



## MATHS

### BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

#### ADDITION OF VECTORS

##### Solved Example

1. A unit vector parallel to the sum of the vectors  $2i + 4j - 5k$ ,  $i + 2j + 3k$  are

A.  $\frac{\pm(3i + 6j - 2k)}{7}$

B.  $\frac{\pm(3i - 6j - 2k)}{7}$

C.  $\frac{\pm(3i + 6j + 2k)}{7}$

D.  $\frac{\pm(3i - 6j - 2k)}{7}$

Answer: A



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2. The points  $-6a + 3b + 2c$ ,  $3a - 2b + 4c$ ,  $5a + 7b + 3c$ ,  $-13a + 17b - c$  are

- A. collinear
- B. coplanar but not collinear
- C. noncoplanar
- D. none

**Answer: D**



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3. If the position vectors of A, B are  $2i + 3j + k$  and  $3i - j + 4k$  respectively then the position vector of the point which divides AB in the ratio 3 : 2 is

A.  $\frac{9i + 30j + 4k}{5}$

B.  $\frac{8i + 7j + 3k}{5}$

C.  $\frac{13i + 3j + 14k}{5}$

D.  $\frac{12i + 3j + 5k}{5}$

**Answer: C**



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4. The vector equation of the plane passing through the point (1, 2, 3) and parallel to the vectors (-2, 3, 1), (2, -3, 4) is

A.  $r = s(2i + j - k) + t(i + 2j + 2k)$

B.  $r = 2i + 2j - 3k + s(3i + 3j - 5k) + t(i + 2j + k)$

C.  $r = (i + 2j + 3k) + s(-2i + 3j + k) + t(2i - 3j + 4k)$

D. none

**Answer: C**



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5. If P is a point on the line passing through the point A with position vector  $2\mathbf{i} + \mathbf{j} - 3\mathbf{k}$  and parallel to  $\mathbf{i} + 2\mathbf{j} + \mathbf{k}$  such that  $AP = 2\sqrt{6}$  then the position vector of P is

A.  $4\mathbf{i} + 5\mathbf{j} + \mathbf{k}$

B.  $3\mathbf{j} + 5\mathbf{k}$

C.  $4\mathbf{i} + 5\mathbf{j} - \mathbf{k}$

D.  $3\mathbf{j} - 4\mathbf{k}$

**Answer: C**



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6. The points of intersection of the line  $\mathbf{r} = 2\mathbf{a} + t(\mathbf{b} - \mathbf{c})$  with the plane  $\mathbf{r} = \mathbf{a} + p(\mathbf{b} + \mathbf{c}) + q(\mathbf{a} + 2\mathbf{b} - \mathbf{c})$  is

A.  $4\mathbf{a} + 3\mathbf{b} - 3\mathbf{c}$

B.  $4\mathbf{a} - 3\mathbf{b} + 3\mathbf{c}$

C.  $\frac{1}{2}(4a - 3b + 3c)$

D.  $\frac{1}{2}(4a + 3b - 3c)$

**Answer: D**



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**7. Match the items of column I to that of column II**

Column I	Column II
(A) If a and b are noncollinear and $xa + yb = (y + 1)a + (2 - x)b$ Then $x - y$ equals	(p) 6
(B) If a, b are non-collinear and $(2 - x)a + b$ and $ya + (x - 3)b$ are equal, then $ x - y  =$	(q) -1
(C) If a, b are non-collinear and $(x - 1)a + 2b$ and $3a + xb$ are collinear, then the sum of the values of x is	(s) 1
(D) If a, b are non-collinear and $3a + xb$ and $(1 - x)a - \frac{2}{3}b$ are like vectors, then x is	(t) 2

The correct match is :

A.  $A \rightarrow s, B \rightarrow p, C \rightarrow t, D \rightarrow q$

B.  $A \rightarrow s, B \rightarrow q, C \rightarrow s, D \rightarrow q$

C.  $A \rightarrow p, B \rightarrow q, C \rightarrow r, D \rightarrow s$

$$D. A \rightarrow q, B \rightarrow p, C \rightarrow s, D \rightarrow r$$

**Answer: A**



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8. Three vectors of magnitudes  $a$ ,  $2a$  and  $3a$  are along the directions of the diagonals of three adjacent faces of a cube that meet in a point. Then the magnitude of their sum is

A.  $4a$

B.  $5a$

C.  $6a$

D.  $8a$

**Answer: B**



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9.  $A(2, 1, 2)$ ,  $B(1, 0, 0)$  and  $C(1 + \sqrt{3}, \sqrt{3}, -\sqrt{6})$  are the vertices of a triangle. If the length of the median drawn to the side BC is equal to  $\lambda\sqrt{9 - 2\sqrt{3} + 2\sqrt{6}}$ . then  $\lambda$  equal to

A. 4

B. 3

C. 2

D. 1

**Answer: D**



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## Exercise 1

1. If the position vectors of P, Q are respectively  $5a + 4b$  and  $3a - 2b$  then

QP =

A.  $2a + 6a$

B.  $2a - 6b$

C.  $2a + 5b$

D.  $2a - 5b$

**Answer: A**



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**2.**

**If**

$$\vec{OA} = i + j + k, \vec{AB} = 3i - 2j + k, \vec{BC} = i + 2j - 2k, \vec{CD} = 2i + j + k$$

then the position vector of D is

A.  $2i + 3j + 7k$

B.  $7i + 2j + 3k$

C.  $3i + 2j + 7k$

D. none

**Answer: B**



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3. If the position vectors of A, B, C, D are  $a$ ,  $b$ ,  $2a + 3b$ ,  $a - 2b$  respectively, then  $\vec{AC}$ ,  $\vec{DB}$ ,  $\vec{BA}$ ,  $\vec{DA}$  are

A.  $a + 3b, 3b - a, a - b, 2b$

B.  $2b, b - 2a, 3b + a, b - a$

C.  $a - 3b, 3b - a, a + b, 2b$

D.  $-2b, b - 2a, 3b - a, b - a$

**Answer: A**

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4. If the position vectors of A, B, C are  $i + 2j + 3k$ ,  $j + 2k$ ,  $-i + k$  and  $\vec{AB} = \lambda \vec{AC}$  then  $\lambda =$

A. 0

B. 1

C. 2

D.  $1/2$

**Answer: D**



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5. If the position vectors of A, B, C are  $(-2, 1, 1)$ ,  $(-4, 2, 2)$ ,  $(6, -3, -3)$  and

$$\vec{AB} = \lambda \vec{AC} \text{ then } \lambda =$$

A. 1

B. -2

C. 4

D.  $-1/4$

**Answer: D**



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6. If three points A, B and C have position vectors  $(1, x, 3)$ ,  $(3, 4, 7)$  and  $(y, -2, -5)$  respectively and if they are collinear, then  $(x, y) =$

A.  $(2, -3)$

B.  $(-2, 3)$

C.  $(-2, -3)$

D.  $(2, 3)$

**Answer: A**



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7. If the points whose position vectors are  $2\mathbf{i} + \mathbf{j} + \mathbf{k}$ ,  $6\mathbf{i} - \mathbf{j} + 2\mathbf{k}$  and  $14\mathbf{i} - 5\mathbf{j} + p\mathbf{k}$  are collinear then the value of  $p$  is

A. 2

B. 4

C. 6

D. 8

**Answer: B**



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8. If the points with position vectors  $60i + 3j$ ,  $40i - 8j$  and  $ai - 52j$  are collinear, then  $a =$

A. -40

B. -20

C. 20

D. 40

**Answer: A**



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9. if  $a = 3i + 2j + k$ ,  $b = 6i + mj + nk$  and  $a, b$  are collinear, then  $m, n$  are

A.  $m = 2, n = 10$

B.  $m = 10, n = 2$

C.  $m = 4, n = 2$

D.  $m = 2, n = 4$

**Answer: C**



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10. The vectors  $a$  and  $b$  are noncollinear, if  $a + (x + 1)b$  and  $(2x - 3)b - a$  are collinear, then the value of  $x$  is

A.  $3/2$

B.  $-3/2$

C.  $-2/3$

D.  $2/3$

**Answer: D**



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11. If  $a, b$  are noncollinear vectors and  $A = (x + 4y) a + (2x + y + 1)b$ ,  $B = (y - 2x + 2) a + (2x - 3y - 1) b$  and  $3A = 2B$ , then  $(x, y) =$

A. (2, 1)

B. (2, -1)

C. (-2, -1)

D. (-2, 1)

**Answer: B**



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12. Let  $a, b$  and  $c$  be three non zero vectors, no two of which are collinear. If the vector  $a + 2b$  is collinear with  $c$ , and  $b + 3c$  is collinear with  $a$ , then  $a$

$$+ 2b + 6c =$$

A.  $\lambda a$

B.  $\lambda b$

C.  $\lambda c$

D. 0

**Answer: D**



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**13.** Three non-zero non-collinear vectors  $a, b, c$  are such that  $a + 3b$  is collinear with  $c$ , while  $3b + 2c$  is collinear with  $a$ . Then  $a + 3b + 2c =$

A.  $2a$

B.  $3b$

C.  $4c$

D. 0

**Answer: D**



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14. If  $a$ ,  $b$  and  $c$  are non-coplanar vectors and if  $d$  is such that  $d = \frac{1}{x}(a + b + c)$  and  $a = \frac{1}{y}(b + c + d)$  where  $x$  and  $y$  are non-zero real numbers, then  $\frac{1}{xy}(a + b + c + d) =$

A.  $-a$

B.  $0$

C.  $2a$

D.  $3c$

**Answer: B**



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15. If the vectors  $2i + 3j$ ,  $5i + 6j$ ,  $8i + \lambda j$  have their initial point at  $(1, 1)$  then the value of  $\lambda$  so that the vectors terminated on one line is

- A. 5
- B. 9
- C. 4
- D. 0

**Answer: B**



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16. The length of the line segment joining the points  $2i - 2j + 3k$ ,  $5i + 2j + 3k$  is

- A. 3
- B. 4
- C. 5

D. 6

**Answer: C**



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17. If the position vectors of A and B are  $3i - 2j + k$  and  $2i + 4j - 3k$  then

$$\left| \vec{AB} \right|$$

A.  $\sqrt{14}$

B.  $\sqrt{29}$

C.  $\sqrt{43}$

D.  $\sqrt{53}$

**Answer: D**



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18. The distance between the points  $(5, 3, 1)$ ,  $(3, 2, -1)$  is

A. 3

B. 4

C. 5

D. 6

**Answer: A**



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19. The distance between the points  $i + 6j + 7k$ ,  $-3i + 4j + 3k$  is

A. 3

B. 4

C. 5

D. 6

**Answer: D**



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20. If  $a = 2i + 5j + 6k$ ,  $b = -2i + 3j + 2k$  then the magnitude of  $a - b$  is

A. 4

B. 6

C. 9

D. 12

**Answer: B**



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21. If  $a = 3i - 2j + k$ ,  $b = 2i - 4j - 3k$ ,  $c = -i + 2j + 2k$  then  $a + b + c =$

A.  $3i - 4j$

B.  $3i + 4j$

C.  $4i - 4j$

D.  $4i + 4j$

**Answer: C**



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**22.** If  $a = i - j + 2k$ ,  $b = 2i + 3j + k$ ,  $c = i - k$ , then magnitude of  $a + 2b - 3c$  is

A.  $\sqrt{87}$

B.  $\sqrt{78}$

C.  $\sqrt{89}$

D.  $\sqrt{101}$

**Answer: B**



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23. If  $a = i + j + k$ ,  $b = 2i + 3j$ ,  $c = 3i + 5j - 3k$  and  $d = k + j$ , then the ratio of moduli of  $b - a$  and  $d - c$  is

A. 1 : 3

B. 2 : 1

C. 3 : 1

D. 1 : 2

**Answer: A**



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24. If the position vectors of A, B are  $2i - 9j - 4k$ ,  $6i - 3j + 8k$  then the unit vector in the direction of  $\vec{AB}$  is

A.  $\frac{2i + j + 2k}{3}$

B.  $\frac{-i - 2j + 2k}{3}$

C.  $\frac{2i + 3j + 6k}{7}$

D.  $\frac{-i + 2j + 6k}{7}$

**Answer: C**



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25. If the position vectors of  $A = (2, 3, 5)$ ,  $B = (1, 1, 7)$  then the unit vector in the direction of  $\vec{AB}$  is

A.  $\frac{2i + j + 2k}{3}$

B.  $\frac{-i - 2j + 2k}{3}$

C.  $\frac{2i + 3j + 6k}{7}$

D.  $\frac{-i + 2j + 6k}{7}$

**Answer: B**



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26. If  $a = 3i - 2j + k$ ,  $b = -i + j + k$  then the unit vector parallel to the vector  $a + b$  is

A.  $\frac{2}{3}i - \frac{1}{3}j + \frac{2}{3}k$

B.  $\frac{2}{5}i - \frac{1}{5}j + \frac{2}{5}k$

C.  $\frac{2}{\sqrt{3}}i - \frac{1}{\sqrt{3}}j + \frac{2}{3}k$

D.  $-\frac{2}{\sqrt{3}}i + \frac{1}{\sqrt{3}}j - \frac{2}{\sqrt{3}}k$

**Answer: A**



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27. If  $a = 3i - 2j + k$  and  $b = i + 2j + 5k$ , then the unit vector along  $a - b$  is

A.  $\frac{\sqrt{2}i + 4j + 4k}{\sqrt{34}}$

B.  $\frac{i - 2j - 2k}{3}$

C.  $\frac{-2i + 4j + 4k}{6}$

D.  $\frac{\sqrt{2}i + 4j - 4k}{\sqrt{340}}$



**Answer: B**



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28. If  $a = i + j - 2k$ ,  $b = -i + 2j + k$ ,  $c = i - 2j + 2k$ , then a unit vector parallel to  $a + b + c =$

A.  $\frac{2i + j + k}{\sqrt{6}}$

B.  $(i+j+k)/(\text{sqrt}(3))$

C.  $\frac{i - 2j + k}{\sqrt{6}}$

D.  $\frac{i - j + k}{\sqrt{3}}$

**Answer: B**



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29. If  $a = i + j$ ,  $b = j + k$  and  $c = i + k$  then a unit vector in the direction of  $a - 2b + 3c$  is

A.  $\frac{1}{\sqrt{2}}(4i - j + k)$

B.  $\frac{1}{3\sqrt{2}}(4i - j + k)$

C.  $\frac{1}{3\sqrt{2}}(4i + j - k)$

D.  $\frac{1}{3\sqrt{3}}(4i - 2j - k)$

**Answer: B**



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**30.** If  $\lambda(2i - 4j + 4k)$  is a unit vector then  $\lambda =$

A.  $\pm 1/6$

B.  $1/6$

C. 6

D. 16

**Answer: A**



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31. If the vector  $a = 2i + 3j + 6k$  and  $b$  are collinear and  $|b| = 21$ , then  $b =$

A.  $\pm(2i + 3j + 6k)$

B.  $\pm 3(2i + 3j + 6k)$

C.  $(i + j + k)$

D.  $\pm 21(2i + 3j + 6k)$

**Answer: B**



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32. If  $2i + 3j - 6k$ ,  $6i - 2j + 3k$ ,  $3i - 6j - 2k$  represent the sides of a triangle then the perimeter of the triangle is

A. 14

B. 21

C. 7

D. 6

**Answer: B**



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**33.** The points whose position vectors are  $2i + 3j + 4k$ ,  $3i + 4j + 2k$  and  $4i + 2j + 3k$  are the vertices of

- A. vertices of a right angled triangle
- B. vertices of an isosceles triangle
- C. vertices of an equilateral triangle
- D. collinear

**Answer: C**



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34. The three points whose position vectors are  $i + 2j + 3k$ ,  $3i + 4j + 7k$  and  $-3i - 2j - 5k$

- A. form the vertices of an equilateral triangle
- B. form the vertices of a right angled triangle
- C. are collinear
- D. form the vertices of an isosceles triangle

**Answer: C**



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35. The points whose position vectors are  $2i + 3j + 4k$ ,  $3i + 4j + 2k$  and  $4i + 2j + 3k$  are the vertices of

- A. an isosceles triangle
- B. right angled triangle
- C. equilateral triangle

D. right angled isosceles triangle

**Answer: C**



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36. If the position vectors of the vertices of a triangle are  $2i - j + k$ ,  $i - 3j - 5k$ ,  $3i - 4j - 4k$  then it is

- A. equilateral triangle
- B. isosceles triangle
- C. right angled isosceles triangle
- D. right angled triangle

**Answer: D**



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37. The points  $(1, 1, 1)$ ,  $(1, 2, 3)$ ,  $(2, -1, 1)$  form

- A. an equilateral triangle
- B. an isosceles triangle
- C. a right angled triangle
- D. a right angled isosceles triangle

**Answer: B**



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38. The points  $2a + 3b + c$ ,  $a + b$ ,  $6a + 11b + 5c$  are

- A. collinear
- B. coplanar but not collinear
- C. noncoplanar
- D. none

**Answer: D**



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**39.** The points  $2i + j + k$ ,  $6i - j + 2k$ ,  $14i - 5j + 4k$  are

- A. collinear
- B. coplanar but not collinear
- C. noncoplanar
- D. none

**Answer: A**



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**40.** The points  $(1, 2, 3)$ ,  $(3, 4, 7)$ ,  $(-3, -2, -5)$  are

- A. collinear



B. coplanar but not collinear

C. noncoplanar

D. none

**Answer: A**



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41. If the points whose position vectors are  $-2i + 3j + 5k$ ,  $i + 2j + 3k$ ,  $\lambda i - k$  are collinear, then  $\lambda =$

A. 1

B. 2

C. 5

D. 7

**Answer: D**



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42. The vectors  $5a + 6b + 7c$ ,  $7a - 8b + 9c$ ,  $3a + 20b + 5c$  are

- A. collinear
- B. coplanar but not collinear
- C. noncoplanar
- D. none

**Answer: B**



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43. The points  $-a + 4b - 3c$ ,  $3a + 2b + 5c$ ,  $-3a + 8b - 5c$ ,  $-3a + 2b + c$  are

- A. collinear
- B. coplanar but not collinear
- C. noncoplanar
- D. none

**Answer: C**



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**44.** The points  $2i + j - k$ ,  $i + j + k$ ,  $2i + 2j + k$ ,  $2j + 5k$  are

- A. collinear
- B. coplanar but not collinear
- C. noncoplanar
- D. none

**Answer: B**



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**45.** The points  $i + j + k$ ,  $i + 2j$ ,  $2i + 2j + k$ ,  $2i + 3j + 2k$  are

- A. collinear

B. coplanar but not collinear

C. noncoplanar

D. none

**Answer: C**



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**46.** The points  $(2, -1, 3)$ ,  $(-1, 2, -4)$ ,  $(-12, -1, -3)$ ,  $(6, 2, -1)$  are

A. collinear

B. coplanar but not collinear

C. noncoplanar

D. none

**Answer: B**



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47. The vectors  $3a - 2b - 4c$ ,  $-a + 2c$ ,  $-2a + b + 3c$  are

- A. linearly dependent
- B. linearly independent
- C. collinear
- D. none

**Answer: A**



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48. If the vectors  $2a - b + c$ ,  $a + 2b - 3c$ ,  $3a + mb + 5c$  are linearly dependent, then  $m =$

- A. 2
- B. -2
- C. 4
- D. -4

**Answer: D**



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**49.** If  $a = i + j + k$ ,  $b = 4i + 3j + 4k$ ,  $c = i + \alpha j + \beta k$  are linearly dependent and  $|c| = \sqrt{3}$  then

A.  $\alpha = 1, \beta = -1$

B.  $\alpha = 1, \beta = \pm 1$

C.  $\alpha = -1, \beta = \pm 1$

D.  $\alpha = \pm 1, \beta = 1$

**Answer: D**



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**50.** If  $a = i + 4j$ ,  $b = 2i - 3j$  and  $c = 5i + 9j$  then  $c =$

A.  $2a + b$

B.  $a + 2b$

C.  $a + 3b$

D.  $3a + b$

**Answer: D**

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51. If  $a = 2i - j + 3k$ ,  $b = -i + 4j - 2k$ ,  $c = 5i + j + 7k$  and  $xa + yb = c$  then  $(x, y) =$

A.  $(3, 1)$

B.  $(3, -1)$

C.  $(-3, 1)$

D.  $(-3, -1)$

**Answer: A**

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52. The linear relation between the vectors  $a + 3b + 4c$ ,  $a - 2b + 3c$ ,  $a + 5b - 2c$ ,  $6a + 14b + 4c$  is

A.  $1(a + 3b + 4c) + 2(a - 2b + 3c) + 2(a + 5b - 2c) - 1(6a + 14b + 4c) = 0$

B.  $1(a + 3b + 4c) + 2(a - 2b + 3c) + 3(a + 5b - 2c) - 2(6a + 14b + 4c) = 0$

C.  $1(a + 3b + 4c) + 2(a - 2b + 3c) + 3(a + 5b - 2c) - 1(6a + 14b + 4c) = 0$

D. none

**Answer: C**



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53. The values of  $\lambda$  such that  $(x, y, z) \neq (0, 0, 0)$  and  $(i + j + 3k)x + (3i - 3j + k)y + (-4i + 5j)z = \lambda(xi + yj + zk)$  are

A. 0, 1

B. 0, -1



C. 1, -1

D. 0, 1, -1

**Answer: B**



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54. If the position vectors of A, B are  $2a + 3b - c$ ,  $4a - b + 5c$ , then the position vector of midpoint of  $\overline{AB}$  is

A.  $3a + b + 2c$

B.  $3a - b + 2c$

C.  $3a + b - 2c$

D.  $3a - b - 2c$

**Answer: A**



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55. If the position vectors of A, B are  $i + j + k$  and  $i + j - 4k$  respectively then the position vector of the point which divides  $\overline{AB}$  in the ratio 2 : 3 is

A.  $i + j + k$

B.  $i + j - k$

C.  $i - j + k$

D.  $i - j - k$

**Answer: B**



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56. If  $A = i + 2j + 3k$  and  $B = 2i - j + 4k$ , then the position vectors of the points of trisection are

A.  $(\frac{4}{3}, 1, \frac{10}{3}), (\frac{5}{3}, 0, \frac{11}{3})$

B.  $(-\frac{4}{3}, -1, -\frac{10}{3}), (-\frac{5}{3}, 0, -\frac{11}{3})$

C.  $(\frac{4}{3}, -1, -\frac{10}{3}), (-\frac{5}{3}, 0, \frac{11}{3})$

D. none

**Answer: A**



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57. A point  $C = \frac{5a + 4b - 5c}{3}$  divides the line joining  $A = a - 2b + 3c$  and  $B$  in the ratio  $2 : 1$ , then the position vector of  $B$  is

A.  $2a - 3b + 4c$

B.  $2a + 3b - 4c$

C.  $2a - 3b - 4c$

D. none

**Answer: B**



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58. The ratio in which  $i + 2j + 3k$  divides the join of  $-2i + 3j + 5k$  and  $7i - k$  is

A.  $-3:2$

B.  $1:2$

C.  $2:3$

D.  $-4:3$

**Answer: B**



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59. If  $A = i + 2j + 3k$ ,  $B = 2i + 4j + 7k$  and  $C = 2i + 3j + 5k$  are collinear, then the ratio in which B divides  $\overline{AC}$  is

A.  $2:1$  externally

B.  $2:1$  internally

C.  $4:1$  externally

D.  $4:1$  internally

**Answer: A**



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**60.** The ratio in which the line segment joining the points with position vectors  $i + 2j + 3k$ ,  $-3i + 6j - 8k$  is divided by  $xy$ -plane, is

A.  $-3 : 8$

B.  $8 : 1$

C.  $3 : 8$

D.  $2 : 8$

**Answer: C**



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**61.** If the position vectors of A, B are  $i + 2j - 3k$ ,  $3i - 2j + 5k$  respectively then the position vector of C in AB produced such that  $2 AC = 3 AB$  is

A.  $4i - 4j + 9k$

B.  $2i - 2j + 3k$

C.  $2i - 2j + 9k$

D.  $4i - 4j + 3k$

**Answer: A**



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**62.** If the position vectors of A, B are  $2a - 3b$ ,  $3a + 2b$  respectively then the position of vector of C in AB produced such that  $AC = 2 AB$  is

A.  $3a + 2b$

B.  $3b - 2a$

C.  $4a + 7b$

D.  $5b - 2a$

**Answer: C**

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63. The position vectors of P and Q are respectively a and b. If R is a point on  $\overrightarrow{PQ}$  such that  $\overrightarrow{PR} = 5\overrightarrow{RQ}$ , then the position vector of R is

A.  $5b - 4a$

B.  $5b + 4a$

C.  $4b - 5a$

D.  $4b + 5a$

**Answer: A**

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64. If the vectors  $\overrightarrow{AB} = -3\mathbf{i} + 4\mathbf{k}$  and  $\overrightarrow{AC} = 5\mathbf{i} - 2\mathbf{j} + 4\mathbf{k}$  are the sides of a triangle ABC, then the length of the median through A is

A.  $\sqrt{14}$

B.  $\sqrt{18}$

C.  $\sqrt{25}$

D.  $\sqrt{29}$

**Answer: B**



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65. If the position vectors of A, B, C are  $2i - 2j + k$ ,  $2i + j - k$ ,  $-2i + j + 15k$  respectively then the length of the median through A is

A. 3

B. 5

C. 7

D. 11

**Answer: C**



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66. The position vector of a point lying on the line joining the points whose position vectors are  $\vec{i} + \vec{j} - \vec{k}$  and  $\vec{i} - \vec{j} + \vec{k}$  is

A.  $\vec{j}$

B.  $\vec{i}$

C.  $\vec{k}$

D.  $\vec{o}$

**Answer: B**



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67. In  $\Delta ABC$ , P, Q, R are points on BC, CA and AB respectively, dividing them in the ratio 1 : 4, 3 : 2 and 3 : 7. The point S divides AB in the ratio 1 :

3. Then 
$$\frac{|AP + BQ + CR|}{|\vec{CS}|} =$$

A.  $1/5$

B.  $2/5$

C.  $5/2$

D.  $7/10$

**Answer: B**



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68. P, Q, R, S have position vectors  $\bar{p}, \bar{q}, \bar{r}, \bar{s}$  respectively such that  $(\bar{p} - \bar{q}) = 2(\bar{s} - \bar{r})$ , then QS and PR

A. PQ and RS bisect each other

B. PQ and PR bisect each other

C. PQ and RS trisect each other

D. QS and PR trisect each other

**Answer: D**



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69. The position vector of the centroid of the triangle formed by the points  $i + j + k$ ,  $i - j + k$ ,  $-i + j + k$  is

A.  $\frac{i + j + 3k}{3}$

B.  $\frac{i - j + 3k}{3}$

C.  $\frac{i + j - 3k}{3}$

D.  $\frac{i - j - 3k}{3}$

**Answer: A**



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70. The position vector of the centroid of the triangle formed by the points  $2a + 3b$ ,  $5a + 4b$ ,  $2a - b$  is

A.  $3a + 2b$

B.  $3b - 2a$

C.  $4a + 7b$

D.  $5b - 2a$

**Answer: A**

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71. If C is the midpoint of AB and P is any point outside AB, then

A.  $PA + PB = 2 PC$

B.  $PA + PB = PC$

C.  $PA + PB + 2 PC = 0$

D.  $PA + PB + PC = 0$

**Answer: A**

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72. If A, B, C are the vertices of a triangle then  $\vec{A}B + \vec{B}C + \vec{C}A =$

A. 0

B.  $\vec{A}C$

C.  $2\vec{A}C$

D.  $3\vec{A}C$

**Answer: A**



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73. If G is the centroid of  $\Delta ABC$  then  $\vec{G}A + \vec{G}B + \vec{G}C =$

A. 0

B.  $\vec{O}G$

C.  $2\vec{O}G$

D.  $3\vec{O}G$

**Answer: A**



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**74.** If  $G$  is the centroid of  $\triangle ABC$ ,  $G'$  is the centroid of  $\triangle A'B'C'$  then

$$\vec{AA'} + \vec{BB'} + \vec{CC'} =$$

A.  $0$

B.  $\vec{GG'}$

C.  $2\vec{GG'}$

D.  $3\vec{GG'}$

**Answer: D**



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**75.** If  $D$  is the midpoint of the side  $BC$  of  $\triangle ABC$  then  $\vec{AB} + \vec{AC} =$

A.  $\vec{AD}$

B.  $2\vec{AD}$

C.  $3\vec{AD}$

D.  $4\vec{AD}$

**Answer: B**



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76. If D, E, F are the midpoints of BC, CA, AB of  $\Delta ABC$ , then

$$\vec{AD} + \vec{BE} + \vec{CF} =$$

A. 0

B.  $3\vec{OD}$

C.  $3\vec{OE}$

D.  $\vec{OD} + \vec{OE} + \vec{OF}$

**Answer: A**

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77. If D, E are the midpoints of AB, AC of  $\Delta ABC$  and  $\vec{DE} = \lambda \vec{BC}$  then  $\lambda =$

A. 1

B. 2

C.  $1/2$

D. 3

Answer: C

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78. If D, E are the midpoints of AB, AC of  $\Delta ABC$ , then  $\vec{BE} + \vec{DC} =$

A.  $\vec{BC}$

B.  $\frac{1}{2}\vec{BC}$

C.  $2\vec{BC}$



D.  $\frac{3}{2}\vec{BC}$

**Answer: D**



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79. If  $S$  is the circumcentre,  $G$  the centroid,  $O$  the orthocentre of  $\triangle ABC$ ,

then  $\vec{SA} + \vec{SB} + \vec{SC} =$

A.  $\vec{SG}$

B.  $\vec{OS}$

C.  $\vec{SO}$

D.  $\vec{OG}$

**Answer: C**



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80. If  $S$  is the circumcentre,  $O$  is the orthocentre of  $\Delta ABC$  then

$$\vec{OA} + \vec{OB} + \vec{OC} =$$

A.  $\vec{SO}$

B.  $2\vec{SO}$

C.  $\vec{OS}$

D.  $2\vec{OS}$

**Answer: D**



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81. If  $A = (3, 2, 5)$ ,  $B = (3, 3, 5)$  and  $C = (3, 4, 8)$  are the vertices of a triangle  $ABC$ , then its centroid is

A.  $(3, 3, 5)$

B.  $(3, 4, 7)$

C.  $(3, 4, 6)$

D. (3, 3, 6)

**Answer: D**



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82. If  $4i + 7j + 8k$ ,  $2i + 3j + 4k$ ,  $2i + 5j + 7k$  are position vectors of A, B, C of  $\triangle ABC$  then position vector of the point where the bisector of angle A meets BC is

A.  $2i + \frac{11}{3}j + \frac{17}{3}k$

B.  $2i + \frac{7}{2}j + 6k$

C.  $6i + 11j + 17k$

D.  $2i + 4j + \frac{5}{2}k$

**Answer: B**



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83. P, Q, R are the midpoints of the sides AB, BC and CA of the triangle ABC

and O is a point within the triangle, then  $OA + OB + OC =$

A.  $2(OP + OQ + OR)$

B.  $OP + OQ + OR$

C.  $4(OP + OQ + OR)$

D. none

**Answer: B**



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84. If the position vectors of A, B are  $i + 2j - 3k$ ,  $3i - 2j + 5k$  respectively then

the position vector of C in AB produced such that  $2 AC = 3 AB$  is

A.  $(1/3) (-4i + 5j + 17k)$

B.  $(1/3) (4i - 5j + 17k)$

C.  $(1/3) (4i + 5j - 17k)$

D. none

**Answer: A**



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**85.** If  $a, b, c$  are position vectors of three vertices of an equilateral triangle whose orthocentre is at the origin, then

A.  $a + b + c = o$

B.  $a^2 + b^2 = c^2$

C.  $a + b = c$

D. none

**Answer: A**



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86.  $a$  and  $b$  are unit vectors along  $OA$ ,  $OB$  and  $OC$  bisects the angle  $AOB$ .

The unit vector along  $OC$  is

A.  $\frac{a + b}{2}$

B.  $\frac{a - b}{2}$

C.  $\frac{a + b}{|a + b|}$

D.  $\frac{a - b}{|a - b|}$

**Answer: C**



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87. Let  $O$  be the origin and  $A, B$  be two points  $p, q$  are vectors represented by  $OA$  and  $OB$  and their magnitudes are  $p, q$ . The unit vector bisecting the angle  $AOB$  is

A.  $\frac{p/p + q/q}{|p/p| + |q/q|}$

B.  $\frac{p/p + q/q}{|p/p + q/q|}$

C.  $\frac{p/p + q/q}{|p + q|}$

D.  $\frac{p + q}{2}$

**Answer: B**



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88. The vector  $ai + bj + ck$  is a bisector of the angle between the vectors  $i + j$  and  $j + k$  if

A.  $a = b$

B.  $a = c$

C.  $c = a + b$

D.  $a = b = c$

**Answer: B**



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89. If  $\vec{OA} = i + 3j - 2k$ ,  $\vec{OB} = 3i + j - 2k$  and C is a point on AB such that OC bisects angle AOB then  $\vec{OC} =$

A.  $4(i + j - k)$

B.  $2(i + j - k)$

C.  $i + j - k$

D. none

**Answer: B**



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90. If  $4i + 7j + 8k$ ,  $2i + 3j + 4k$ ,  $2i + 5j + 7k$  are position vectors of A, B, C of  $\Delta ABC$  then position vector of the point where the bisector of angle A meets BC is

A.  $(2, 13/3, 6)$

B.  $(-2, 13/3, 6)$



C.  $(2, -13/3, 6)$

D.  $(2, 13/3, -6)$

**Answer: A**



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91. Let A  $(4, 7, 8)$ , B  $(2, 3, 4)$  and C  $(2, 5, 7)$  be the position vectors of the vertices of a triangle ABC. The length of the internal bisector of the angle at A is

A.  $\frac{3}{2}\sqrt{34}$

B.  $\frac{2}{3}\sqrt{34}$

C.  $\frac{1}{2}\sqrt{34}$

D.  $\frac{1}{3}\sqrt{34}$

**Answer: B**



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92. Let vector of magnitude  $3\sqrt{6}$  along the internal bisector of the angle between the vectors  $4i - 7j + 4k$  and  $i + 2j - 2k$  is

A.  $\pm(7i + 2j + 2k)$

B.  $\pm(7i - j + 2k)$

C.  $\pm(7i - j - 2k)$

D. none

Answer: C



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93.



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94.



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114.



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115.



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116.



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117.



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118. The vector equation to the line passing through the points  $(-2, 3, 5)$ ,  $(1, 2, 3)$  is

A.  $r = (1 - t)(-2i + 3j + 5k) + t(i + 2j + 3k)$

B.  $r = (1 - t)(2i + j + 3k) + t(-4i + 3j - k)$

C.  $r = (1 - t)(2i - 3j + 4k) + t(4i + 2j - 3k)$

D. none

**Answer: A**



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119. The vector equation to the line passing through the points  $2i + j + 3k$ ,  $-4i + 3j - k$  is



A.  $r = (1 - t)(-2i + 3j + 5k) + t(i + 2j + 3k)$

B.  $r = (1 - t)(2i + j + 3k) + t(-4i + 3j - k)$

C.  $r = (1 - t)(2i - 3j + 4k) + t(4i + 2j - 3k)$

D. none

**Answer: B**



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**120.** The vector equation to the line passing through the points  $a + 2b + 3c$ ,  $2a + 3b - 4c$  is

A.  $r = (1 - t)(a + 2b + 3c) + t(2a - 3b + 4c)$

B.  $r = (1 - t)(a + 2b - 3c) + t(2a + 3b - 4c)$

C.  $r = (1 - t)(a + 2b + 3c) + t(2a + 3b - 4c)$

D.  $r = (1 - t)(a + 2b - 3c) + t(2a - 3b + 4c)$

**Answer: C**



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121. The cartesian equation of the line passing through the points

$2i + j + 3k$ ,  $-4i + 3j - k$  is

A.  $\frac{x - 2}{3} = \frac{y - 1}{-1} = \frac{z - 3}{2}$

B.  $\frac{x - 2}{2} = \frac{y - 1}{-1} = \frac{z - 3}{2}$

C.  $\frac{x + 2}{3} = \frac{y + 1}{-1} = \frac{z - 3}{2}$

D.  $\frac{x + 2}{3} = \frac{y + 1}{-1} = \frac{z + 3}{2}$

Answer: A



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122. The lines  $r = (6 - 6s) a + (4s - 4) b + (4 - 8s) c$  and  $r = (2t - 1) a + (4t - 2)$

$b - (2t + 3) c$  intersect at

A.  $4c$

B.  $-4c$

C.  $3c$

D.  $-2c$

**Answer: B**



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**123.** If the position vectors of A, B, C, D are  $3\bar{i} + 2\bar{j} + \bar{k}$ ,  $4\bar{i} + 5\bar{j} + 5\bar{k}$ ,  $4\bar{i} + 2\bar{j} - 2\bar{k}$ ,  $6\bar{i} + 5\bar{j} - \bar{k}$  respectively then the position vector of the point of intersection of lines AB and CD is

A.  $2i + j + 3k$

B.  $2i - j + 3k$

C.  $2i + j + 3k$

D.  $2i - j - 3k$

**Answer: D**

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124. Find the equation of the line parallel to the vector  $2\vec{i} - \vec{j} + 2\vec{k}$ , and which passes through the point A whose position vector is  $3\vec{i} + \vec{j} - \vec{k}$ . If P is a point on this line such that  $AP = 15$ , find the position vector of P.

A.  $13i - 4j + 9k$

B.  $13i + 4j + 9k$

C.  $13i + 4j - 9k$

D.  $13i - 4j - 9k$

**Answer: A**

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125. The vector equation of the plane passing through the point  $2i + 2j - 3k$  and parallel to the vectors  $3i + 3j - 5k$ ,  $i + 2j + k$  is

A.  $r = s(2i + j - k) + t(i + 2j + 2k)$

B.  $r = 2i + 2j - 3k + s(3i + 3j - 5k) + t(i + 2j + k)$

C.  $r = (i + 2j + 3k) + s(-2i + 3j + k) + t(2i - 3j + 4k)$

D. none

**Answer: B**



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**126.** The vector equation of the plane passing through the point  $(1, -2, -3)$  and parallel to the vectors  $(2, -1, 3), (2, 3, -6)$  is

A.  $r = (i - 2j - 3k) + s(2i - j + 3k) + t(2i + 3j - 6k)$

B.  $r = (1 - s - t)(i - 2j - 3k) + s(2i - j + 3k) + t(2i + 3j - 6k)$

C.  $r = (i - 2j - 3k) + s(4j - 9k)$

D.  $r = (4j - 9k) + s(i - 2j - 3k)$

**Answer: A**



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**127.** The vector equation of the plane passing through the points  $(1, -2, 5)$ ,  $(0, -5, -1)$ ,  $(-3, 5, 0)$  is

A.  $r = (1 - s - t)(i - 2j + 5k) + s(-5j - k) + t(-3i + 5j)$ ,  $s, t$  are scalars

B.  $r = (1 - s - t)(i + 2j + 3k) + s(3i + 2j + k) + t(2i + j + 3k)$ ,  $s, t$  are scalars

C.  $r = (1 - s - t)(2i + j + k) + s(i - j - k) + t(-i + j + 2k)$ ,  $s, t$  are scalars

D.  $r = (1 - s - t)(i - 2j + 5k) + s(-5j - k) + t(-3i + 5j)$ ,  $s, t$  are scalars

**Answer: A**



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**128.** The vector equation of the plane passing through the points  $i + 2j + 5k$ ,  $-5j + k$ ,  $-3i + 5j$  is

A.  $r = (1 - s - t)(i - 2j + 5k) + s(-5j - k) + t(-3i + 5j)$ ,  $s, t$  are scalars

B.  $r = (1 - s - t)(i + 2j + 3k) + s(3i + 2j + k) + t(2i + j + 3k)$ ,  $s, t$  are scalars

C.  $r = (1 - s - t)(2i + j + k) + s(i - j - k) + t(-i + j + 2k)$ ,  $s, t$  are scalars

D.  $r = (1 - s - t)(i - 2j + 5k) + s(-5j - k) + t(-3i + 5j)$ ,  $s, t$  are scalars

**Answer: A**

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**129.** Subtract  $3a - 2b + 4c$  from the sum of  $-2a + b - 5c$  and  $3a - 2b + c$

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**130.** If  $a, b$  are two points then  $r = (1 - p)a + pb$  represents

A. line

B. plane

C. plane passing through origin

D. sphere

**Answer: A**



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**131.** If  $a, b, c$  are three noncollinear points then  $r = (1 - p - q) a + pb + qc$  represents  
If  $a, b$  are two points then  $r = (1 - p) a + p b$  represents

- A. line
- B. plane
- C. plane passing through origin
- D. sphere

**Answer: B**



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**132.** If  $r = \alpha a + \beta b + \gamma c$  represents a plane passing through the points  $a, b, c$  then



A.  $\alpha = \beta = \gamma$

B.  $\alpha + \beta + \gamma = 0$

C.  $\alpha + \beta + \gamma = 1$

D.  $\alpha - \beta = \beta - \gamma = \gamma - \alpha$

**Answer: C**



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**133.** If  $r = \alpha a + \beta b + \gamma c$  represents a plane passing through the points a, b, c then

A.  $\alpha = \beta = \gamma$

B.  $\alpha + \beta + \gamma = 0$

C.  $\alpha + \beta + \gamma = 1$

D.  $\alpha - \beta = \beta - \gamma = \gamma - \alpha$

**Answer: C**

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134. The point of intersection of the lines

$$l_1: r(t) = (i - 6j + 2k) + t(i + 2j + k), l_2: R(u) = (4j + k) + u(2i + j + k)$$

is

A. (4, 4, 5)

B. (6, 4, 7)

C. (8, 8, 9)

D. (10, 12, 11)

**Answer: C**

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135. P, Q, R and S are four points with the position vectors  $3\bar{i} - 4\bar{j} + 5\bar{k}$ ,  $4\bar{k}$ ,  $-4\bar{i} + 5\bar{j} + \bar{k}$  and  $-3\bar{i} + 4\bar{j} + 3\bar{k}$  respectively.

Then the line PQ meets the line RS at the point.

A.  $3i + 4j + 3k$

B.  $-3i + 4j + 3k$

C.  $-i + 4j + k$

D.  $i + j + k$

**Answer: B**



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## Exercise 2 Set 1

1. I : If three points A, B and C have position vectors  $(1, x, 3)$ ,  $(3, 4, 7)$  and  $(y, -2, -5)$  respectively and if they are collinear, then  $(x, y) = (2, -3)$

II : If  $a = i + 4j$ ,  $b = 2i - 3j$  and  $c = 5i + 9j$  then  $c = 3a + b$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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2. I : If  $a = 3i - 2j + k$ ,  $b = 2i - 4j - 3k$ ,  $c = -i + 2j + 2k$  then  $a + b + c = 4i + 4j$

II : If  $a = i - j + 2k$ ,  $b = 2i + 3j + k$ ,  $c = i - k$ , then magnitude of  $a + 2b - 3c$  is

$\sqrt{78}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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3. If  $a, b$  are noncollinear vectors and  $A = (x + 4y)a + (2x + y + 1)b$ ,  $B = (y - 2x + 2)a + (2x - 3y - 1)b$  and  $3A = 2B$ , then  $(x, y) =$

- A. only I is true
- B. only II is true
- C. both I and II are true
- D. neither I nor II are true

**Answer: C**

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4. I : If  $a = i + 4j$ ,  $b = 2i - 3j$ ,  $c = 5i + 9j$  then  $c = 3a + b$

II : If  $a = 3i - 6j + 2k$  then the length of the vector is 3.

- A. only I is true
- B. only II is true
- C. both I and II are true

D. neither I nor II are true

**Answer: A**



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5. I : If G is the centroid of the  $\Delta ABC$ , G' is the centroid of the  $\Delta A'B'C'$   
then  $\overline{AA'} + \overline{BB'} + \overline{CC'} = 3\overline{GG'}$

II : If S is the circumcentre, 'O' is the orthocentre of  $\Delta ABC$  then  
 $\overline{SA} + \overline{SB} + \overline{SC} = \overline{SO}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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6. I : The three points with position vectors  $i - 2j + 3k$ ,  $2i + 3j - 4k$  and  $-7j + 10k$  are collinear.

II : The vectors  $a - 2b + 3c$ ,  $2a + 3b - 4c$ ,  $-7b + 10c$  are coplanar.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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7. I : If  $a, b$  are two points then  $r = (1 - s)a + sb$  represents a line.

II : If  $a, b, c$  are three noncollinear points then  $r = (1 - s - t)a + sb + tc$  represents a plane

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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8. I : If  $r\alpha a + \beta b$  represents a line passing through the points a, b then  $\alpha + \beta = 1$ .

II : If  $r = \alpha a + \beta b + \gamma c$  represents a plane passing through the points a, b, c then  $\alpha + \beta + \gamma = 1$ .

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true



**Answer: C**



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9. I : Two non-zero, non-collinear vectors are linearly independent.

II : Any three coplanar vectors are linearly dependent. which one is true?

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

**Answer: C**



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10. Statement I : The points  $4i + 5j + k$ ,  $-j - k$ ,  $3i + 9j + 4k$  and  $-4i + 4j + 4k$  are coplanar.

Statement II : The given points from the vertices of a parallelogram.

Which of the following is true ?

- A. Both statements are true and statement II is correct explanation of statement I
- B. Both statements are true and statement II is not a correct explanation of statement I
- C. Statement I is true and Statement II is false
- D. Statement I is false and Statement II is true

**Answer: C**



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## Exercise 2 Set 2

1. If  $a = 2i + 3j - k$ ,  $b = -i + 2j + k$ , then the ascending order of the following :

- (A)  $|a + b|$     (B)  $|a - b|$
- (C)  $|3a + b|$     (D)  $|a + 2b|$

A.  $B < A < D < C$

B.  $B < D < C < A$

C.  $C < D < A < B$

D.  $A < D < C < B$

**Answer: A**



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2. If  $a = 2i + 2j + k$ ,  $b = i + j$ ,  $c = 3i + 4k$ ,  $d = 12i + 3j + 4k$  then the descending order of their magnitudes is

A.  $|d|, |c|, |a|, |b|$

B.  $|a|, |b|, |c|, |d|$

C.  $|d|, |a|, |c|, |b|$

D.  $|a|, |b|, |d|, |c|$

**Answer: A**



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3. The ascending order of magnitudes of the vectors

(A)  $\frac{i-2j}{2}$       (B)  $\frac{2i+j+k}{\sqrt{6}}$

(C)  $2i - j + 2k$       (D)  $3i - 4j + 6k$

A.  $A < B < C < D$

B.  $B < A < C < D$

C.  $A < D < C < D$

D.  $A < C < B < D$

Answer: B



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4. If  $m_1, m_2, m_3$  and  $m_4$  are respectively the magnitudes of the vectors

$a_1 = 2i - j + k, a_2 = 3i - 4j - 4k, a_3 = i + j - k$  and  $a_4 = -i + 3j +$

then the correct order of  $m_1, m_2, m_3, m_4$  is :

A.  $m_3 < m_1, < m_4 < m_2$

B.  $m_3 < m_1 < m_2 < m_4$

C.  $m_3 < m_4 < m_1 < m_2$

D.  $m_3 < m_4 < m_2 < m_1$

Answer: A



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### Exercise 2 Set 3

#### 1. Match the following

*I.*  $A = (2, 3, 4), B = (3, 4, 2), C = (4, 2, 3)$

(a)  $\Delta$  is isosceles

*II.*  $A = (2, -1, 1, 1), B = (1, -3, -5), C = (3, -4, -4)$

(b)  $\Delta ABC$  is equilateral

*III.*  $A = (1, 1, 1), B = (1, 2, 3), C = (2, -1, 1)$

(c) A, B, C are collinear

*IV.*  $A = (1, 2, 3), B = (3, 4, 7), C = (-3, -2, -5)$

(d)  $\Delta ABC$  is right-angled

A. a, d, c b

B. a, b, d, c

C. a, b, c, d

D. b, d, a, c

**Answer: D**



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2. If  $S$  is circumcentre and 'O' is orthocentre of  $\triangle ABC$ , then match the following

- |             |                |     |                 |
|-------------|----------------|-----|-----------------|
| <i>I.</i>   | $SA + SB + SC$ | (a) | $\frac{1}{2}OS$ |
| <i>II.</i>  | $OA + OB + OC$ | (b) | $2OS$           |
| <i>III.</i> | $AO + OB + OC$ | (c) | $2AS$           |
| <i>IV.</i>  | $OG$           | (d) | $\frac{2}{3}OS$ |
|             |                | (e) | $SO$            |

A. a, e, c, b

B. e, b, d, c

C. e, b, c, d

D. b, d, c, e



4. D, E and F are the mid points of the sides BC, CA and AB respectively of

$\Delta ABC$ . 'O' is any point Match List-I to List-II.

List I

(I)  $OA + OB + OC$  is equal to.....

(II)  $AD + BE + CF$  is equal to

(III)  $OE + OF + DO$  is

(IV)  $AD + \frac{2}{3}BE + \frac{1}{3}CF$  equal

List II

(a)  $OD + OE + OF$

(b)  $O$

(c)  $OA$

(d)  $\frac{1}{2}C$

The correct match is

A.  $I \rightarrow a, II \rightarrow b, III \rightarrow c, IV \rightarrow d$

B.  $I \rightarrow a, II \rightarrow c, III \rightarrow d, IV \rightarrow d$

C.  $I \rightarrow c, II \rightarrow d, III \rightarrow a, IV \rightarrow b$

D.  $I \rightarrow c, II \rightarrow a, III \rightarrow b, IV \rightarrow d$

**Answer: A**



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1. A : If the position vectors of A, B are (2, 3, 5), (1, 1, 7) then the unit vector

in the direction of  $\vec{AB}$  is  $\frac{-i - 2j + 2k}{3}$

R : Unit vector in the direction of  $\vec{AB}$  is  $\frac{\vec{AB}}{|\vec{AB}|}$

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is correct, R is false

D. A is false, R is correct

**Answer: A**



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2. A : If  $a = i + j + k$ ,  $b = 4i + 3j + 4k$ ,  $c = i + \alpha j + \beta k$  are linearly dependent and  $|c| = \sqrt{3}$  then  $\alpha = \pm 1$ ,  $\beta = 1$

R : For coplanar vectors every vector can be expressed as linear combination of other.

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is correct, R is false

D. A is false, R is correct

**Answer: A**

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3. A :  $(a, b) = \theta \Rightarrow (5a, -3b) = \pi - \theta$

R :  $m > 0, n < 0, (ma, nb) = \pi - (a, b)$

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true but R is not the correct explanation of A.

C. A is true, but R is false

D. A is false, but R is true

**Answer: A**

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4. A : The centroid of the triangle formed by the points  $2a + 3b$ ,  $5a + 4b$ ,  $2a - b$  is  $3a + 2b$ .

R : The centroid of the triangle formed by the points  $a$ ,  $b$ ,  $c$  is  $\frac{a + b + c}{3}$

- A. A, R are correct, R is correct explanation of A
- B. A, R are correct, R is not correct explanation of A
- C. A is correct, R is false
- D. A is false, R is correct

**Answer: A**

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5. A : ABCD is a parallelogram. If G is the point of intersection of its diagonals and 'O' is any point then  $OA + OB + OC + OD = 4OG$

R : In a parallelogram diagonals bisect each other.

A. A, R are correct, R is correct explanation of A

B. A, R are correct, R is not correct explanation of A

C. A is correct, R is false

D. A is false, R is correct

**Answer: A**

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6. A : The vector equation of the line passing through the point  $2i + 3j - 4k$  and parallel to the vector  $6i + 3j - 4k$  is  $r = (2i + 3j - 4k) + t(6i + 3j - 4k)$ .

R : The vector equation of the line passing through the point a and parallel to the vector b is  $r = a + tb$

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true but R is not the correct explanation of A.

C. A is true, but R is false

D. A is false, but R is true

**Answer: A**



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7. A : The vector equation of the plane passing through the point  $2i + 2j - 3k$  and parallel to the vectors  $3i + 3j - 5k, i + 2j + k$  is  $r = 2i + 2j - 3k + s(3i + 3j - 5k) + t(i + 2j + k)$

R : The vector equation of the plane passing through the points a, b, c is  $r = (1 - s - t) a + sb + tc$

- A. Both A and R are true and R is the correct explanation of A.
- B. Both A and R are true but R is not the correct explanation of A.
- C. A is true, but R is false
- D. A is false, but R is true

**Answer: B**



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8. Observe the following statements :

Assertion (A) : Three vectors are coplanar if one of them is expressible as a linear combination of the other two.

Reason (R) : Any three coplanar vectors are linearly dependent.

Then which of the following is true?

- A. Both A and R are true and R is the correct explanation of A.
- B. Both A and R are true but R is not the correct explanation of A.
- C. A is true, but R is false
- D. A is false, but R is true

**Answer: B**



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