (4) $2x + 6y + 12z = -13$

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78. If the line, $\frac{x-3}{2} = \frac{y+2}{-1} = \frac{z+4}{3}$ lies in the plane, $lx + my - n = 9$, then $l^2 + m^2$ is equal to

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79. The distance of the point $(1, -5, 9)$ from the plane $x - y + z = 5$ measured along the line $x = y = z$ is

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80. If the image of the point $P(1, -2, 3)$ in the plane, $2x + 3y - 4z + 22 = 0$ measured parallel to the line, $\frac{x}{1} = \frac{y}{4} = \frac{z}{5}$ is Q, then PQ is equal to : $\sqrt{42}$ (2) $6\sqrt{5}$ (3) $3\sqrt{5}$ (4) $3\sqrt{42}$

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81. The distance of the point $(1, 3, -7)$ from the plane passing through the point $(1, -1, -1)$ having normal perpendicular to both the lines $\frac{x-1}{1} = \frac{y+2}{-2} = \frac{z-4}{3}$ and $\frac{x-2}{2} = \frac{y+1}{-1} = \frac{z+7}{-1}$ is

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82. From a point $P(\lambda, \lambda, \lambda)$, perpendicular PQ and PR are drawn respectively on the lines $y = x, z = 1$ and $y = -x, z = -1$. If P is such tthat $\angle QPR$ is a right angle , then the possible value(s) of λ is (are)

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83. In R_3, consider the planes $P_1 : y = 0$ and $P_2 : x + z = 1$. $Let P_3$ be a plane , different from P_1 and P_2 , which passes through the interesection of P_1 and P_2I fhte distance of the (0,1,0) from p_3 is 1 and the distance of a point (α, β, γ) from P_3 is 2, then which of the following relations is (are) true ?

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84. The value of λ or which the straighat line $\frac{x-\lambda}{3} = \frac{y-1}{2+\lambda} = \frac{z-3}{-1}$ may lie on the plane $x-2y=0$ (A) 2 (B) 0 (C) $-\frac{1}{2}$ (D) there is no such λ

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85. Let P be the image of the point (3,1,7) with respect to the plane x-y+z=3. then the equation o the plane passing through P and containing the straight line $\frac{x}{1} = \frac{y}{2} = \frac{z}{1}$

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