Roll No.----------

Paper Code		
5	7	3

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No. | | | | | | | | |

प्रश्नपुस्तिका सीरीज
Question Booklet Series
A

B.C.A.(First Semester) Examination, February/March-2022
BCA-105(N)
Mathematics-I
(B.P. Students)

Time : 1:30 Hours **Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : –

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही– सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. **इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमे से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET)में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वांइट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।**
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक–पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : – **प्रश्नपुस्तिका खोलने पर प्रथमतः जॉच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभॉति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।**

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Rough Work / रफ कार्य

1. In a square matrix, the number of rows and the number of columns are :

(A) The same

(B) Different

(C) Multiples of each other

(D) Greater than 10

2. Two matrix A and B are added if :

(A) Both are rectangular

(B) Both have same order

(C) No. of rows of A is equal to no. of column of B

(D) No. of column of A is equal to no. of rows of B

3. If $\begin{bmatrix} x+3 & 4 \\ y-4 & x+y \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 3 & 9 \end{bmatrix}$ then the values of x and y are :

(A) $x = 2, y = 7$

(B) $x = 7, y = 2$

(C) $x = 3, y = 6$

(D) $x = -2, y = 7$

4. If $\begin{bmatrix} x+2y & 3y \\ 4x & 2 \end{bmatrix} = \begin{bmatrix} 0 & -3 \\ 8 & 2 \end{bmatrix}$ then the values of $x - y$ is :

(A) - 3

(B) 1

(C) 3

(D) 5

5. If A is symmetric matrix then $A^T =$

(A) A

(B) $|A|$

(C) $-A$

(D) A^T

6. If $|A| = 3$ and $|B| = 2$, then $|AB|$ is :

(A) 5

(B) 6

(C) - 6

(D) - 5

7. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then $A^2 =$

(A) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

(B) $\begin{bmatrix} 8 & -5 \\ 5 & 3 \end{bmatrix}$

(C) $\begin{bmatrix} 8 & -5 \\ -5 & 3 \end{bmatrix}$

(D) $\begin{bmatrix} 8 & -5 \\ -5 & -3 \end{bmatrix}$

8. If $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then $A^2 =$

(A) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

(B) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

(D) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

9. The value of the determinant $\begin{vmatrix} 11 & 12 & 13 \\ 12 & 13 & 14 \\ 13 & 14 & 15 \end{vmatrix}$ is :

(A) 1

(B) -67

(C) -1

(D) 0

10. The value of the determinant $\begin{vmatrix} a & a^2 & 1 \\ a & a^2 & 1 \\ a & a^2 & 1 \end{vmatrix}$ is :

(A) 0

(B) a

(C) a^2

(D) a^3

11. If $A^2 - A + I = 0$, then inverse of matrix A is :

(A) $I - A$

(B) $A - I$

(C) A

(D) $A + I$

12. If A is a 3×3 matrix whose rank is 2 and B is a 3×3 matrix whose rank is 3, then the rank of AB is :

(A) 5

(B) 3

(C) 1

(D) 2

13. If A is a $m \times n$ matrix such that AB and BA are both defined then B is an :

(A) $m \times n$ matrix

(B) $n \times m$ matrix

(C) $n \times n$ matrix

(D) $m \times m$ matrix

14. The number of non-zero rows in an echlon form is called :

(A) Rank of a matrix

(B) Cofactor of the matrix

(C) Reduced echlon form

(D) Conjugate of the matrix

15. If $A = [a_{ij}]_{2\times 2}$ where $a_{ij} = i + j$, then A is equal to :

(A) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

(B) $\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$

(D) $\begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$

16. Inverse of a matrix A exists, if :

(A) $|A| = 0$

(B) $A^T = A$

(C) Matrix A is singular

(D) Matrix A is non singular

17. The matrix $\begin{vmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{vmatrix}$ is a :

(A) Diagonal matrix

(B) Symmetric matrix

(C) Skew-symmetric matrix

(D) Scalar matrix

18. If matrix $A = [a_{ij}]_{m\times n}$ is said to be symmetric :

(A) $a_{ij} = 0$

(B) $a_{ij} = a_{ji}$

(C) $a_{ij} = a_{ij}$

(D) $a_{ij} = 1$

19. A square matrix $A = [a_{ij}]_{n\times n}$ is called a diagonal matrix if $a_{ij} = 0$ for :

(A) $i = j$

(B) $i < j$

(C) $i > j$

(D) $i \neq j$

20. If $|A| = 0$, the A is :

(A) Zero matrix

(B) 0

(C) Singular matrix

(D) Non-singular matrix

21. If the order of matrix A is $m \times p$ and the order of B is $p \times n$. Then the order of AB matrix is :

(A) $p \times n$

(B) $m \times n$

(C) $n \times p$

(D) $n \times m$

22. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$, then characteristic equation of A is :

(A) $\lambda^2 + 4\lambda + 3 = 0$

(B) $\lambda^2 + 4\lambda - 3 = 0$

(C) $\lambda^2 - 4\lambda + 3 = 0$

(D) $\lambda^2 - 4\lambda - 3 = 0$

23. $\lim_{x\to 0} \frac{\sin 3x}{\sin 4x}$ is :

(A) $\frac{3}{4}$

(B) 0

(C) $\frac{4}{3}$

(D) 1

24. $\lim_{x\to 3} \frac{x-3}{x^2-2x-3}$ is :

(A) 0

(B) 1

(C) $\frac{1}{4}$

(D) None of these

25. $\lim_{x\to 0} \frac{\tan x.}{x}$ is :

(A) 0

(B) 1

(C) π

(D) Limit does not exist

26. $\lim_{x\to 0} \frac{\sin 2x.}{x}$ is :

(A) 1

(B) 2

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

(D) 0

27. $\lim_{x\to 0} \frac{1-\cos x.}{x}$ is :

(A) 1

(B) 2

(C) 0

(D) None of these

28. $\lim_{x\to 0} \frac{\tan \pi x.}{x}$ is :

(A) π

(B) 1

(C) $\frac{1}{\pi}$

(D) Limit does not exist

29. $\lim_{x\to 1} x^2 + 3x - 1$is :

(A) -3

(B) 3

(C) 2

(D) 1

30. Find the minimum value of the expression $3x^2 + 6x + 6$, is :

(A) -3

(B) 2

(C) 0

(D) 3

31. If x is real, find the maximum value of the function $7 - 3x - x^2$, is :

(A) $\frac{36}{5}$

(B) $\frac{37}{7}$

(C) $\frac{37}{4}$

(D) None of these

32. If x is real, find the minimum value of the function $3x^2 + 3x + 4$, is :

(A) $-\frac{1}{2}$

(B) $\frac{13}{2}$

(C) 7

(D) $\frac{13}{4}$

33. Function $y = f(x)$ have maximum value at $x = a$:

(A) $f'(a) = 0, f''(a) < 0$

(B) $f'(a) = 0, f''(a) > 0$

(C) $f'(a) = 0, f''(a) = 0$

(D) None of these

34. Saddle point is the point where :

(A) Function has maximum value

(B) Function has minimum value

(C) Function has neither maximum nor minimum value

(D) Function has zero value

35. Function $y = f(x)$ have minimum value at $x = a$:

(A) $f'(a) = 0, f''(a) < 0$

(B) $f'(a) = 0, f''(a) > 0$

(C) $f'(a) = 0, f''(a) = 0$

(D) None of these

36. Rolle's Theorem tells about the :

(A) Existence of point c where derivative of a function becomes zero

(B) Existence of point c where derivative of a function is positive

(C) Existence of point c where derivative of a function is negative

(D) Existence of point c where derivative of a function is either positive or negative

37. Rolle's what is the relation between $f(a)$and $f(b)$ according to Rolle's theorem :

(A) Less than

(B) Greater than

(C) Equal to

(D) Unequal

38. For which value $c \in (1, 5)$ of Rolle's theorem is verified for the function$f(x) = x^2 - 6x + 5$ in $[1, 5]$

(A) 1

(B) 3

(C) 2

(D) 4

39. What is the formula for Lagrange's mean value theorem ?

(A) $f'(c) = \frac{f(a)+f(b)}{b-a}$

(B) $f'(c) = \frac{f(b)-f(a)}{b-a}$

(C) $f'(c) = \frac{f(a)+f(b)}{b+a}$

(D) $f'(c) = \frac{f(a)-f(b)}{b+a}$

40. What are the conditions to satisfy Lagrange's mean value theorem :

(A) f is continuous on (a, b)

(B) f is differentiable on $[a, b]$

(C) f is continuous and differentiable on (a, b)

(D) f is differentiable but not continuous on (a, b)

41. Lagrange's mean value theorem is also called as :

(A) Euclid's theorem

(B) Rolle's theorem

(C) Mean value theorem

(D) A special case of Rolle's theorem

42. Maclaurin's series is an special case of Taylor's series if a is :

(A) 0

(B) 1

(C) -1

(D) None of these

43. Maclaurin's series of the function $f(x)$ is :

(A) $f(0) + \frac{x}{1}f'(0) + \frac{x^2}{2}f''(0) + \frac{x^3}{3}f'''(0) + \ldots\ldots\ldots..,$

(B) $1 + \frac{x}{1!}f'(1) + \frac{x^2}{2!}f''(1) + \frac{x^3}{3!}f'''(1) + \ldots\ldots\ldots..,$

(C) $f(0) - \frac{x}{1!}f'(0) + \frac{x^2}{2!}f''(0) - \frac{x^3}{3!}f'''(0) + \ldots\ldots\ldots..,$

(D) $f(0) + \frac{x}{1!}f'(0) + \frac{x^2}{2!}f''(0) + \frac{x^3}{3!}f'''(0) + \ldots\ldots\ldots..,$

44. Taylors's series of the function $f(a + h)$ is :

(A) $f(a) + \frac{h}{1!}f'(a) + \frac{h^2}{2!}f''(h) + \frac{h^3}{3!}f'''(h) + \ldots\ldots + \frac{h^n}{n!}f^n(h) + \ldots\ldots\ldots.,$

(B) $f(a) + \frac{h}{1}f'(a) + \frac{h^2}{2}f''(h) + \frac{h^3}{3}f'''(h) + \ldots\ldots + \frac{h^n}{n}f^n(h) + \ldots\ldots\ldots.,$

(C) $f(a) - \frac{h}{1!}f'(a) + \frac{h^2}{2!}f''(h) - \frac{h^3}{3!}f'''(h) + \ldots\ldots + (-1)^n\frac{h^n}{n!}f^n(h) + \ldots\ldots\ldots.,$

(D) None of these

45. The necessary condition for the Maclaurin's expansion to be true for function $f(x)$ is :

(A) $f(x)$ should be continuous

(B) $f(x)$ should be differentiable

(C) $f(x)$ should be exists at every point

(D) $f(x)$ should be continuous and differentiable

46. Coefficient of x in Maclaurin's series $f(x) = e^{\sin x}$ is :

(A) 2

(B) 1

(C) 3

(D) 0

47. Coefficient of x^n is Maclaurin's series $f(x)$about $a = 0$ is :

(A) $\frac{f^n(0)}{n}$

(B) $f^n(0)$

(C) $-\frac{f^n(0)}{n!}$

(D) $\frac{f^n(0)}{n!}$

48. If $f(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} -$....., is :

(A) $\sin x$

(B) $\sin hx$

(C) $\cos hx$

(D) $\cos x$

49. Find the $\frac{dy}{dx}$,derivative of the function $y = 3x^{2/3} - 4x^{1/2} - 2$.

(A) $2x^{1/3} - 2x^{-1/2}$

(B) $3x^{-1/3} - 2x^{-1/2}$

(C) $2x^{-1/3} - 2x^{-1/2}$

(D) None of these

50. If $f(x) = \sin hx$then$f''(x)$ is :

(A) $-\sin hx$

(B) $\sin hx$

(C) $\cos hx$

(D) $-\cos hx$

51. $y = \tan^{-1}\frac{x}{2}$, then find $\frac{dy}{dx}$:

(A) $\frac{4}{4+x^2}$

(B) $\frac{2}{\sqrt{4-x^2}}$

(C) $\frac{1}{2+x^2}$

(D) $\frac{2}{4+x^2}$

52. If $y = \sin^2 3x + cos^2 3x$, then find $\frac{dy}{dx}$:

(A) $-6\sin 6x$

(B) 0

(C) 1

(D) $-6\cos 6x$

53. If $y = e^{-x}\log x$, then find $\frac{dy}{dx}$, when $x = 1$, is :

(A) $\frac{1}{e}$

(B) 0

(C) e

(D) $\frac{2}{e}$

54. If $y = x^5 + 3$, then find $\frac{dy}{dx}$ when $x = 1$, is :

(A) $\frac{-3}{2}$

(B) $\frac{3}{2}$

(C) -5

(D) 5

55. $y = 2\sqrt{x} - \frac{1}{2\sqrt{x}}$, then find $\frac{dy}{dx}$:

(A) $x + \frac{1}{x\sqrt{x}}$

(B) $x - \frac{1}{x\sqrt{x}}$

(C) $\frac{1}{\sqrt{x}} + \frac{1}{4x\sqrt{x}}$

(D) $\frac{4x-1}{4x\sqrt{x}}$

56. $y = \sqrt{3-2x}$, then $\frac{dy}{dx}$ is :

(A) $\frac{1}{2\sqrt{3-2x}}$

(B) $\frac{-1}{\sqrt{3-2x}}$

(C) $\frac{-1}{3-2x}$

(D) $\frac{2}{3}(3-2x)^{3/2}$

57. $y = \cos x^2$, then find $\frac{dy}{dx}$:

(A) $2x \sin x^2$

(B) $\sin 2x$

(C) $-2x \sin x^2$

(D) $-2 \sin x \cos x$

58. $y = \cos^2 x$, then find $\frac{dy}{dx}$:

(A) $-\sin^2 x$

(B) $2 \sin x \cos x$

(C) $-2 \sin x$

(D) $-2 \sin x \cos x$

59. $y = e^{-x} \cos 2x$,then find $\frac{dy}{dx}$:

(A) $-e^{-x}(\cos 2x + 2 \sin 2x)$

(B) $e^{-x}(\cos 2x - 2 \sin 2x)$

(C) $-e^{-x}(\cos 2x + \sin 2x)$

(D) None of these

60. $\int 5\ cos\ mx\ dx =$

(A) $\frac{5 \sin mx}{x} + c$

(B) $x \sin mx + c$

(C) $\frac{5 \sin mx}{m} + c$

(D) $\sin mx + c$

61. $\int x^2 \sin x^3\ dx =$

(A) $\frac{1}{3}\cos x^3 + c$

(B) $-\frac{1}{3}\cos x^3 + c$

(C) $-\frac{1}{3}\cos x + c$

(D) $\frac{1}{3}\sin x^3 + c$

62. $\int 2x\ (x^2 + 6)dx =$

(A) $\frac{x^4}{2} + 6x^2 + c$

(B) $\frac{x^4}{2} - 6x + c$

(C) $\frac{x^4}{2} - 6x^2 + c$

(D) $\frac{x^4}{2} + x^2 + c$

63. $\int uv\ dx =$

(A) $u\int v\ dx - v\int udx$

(B) $u\int v\ dx - \int \frac{du}{dx} dx + c$

(C) $u\int v\ dx - \int \frac{du}{dx} v\ dx + c$

(D) $u\int v\ dx - \int \frac{du}{dx}\left(\int vdx\right)dx + c$

64. $\int \left(x^2 + \frac{2}{x^3}\right) dx =$

(A) $\frac{x^3}{3} + \frac{2}{x^2} + c$

(B) $\frac{x^3}{3} - \frac{2}{x^2} + c$

(C) $\frac{x^3}{3} - \frac{1}{x^2} + c$

(D) None of these

65. $\int sin\ 2x\ dx =$

(A) $\frac{\cos 2x}{2} + c$

(B) $\frac{\sin 2x}{2} + c$

(C) $\cos 2x + c$

(D) $-\frac{\cos 2x}{2} + c$

66. $\int cos\ x \log(\sin x)\, dx =$

(A) $\sin x \log(\cos x - 1) + c$

(B) $\cos x \log(\sin x + 1) + c$

(C) $\sin x\, [\log(\sin x) - 1] + c$

(D) $\cos x \log(\sin x - 1) + c$

67. $\int 1 dx =$

(A) $x + c$

(B) $1 + c$

(C) $\log x + c$

(D) $x^2 + c$

68. $\frac{d}{dx}\int f(x)dx =$

(A) $f'(x)$

(B) $f(x)$

(C) 0

(D) None of these

69. $\int \frac{1}{x}dx =$

(A) $\log x + c$

(B) $-1 + c$

(C) $-x + c$

(D) $\frac{x^2}{2} + c$

70. In the gamma function, what is the value of $\Gamma\left(\frac{1}{2}\right) =$

(A) $\pi - \left(\sqrt{2}\right)$

(B) $\pi\sqrt{2}$

(C) $\sqrt{\pi}$

(D) π^2

71. $\Gamma(n+1) = n!$ Can be used when :

(A) n is any integers

(B) n is negative integers

(C) n is positive integers

(D) n is any real number

72. Which of the following statement is true for beta and gamma function :

(A) $B(m,n) = \frac{\Gamma(m).\Gamma(n)}{\Gamma(m+n)}$

(B) $B(m,n) = \Gamma(m+n)$

(C) $B(m,n) = -\frac{\Gamma(m).\Gamma(n)}{\Gamma(m+n)}$

(D) None of these

73. $\int \sin^2 x \cos x \, dx =$

(A) $\frac{1}{2}\cos^2 x + c$

(B) $\frac{1}{3}\cos^3 x + c$

(C) $\frac{1}{2}\sin^2 x + c$

(D) $\frac{1}{3}\sin^3 x + c$

74. $\int e^{\sin x} \cos x \, dx =$

(A) $e^{\sin x} + c$

(B) $e^{\cos x} + c$

(C) $\cos x \, e^{\sin x} + c$

(D) $\sin x \, e^{\sin x} + c$

75. $\int_0^1 \frac{\tan^{-1} x}{1 + x^2} \, dx =$

(A) 1

(B) $\frac{\pi^2}{64}$

(C) $\frac{\pi^2}{32}$

(D) None of these

76. If $I_n = \int \tan^n x \, dx =$

(A) $I_n + I_{n-2} = \frac{\tan^{n-1} x}{n-1}$

(B) $I_n - I_{n-2} = \frac{\tan^{n-1} x}{n-1}$

(C) $I_n + I_{n-2} = \frac{1}{n-1}$

(D) $I_n - I_{n-2} = \frac{\tan^{n+1} x}{n+1}$

77. $\int_1^2 \log x \ dx =$

(A) $2\log 2 - 1$

(B) $2\log 2 + 1$

(C) $2\log 2 - 3$

(D) $2\log 2 + 3$

78. $\int_{-1}^1 |x| \ dx =$

(A) -1

(B) 1

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

(D) 2

79. Cross product is a mathematical operation performed between :

(A) Two scalar numbers

(B) A scalar and a vector

(C) Two vector numbers

(D) Any two numbers

80. Vector has :

(A) Direction only

(B) Magnitude only

(C) Direction as well as magnitude

(D) None of these

81. If θ is the angle between any two vectors $\vec{a}$ and $\vec{b}$, then $|\vec{a} \times \vec{b}| = |\vec{a} \cdot \vec{b}|$ when θ is :

(A) 0

(B) π

(C) $\frac{\pi}{4}$

(D) $\frac{\pi}{2}$

82. If $3\hat{\imath} + 4\hat{\jmath}$ and $x\hat{\imath} + y\hat{\jmath}$ are equal vectors ten x and y are :

(A) $x = 3, y = 4$

(B) $x = 4, y = 3$

(C) $x = -3, y = 4$

(D) $x = 3, y = -4$

83. Cross product of two non zero vectors $\vec{a}$ and $\vec{b}$ is :

(A) $\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \sin\theta$

(B) $\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \sin\theta\, \hat{n}$

(C) $\vec{a} \times \vec{b} = -|\vec{a}||\vec{b}| \sin\theta$

(D) $\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \cos\theta$

84. If three vectors are coplanar then their scalar product is :

(A) 1

(B) 0

(C) - 1

(D) $\pm$ 1

85. Unit vectors along the axis OX, OY and OZ are :

(A) $-\hat{\imath}, -\hat{\jmath}, \hat{k}$

(B) $\hat{\imath}, \hat{\jmath}, -\hat{k}$

(C) $\hat{\imath}, -\hat{\jmath}, \hat{k}$

(D) $\hat{\imath}, \hat{\jmath}, \hat{k}$

86. $\hat{\imath} \times (\hat{\jmath} \times \hat{k}) + \hat{\jmath} \times (\hat{k} \times \hat{\imath}) =$

(A) 1

(B) 2

(C) 0

(D) - 1

87. Scalar triple product of the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ is denoted as :

(A) $\vec{a} \,.\, \vec{b} \,.\, \vec{c}$

(B) $2\vec{a} \,.\, (\vec{b} \times \vec{c})$

(C) $3\vec{a} \,.\, (\vec{b} \times \vec{c})$

(D) $\vec{a} \,.\, (\vec{b} \times \vec{c})$

88. Angle between $\hat{\imath}$and$\hat{\jmath}$is a vector ?

(A) 45°

(B) 270°

(C) 90°

(D) 180°

89. Magnitude of the vector $3\hat{\imath} + 2\hat{\jmath} - \hat{k}$ is :

(A) $\sqrt{11}$

(B) $\sqrt{15}$

(C) $\sqrt{13}$

(D) $\sqrt{14}$

90. Unit vector of $\vec{a} = \hat{\imath} + \hat{\jmath} + \hat{k}$ is :

(A) $\frac{\hat{\imath}+\hat{\jmath}+\hat{k}}{\sqrt{3}}$

(B) $\hat{\imath} + \hat{\jmath} + \hat{k}$

(C) $\frac{\hat{\imath}+\hat{\jmath}+\hat{k}}{\sqrt{2}}$

(D) $\frac{\hat{\imath}+\hat{\jmath}+\hat{k}}{\sqrt{9}}$

91. Scalar product of two non zero vectors $\vec{a}$ and $\vec{b}$ is :

(A) $\vec{a} \cdot \vec{b} = |\vec{a}||\vec{b}| \sin\theta$

(B) $\vec{a} \cdot \vec{b} = |\vec{a}||\vec{b}| \cos\theta$

(C) $\vec{a} \cdot \vec{b} = 2|\vec{a}||\vec{b}|$

(D) $\vec{a} \cdot \vec{b} = 2|\vec{a}||\vec{b}| \sin\theta$

92. Which of the following is a vector ?

(A) Acceleration

(B) Charge

(C) Energy

(D) Mass

93. $(\vec{a} \times \vec{b}) \times \vec{c} =$

(A) $(\vec{a} \cdot \vec{c})\vec{b} - (\vec{b} \cdot \vec{c})\vec{a}$

(B) $(\vec{a} \times \vec{c})\vec{b} - (\vec{b} \times \vec{c})\vec{a}$

(C) $(\vec{a} \times \vec{c}) \cdot \vec{b}$

(D) None of these

94. Value of x for which $\vec{a} = x(\hat{\imath} + \hat{\jmath} + \hat{k})$ is unit vectors is :

(A) $x = \pm\frac{1}{\sqrt{2}}$

(B) $x = \pm\frac{1}{\sqrt{3}}$

(C) $x = \pm\frac{1}{\sqrt{6}}$

(D) $x = \pm\frac{1}{\sqrt{5}}$

95. If $\vec{a} = a_1\hat{\imath} + a_2\hat{\jmath} + a_3\hat{k}$, $\vec{b} = b_1\hat{\imath} + b_2\hat{\jmath} + b_3\hat{k}$then $\vec{a} \cdot \vec{b} =$

(A) $a_1b_1 - a_2b_2 - a_3b_3$

(B) $a_1b_1 - a_2b_2 + a_3b_3$

(C) $a_1b_1 + a_2b_2 - a_3b_3$

(D) $a_1b_1 + a_2b_2 + a_3b_3$

96. If $\vec{a} + \vec{b} + \vec{c}$, then $\vec{a} \times \vec{b} =$

(A) $\vec{c} \times \vec{a}$

(B) $\vec{b} \times \vec{c}$

(C) None of these

(D) Both (A) and (B)

97. Find the value of $\vec{a} \times \vec{a}$ is :

(A) 0

(B) 1

(C) $|\vec{a}|$

(D) $|\vec{a}|^2$

98. Direction cosines are :

(A) Tangent of the direction angles

(B) Cosine of direction angles

(C) Sine of direction angles

(D) None of these

99. If $\vec{a}$ and $\vec{b}$ be two vectors such that $|\vec{a} = |\vec{b}| = \sqrt{2}$ and $\vec{a} \,.\, \vec{b} = -1$, then the angle between $\vec{a}$ and $\vec{b}$ is :

(A) $\frac{\pi}{2}$

(B) $\frac{\pi}{4}$

(C) $\frac{2\pi}{3}$

(D) π

100. Which of the following equals to $\vec{a} \times \vec{b} =$

(A) $-(\vec{a} \times \vec{b})$

(B) $\vec{a} \,.\, \vec{b}$

(C) $\vec{b} \times \vec{a}$

(D) $-(\vec{b} \times \vec{a})$

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