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(To be filled in the
OMR Sheet)

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No.

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प्रश्नपुस्तिका सीरीज
Question Booklet Series

D

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 भरे, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमें से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने हैं। 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 प्वाइंट 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 जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।

Rough Work / रफ कार्य

1. If $f(x) = \sin hx$ then $f''(x)$ is :
 - (A) $-\sin hx$
 - (B) $\sin hx$
 - (C) $\cos hx$
 - (D) $-\cos hx$
2. 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
3. If $f(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots$, is :
 - (A) $\sin x$
 - (B) $\sin hx$
 - (C) $\cos hx$
 - (D) $\cos x$
4. Coefficient of x^n in 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) $\frac{f^n(0)}{n!}$
5. Coefficient of x in Maclaurin's series $f(x) = e^{\sin x}$ is :
 - (A) 2
 - (B) 1
 - (C) 3
 - (D) 0
6. 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 exist at every point
 - (D) $f(x)$ should be continuous and differentiable

7. Taylors's series of the function $f(a + h)$ is :
- (A) $f(a) + \frac{h}{1!}f'(a) + \frac{h^2}{2!}f''(h) + \frac{h^3}{3!}f'''(h) + \dots + \frac{h^n}{n!}f^n(h) + \dots$,
- (B) $f(a) + \frac{h}{1}f'(a) + \frac{h^2}{2}f''(h) + \frac{h^3}{3}f'''(h) + \dots + \frac{h^n}{n}f^n(h) + \dots$,
- (C) $f(a) - \frac{h}{1!}f'(a) + \frac{h^2}{2!}f''(h) - \frac{h^3}{3!}f'''(h) + \dots + (-1)^n \frac{h^n}{n!}f^n(h) + \dots$,
- (D) None of these
8. Maclaurin's series of the function $f(x)$ is :
- (A) $f(0) + \frac{x}{1}f'(0) + \frac{x^2}{2}f''(0) + \frac{x^3}{3}f'''(0) + \dots$,
- (B) $1 + \frac{x}{1!}f'(1) + \frac{x^2}{2!}f''(1) + \frac{x^3}{3!}f'''(1) + \dots$,
- (C) $f(0) - \frac{x}{1!}f'(0) + \frac{x^2}{2!}f''(0) - \frac{x^3}{3!}f'''(0) + \dots$,
- (D) $f(0) + \frac{x}{1!}f'(0) + \frac{x^2}{2!}f''(0) + \frac{x^3}{3!}f'''(0) + \dots$,
9. Maclaurin's series is an special case of Taylor's series if a is :
- (A) 0
- (B) 1
- (C) -1
- (D) None of these
10. 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
11. 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)

12. 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) $f'(c) = \frac{f(a)-f(b)}{b+a}$
13. 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
14. 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
15. 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
16. 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

17. 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
18. 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
19. 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) $\frac{13}{4}$
20. 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
21. Find the minimum value of the expression $3x^2 + 6x + 6$, is :
(A) -3
(B) 2
(C) 0
(D) 3
22. $\lim_{x \rightarrow 1} x^2 + 3x - 1$ is :
(A) -3
(B) 3
(C) 2
(D) 1

23. $\lim_{x \rightarrow 0} \frac{\tan \pi x}{x}$ is :
- (A) π
 - (B) 1
 - (C) $\frac{1}{\pi}$
 - (D) Limit does not exist

24. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x}$ is :
- (A) 1
 - (B) 2
 - (C) 0
 - (D) None of these

25. $\lim_{x \rightarrow 0} \frac{\sin 2x}{x}$ is :
- (A) 1
 - (B) 2
 - (C) $\frac{1}{2}$
 - (D) 0

26. $\lim_{x \rightarrow 0} \frac{\tan x}{x}$ is :
- (A) 0
 - (B) 1
 - (C) π
 - (D) Limit does not exist

27. $\lim_{x \rightarrow 3} \frac{x-3}{x^2-2x-3}$ is :
- (A) 0
 - (B) 1
 - (C) $\frac{1}{4}$
 - (D) None of these

28. $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 4x}$ is :
- (A) $\frac{3}{4}$
 (B) 0
 (C) $\frac{4}{3}$
 (D) 1
29. 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) $\lambda^2 - 4\lambda - 3 = 0$
30. 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) $n \times m$
31. If $|A| = 0$, the A is :
- (A) Zero matrix
 (B) 0
 (C) Singular matrix
 (D) Non-singular matrix
32. 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) $i \neq j$

33. 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) $a_{ij} = 1$
34. 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
35. 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
36. 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) $\begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$

37. 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
38. 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
39. 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
40. If $A^2 - A + I = 0$, then inverse of matrix A is :
- (A) $I - A$
 - (B) $A - I$
 - (C) A
 - (D) $A + I$
41. 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

42. 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

43. 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) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

44. 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) $\begin{bmatrix} 8 & -5 \\ -5 & -3 \end{bmatrix}$

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

- (A) 5
- (B) 6
- (C) - 6
- (D) - 5

46. If A is symmetric matrix then $A^T =$
- (A) A
 - (B) $|A|$
 - (C) $-A$
 - (D) A^T
47. 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
48. 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) $x = -2, y = 7$
49. 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
50. 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

51. Which of the following equals to $\vec{a} \times \vec{b} =$
- (A) $-(\vec{a} \times \vec{b})$
 - (B) $\vec{a} \cdot \vec{b}$
 - (C) $\vec{b} \times \vec{a}$
 - (D) $-(\vec{b} \times \vec{a})$
52. If $\vec{a}$ and $\vec{b}$ be two vectors such that $|\vec{a}| = |\vec{b}| = \sqrt{2}$ and $\vec{a} \cdot \vec{b} = -1$, 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
53. Direction cosines are :
- (A) Tangent of the direction angles
 - (B) Cosine of direction angles
 - (C) Sine of direction angles
 - (D) None of these
54. Find the value of $\vec{a} \times \vec{a}$ is :
- (A) 0
 - (B) 1
 - (C) $|\vec{a}|$
 - (D) $|\vec{a}|^2$
55. 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)
56. If $\vec{a} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$, $\vec{b} = b_1\hat{i} + b_2\hat{j} + b_3\hat{k}$ 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) $a_1b_1 + a_2b_2 + a_3b_3$

57. Value of x for which $\vec{a} = x(\hat{i} + \hat{j} + \hat{k})$ 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) $x = \pm \frac{1}{\sqrt{5}}$

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

(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

59. Which of the following is a vector ?

(A) Acceleration

(B) Charge

(C) Energy

(D) Mass

60. 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) $\vec{a} \cdot \vec{b} = 2|\vec{a}||\vec{b}| \sin \theta$

61. Unit vector of $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ is :

(A) $\frac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{3}}$

(B) $\hat{i} + \hat{j} + \hat{k}$

(C) $\frac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{2}}$

(D) $\frac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{9}}$

62. Magnitude of the vector $3\hat{i} + 2\hat{j} - \hat{k}$ is :
- (A) $\sqrt{11}$
 (B) $\sqrt{15}$
 (C) $\sqrt{13}$
 (D) $\sqrt{14}$
63. Angle between $\hat{i}$ and $\hat{j}$ is a vector ?
- (A) 45°
 (B) 270°
 (C) 90°
 (D) 180°
64. Scalar triple product of the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ is denoted as :
- (A) $\vec{a} \cdot \vec{b} \cdot \vec{c}$
 (B) $2\vec{a} \cdot (\vec{b} \times \vec{c})$
 (C) $3\vec{a} \cdot (\vec{b} \times \vec{c})$
 (D) $\vec{a} \cdot (\vec{b} \times \vec{c})$
65. $\hat{i} \times (\hat{j} \times \hat{k}) + \hat{j} \times (\hat{k} \times \hat{i}) =$
- (A) 1
 (B) 2
 (C) 0
 (D) -1
66. Unit vectors along the axis OX, OY and OZ are :
- (A) $-\hat{i}, -\hat{j}, \hat{k}$
 (B) $\hat{i}, \hat{j}, -\hat{k}$
 (C) $\hat{i}, -\hat{j}, \hat{k}$
 (D) $\hat{i}, \hat{j}, \hat{k}$

67. If three vectors are coplanar then their scalar product is :
(A) 1
(B) 0
(C) - 1
(D) ± 1
68. 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) $\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \cos \theta$
69. If $3\hat{i} + 4\hat{j}$ and $x\hat{i} + y\hat{j}$ are equal vectors then x and y are :
(A) $x = 3, y = 4$
(B) $x = 4, y = 3$
(C) $x = -3, y = 4$
(D) $x = 3, y = -4$
70. 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) $\frac{\pi}{2}$
71. Vector has :
(A) Direction only
(B) Magnitude only
(C) Direction as well as magnitude
(D) None of these

72. 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

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

- (A) -1
- (B) 1
- (C) $\frac{1}{2}$
- (D) 2

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

- (A) $2 \log 2 - 1$
- (B) $2 \log 2 + 1$
- (C) $2 \log 2 - 3$
- (D) $2 \log 2 + 3$

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

76. $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx =$
- (A) 1
- (B) $\frac{\pi^2}{64}$
- (C) $\frac{\pi^2}{32}$
- (D) None of these
77. $\int e^{\sin x} \cos x dx =$
- (A) $e^{\sin x} + c$
- (B) $e^{\cos x} + c$
- (C) $\cos x e^{\sin x} + c$
- (D) $\sin x e^{\sin x} + c$
78. $\int \sin^2 x \cos x dx =$
- (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) $\frac{1}{3} \sin^3 x + c$
79. Which of the following statement is true for beta and gamma function :
- (A) $B(m, n) = \frac{\Gamma(m) \cdot \Gamma(n)}{\Gamma(m+n)}$
- (B) $B(m, n) = \Gamma(m+n)$
- (C) $B(m, n) = -\frac{\Gamma(m) \cdot \Gamma(n)}{\Gamma(m+n)}$
- (D) None of these
80. $\Gamma(n+1) = n!$ 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

81. In the gamma function, what is the value of $\Gamma\left(\frac{1}{2}\right) =$
- (A) $\pi - (\sqrt{2})$
 - (B) $\pi\sqrt{2}$
 - (C) $\sqrt{\pi}$
 - (D) π^2
82. $\int \frac{1}{x} dx =$
- (A) $\log x + c$
 - (B) $-1 + c$
 - (C) $-x + c$
 - (D) $\frac{x^2}{2} + c$
83. $\frac{d}{dx} \int f(x) dx =$
- (A) $f'(x)$
 - (B) $f(x)$
 - (C) 0
 - (D) None of these
84. $\int 1 dx =$
- (A) $x + c$
 - (B) $1 + c$
 - (C) $\log x + c$
 - (D) $x^2 + c$
85. $\int \cos x \log(\sin x) dx =$
- (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) $\cos x \log(\sin x - 1) + c$

86. $\int \sin 2x \, dx =$

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

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

(C) $\cos 2x + c$

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

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

(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

88. $\int uv \, dx =$

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

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

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

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

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

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

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

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

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

90. $\int x^2 \sin x^3 dx =$
- (A) $\frac{1}{3} \cos x^3 + c$
- (B) $-\frac{1}{3} \cos x^3 + c$
- (C) $-\frac{1}{3} \cos x + c$
- (D) $\frac{1}{3} \sin x^3 + c$
91. $\int 5 \cos mx dx =$
- (A) $\frac{5 \sin mx}{x} + c$
- (B) $x \sin mx + c$
- (C) $\frac{5 \sin mx}{m} + c$
- (D) $\sin mx + c$
92. $y = e^{-x} \cos 2x$, 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
93. $y = \cos^2 x$, then find $\frac{dy}{dx}$:
- (A) $-\sin^2 x$
- (B) $2 \sin x \cos x$
- (C) $-2 \sin x$
- (D) $-2 \sin x \cos x$

94. $y = \cos x^2$, then find $\frac{dy}{dx}$:
- (A) $2x \sin x^2$
- (B) $\sin 2x$
- (C) $-2x \sin x^2$
- (D) $-2 \sin x \cos x$
95. $y = \sqrt{3 - 2x}$, then $\frac{dy}{dx}$ is :
- (A) $\frac{1}{2\sqrt{3-2x}}$
- (B) $\frac{-1}{\sqrt{3-2x}}$
- (C) $\frac{-1}{3-2x}$
- (D) $\frac{2}{3}(3 - 2x)^{3/2}$
96. $y = 2\sqrt{x} - \frac{1}{2\sqrt{x}}$, 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) $\frac{4x-1}{4x\sqrt{x}}$
97. 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

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

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

(B) 0

(C) e

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

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

(A) $-6 \sin 6x$

(B) 0

(C) 1

(D) $-6 \cos 6x$

100. $y = \tan^{-1} \frac{x}{2}$, 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) $\frac{2}{4+x^2}$

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