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MCQs – Ch # 7: F.Sc Part 2

CALCULUS AND ANALYTIC GEOMETRY, MATHEMATICS 12

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Choose the correct answer.

1. Unit vector of vector $\underline{v}$ is defined by

   (a) $\frac{\underline{v}}{|\underline{v}|}$ (b) $\frac{|\underline{v}|}{\underline{v}}$ (c) $\underline{v}.|\underline{v}|$ (d) None of these

2. If $\underline{v}=[2,1,3]$ and $\underline{w}=[-1,4,0]$ then $|\underline{v}-2\underline{w}|=$

   (a) $\sqrt{76}$ (b) $\sqrt{74}$ (c) $\sqrt{89}$ (d) 0

3. If $\underline{u}=2\hat{\underline{i}}-4\hat{\underline{j}}+5\hat{\underline{k}}$ and $\underline{v}=4\hat{\underline{i}}-3\hat{\underline{j}}-4\hat{\underline{k}}$ then $\underline{u}$ and $\underline{v}$ are

   (a) Perpendicular (b) Parallel (c) Equal (d) None of these

4. If $\underline{u}\times\underline{v}=0$ then angle between the $\underline{u}$ and $\underline{v}$ is

   (a) 90° (b) 0° (c) 45° (d) None of these

5. If $\underline{u}=2\hat{\underline{i}}-\hat{\underline{j}}$ and $\underline{v}=3\hat{\underline{i}}+\hat{\underline{k}}$ then $\underline{u}.\underline{v}=$

   (a) -6 (b) 3 (c) 4 (d) 6

6. If $\hat{\underline{i}},\hat{\underline{j}},\hat{\underline{k}}$ are unit vectors in space then $\hat{\underline{k}}.\hat{\underline{i}}=$

   (a) 1 (b) 0 (c) $\hat{\underline{j}}$ (d) None of these

7. If $\hat{\underline{i}},\hat{\underline{j}},\hat{\underline{k}}$ are unit vectors in space then $\hat{\underline{k}}\times\hat{\underline{j}}=$

   (a) 0 (b) 1 (c) $\hat{\underline{i}}$ (d) $-\hat{\underline{i}}$

8. If $\hat{\underline{i}},\hat{\underline{j}},\hat{\underline{k}}$ are unit vectors in space then $\hat{\underline{k}}.\hat{\underline{k}}=$

   (a) 0 (b) 1 (c) -1 (d) None of these

9. If $\hat{\underline{i}},\hat{\underline{j}},\hat{\underline{k}}$ are unit vectors in space then $\hat{\underline{j}}\times\hat{\underline{j}}=$

   (a) 1 (b) 0 (c) -1 (d) None of these

10. If $\underline{a}.\underline{b}=0$ then angle between $\underline{a}$ and $\underline{b}$ is

    (a) 0° (b) 45° (c) 90° (d) 60°

11. The projection of $\underline{v}$ along $\underline{u}=$

    (a) $\frac{\underline{u}.\underline{v}}{|\underline{v}|}$ (b) $\frac{\underline{u}.\underline{v}}{|\underline{u}|}$ (c) $\frac{\underline{u}.\underline{v}}{|\underline{v}||\underline{u}|}$ (d) None of these

12. The projection of $\underline{a}=\hat{\underline{i}}-2\hat{\underline{j}}+\hat{\underline{k}}$ along $\underline{b}=4\hat{\underline{i}}-4\hat{\underline{j}}+7\hat{\underline{k}}$ is

    (a) $\frac{19}{8}$ (b) $\frac{9}{19}$ (c) $\frac{8}{19}$ (d) $\frac{19}{9}$

13. The projection of $\underline{b}=\hat{\underline{j}}+\hat{\underline{k}}$ along $\underline{a}=\hat{\underline{i}}-\hat{\underline{k}}$ is

    (a) $\frac{1}{\sqrt{2}}$ (b) $-\frac{1}{\sqrt{2}}$ (c) $\sqrt{2}$ (d) None of these

14. If $\underline{u}$ is a non zero vector then $\underline{u}\times\underline{u}=$

    (a) 1 (b) 2 (c) 0 (d) None of these

15. A vector perpendicular to both the vectors $\underline{a}$ and $\underline{b}$ is

(a) $\underline{a}.\underline{b}$ (b) $\underline{a}\times\underline{b}$ (c) $\dfrac{\underline{a}\times\underline{b}}{\underline{a}.\underline{b}}$ (d) None of these

16. The value of $2\hat{\underline{i}}\times 3\hat{\underline{k}} =$

(a) 6 (b) $-6\hat{\underline{j}}$ (c) $6\hat{\underline{j}}$ (d) $-6\hat{\underline{k}}$

17. The value of $\left(2\hat{\underline{j}}\times\hat{\underline{i}}\right)-3\hat{\underline{k}} =$

(a) $-5\hat{\underline{k}}$ (b) $-5\hat{\underline{j}}$ (c) $5\hat{\underline{i}}$ (d) None of these

18. If $\underline{a}$ and $\underline{b}$ are two vectors then $\left|\underline{a}\times\underline{b}\right|^2+\left|\underline{a}.\underline{b}\right|^2 =$

(a) $|a|^2$ (b) $|b|^2$ (c) $|a|^2|b|^2$ (d) None of these

19. If $\underline{a}=2\hat{\underline{i}}-3\hat{\underline{j}}-\hat{\underline{k}}$ and $\underline{b}=\hat{\underline{i}}+4\hat{\underline{j}}-2\hat{\underline{k}}$ then $\underline{a}\times\underline{b} =$

(a) $10\hat{\underline{i}}+3\hat{\underline{j}}+11\hat{\underline{k}}$ (b) $10\hat{\underline{i}}-3\hat{\underline{j}}+6\hat{\underline{k}}$ (c) $20\hat{\underline{i}}+6\hat{\underline{j}}+22\hat{\underline{k}}$ (d) None of these

20. If $\underline{a}=2\hat{\underline{i}}-3\hat{\underline{j}}-\hat{\underline{k}}$ and $\underline{b}=\hat{\underline{i}}+4\hat{\underline{j}}-2\hat{\underline{k}}$ then $(\underline{a}+\underline{b})\times(\underline{a}-\underline{b}) =$

(a) $\hat{\underline{i}}-6\hat{\underline{j}}+22\hat{\underline{k}}$ (b) $-20\hat{\underline{i}}-6\hat{\underline{j}}-22\hat{\underline{k}}$ (c) $20\hat{\underline{i}}+6\hat{\underline{j}}+22\hat{\underline{k}}$ (d) None of these

21. If $\underline{u}$ is a non zero vector then $\underline{u}.\underline{u} =$

(a) 0 (b) 1 (c) $|\underline{u}|^2$ (d) None of these

22. If $\underline{u}\times\underline{v}=0$ then $\underline{u}$ and $\underline{v}$ are

(a) Parallel vectors (b) Perpendicular vectors (c) Position vectors (d) None of these

23. The angle between the vectors $\underline{a}=3\hat{\underline{i}}+2\hat{\underline{j}}-6\hat{\underline{k}}$ and $\underline{b}=4\hat{\underline{i}}-3\hat{\underline{j}}+\hat{\underline{k}}$ is

(a) 0° (b) 45° (c) 60° (d) 90°

24. If $\overrightarrow{AB}=\hat{\underline{i}}+2\hat{\underline{j}}-2\hat{\underline{k}}$ and $\overrightarrow{AC}=-2\hat{\underline{i}}+2\hat{\underline{j}}+\hat{\underline{k}}$ are two adjacent sides of a triangle then area of triangle

(a) $\dfrac{8}{2}$ (b) $\dfrac{9}{2}$ (c) $\dfrac{7}{2}$ (d) None of these

25. If $\underline{a}=-\hat{\underline{i}}+2\hat{\underline{j}}+4\hat{\underline{k}}$ and $\underline{b}=2\hat{\underline{i}}-\hat{\underline{j}}+4\hat{\underline{k}}$ are adjacent sides of parallelogram then its area is

(a) $\sqrt{290}$ (b) $\sqrt{279}$ (c) $\sqrt{297}$ (d) None of these

26. If $\underline{a}=3\hat{\underline{i}}+2\hat{\underline{j}}-\hat{\underline{k}}$ and $\underline{b}=4\hat{\underline{i}}-\hat{\underline{j}}+2\hat{\underline{k}}$ then $\underline{a}.\underline{b} =$

(a) 6 (b) 8 (c) -8 (d) -6

27. The value of the $\left(\hat{\underline{i}}+2\hat{\underline{j}}\right)\times\hat{\underline{k}} =$

(a) $3\hat{\underline{i}}-\hat{\underline{j}}$ (b) $2\hat{\underline{i}}-\hat{\underline{j}}$ (c) $2+2\hat{\underline{k}}$ (d) None of these

28. If $\underline{a}=6\hat{\underline{i}}+7\hat{\underline{j}}$ and $\underline{b}=-\dfrac{7}{2}\hat{\underline{i}}+3\hat{\underline{j}}$ then the vectors $\underline{a}$ and $\underline{b}$ are

(a) Parallel (b) Perpendicular (c) Co-planer (d) None of these

29. If $\underline{a}=5\hat{\underline{i}}-\hat{\underline{j}}+\hat{\underline{k}}$ and $\underline{b}=\hat{\underline{j}}-5\hat{\underline{k}}$ then the vectors $\underline{a}$ and $\underline{b}$ are

(a) Perpendicular (b) Parallel (c) Co-planer (d) None of these

30. If $\underline{u}=a_1\hat{\underline{i}}+b_1\hat{\underline{j}}+c_1\hat{\underline{k}}$, $\underline{v}=a_2\hat{\underline{i}}+b_2\hat{\underline{j}}+c_2\hat{\underline{k}}$ and $\underline{w}=a_3\hat{\underline{i}}+b_3\hat{\underline{j}}+c_3\hat{\underline{k}}$ then $\underline{u}.(\underline{v}\times\underline{w}) =$

(a) $\begin{vmatrix} a_1 & b_1 & 1 \\ a_2 & b_2 & 1 \\ a_3 & b_3 & 1 \end{vmatrix}$ (b) $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ (c) $\begin{vmatrix} a_1 & b_1 & 0 \\ a_2 & b_2 & 0 \\ a_3 & b_3 & 0 \end{vmatrix}$ (d) None of these

31. The volume of the parallelepiped with $\underline{u}$, $\underline{v}$ and $\underline{w}$ as its coterminus is

(a) $\underline{u}.(\underline{v}\times\underline{w})$ (b) $\frac{1}{2}\underline{u}.(\underline{v}\times\underline{w})$ (c) $\frac{1}{6}\underline{u}.(\underline{v}\times\underline{w})$ (d) None of these

32. If the three vectors $\underline{u}$, $\underline{v}$ and $\underline{w}$ are coplanar then the scalar triple product $\underline{u}.(\underline{v}\times\underline{w})=$

(a) 1 (b) 0 (c) -1 (d) None of these

33. What is the value of $[\underline{u}\ \underline{u}\ \underline{v}]$

(a) 0 (b) 1 (c) -1 (d) None of these

34. If $\underline{u}=3\hat{\underline{i}}+2\hat{\underline{k}}$, $\underline{v}=\hat{\underline{i}}+2\hat{\underline{j}}+\hat{\underline{k}}$ and $\underline{w}=-\hat{\underline{j}}+4\hat{\underline{k}}$ are edges of a parallelepiped then its volume is

(a) 24 (b) 25 (c) 20 (d) None of these

35. The volume of the tetrahedron determined by $\underline{u}=\hat{\underline{i}}+2\hat{\underline{j}}-\hat{\underline{k}}$, $\underline{v}=\hat{\underline{i}}-2\hat{\underline{j}}+3\hat{\underline{k}}$ and $\underline{w}=\hat{\underline{i}}-7\hat{\underline{j}}-4\hat{\underline{k}}$ is

(a) 7 (b) 6 (c) 8 (d) 10

36. The value of $3\hat{\underline{j}}.(\hat{\underline{k}}\times\hat{\underline{i}})=$

(a)3 (b) 4 (c) 6 (d) None of these

37. If $\underline{u}=\hat{\underline{i}}-2\hat{\underline{j}}+3\hat{\underline{k}}$, $\underline{v}=2\hat{\underline{i}}-\hat{\underline{j}}-\hat{\underline{k}}$ and $\underline{w}=\hat{\underline{j}}+\hat{\underline{k}}$ then $[\underline{u}\ \underline{v}\ \underline{w}]=$

(a) 10 (b) 20 (c) 9 (d) None of these

38. If $\underline{F}=3\hat{\underline{i}}-\hat{\underline{j}}+\hat{\underline{k}}$ and $\underline{d}=2\hat{\underline{i}}+\hat{\underline{j}}+4\hat{\underline{k}}$ then work done is

(a) -9 (d) 9 (c) 12 (d) -1

39. A constant force F acting on a body , displaced it from A to B, then work done =

(a) $\underline{F}\times\overrightarrow{AB}$ (b) $|\underline{F}||\overrightarrow{AB}|$ (c) $\underline{F}.\overrightarrow{AB}$ (d) None of these

40. The value of $[\hat{\underline{k}}\ \hat{\underline{i}}\ \hat{\underline{j}}]=$

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

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