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

Paper Code		
5	7	4

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No.

प्रश्नपुस्तिका सीरीज
Question Booklet Series
D

B.C.A. (First Semester) Examination, February/March-2022
BCA-1005
Mathematics-I

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

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

574

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।**

1. Stationary points of $f(x) = x^2 - 2x + 1$ are :

(A) 1, 1

(B) 1, - 1

(C) -1, -1

(D) None of these

2. For which value of x, $f(x) = (x - 1)(-x + 3)$ have its maximum ?

(A) 0

(B) 1

(C) 2

(D) -2

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

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

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

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

(D) None of these

4. Saddle point is the point where :

(A) Function has maximum value

(B) Function has neither maximum value nor minimum value

(C) Function has minimum value

(D) Function has zero value

5. Maximum value of $(x + 8)(7 - x)$ is :

(A) $^{240}/_{4}$

(B) $^{210}/_{4}$

(C) $^{255}/_{4}$

(D) $^{225}/_{4}$

6. The minimum value of $(x - 2)(x - 9)$ is :

(A) $^{49}/_{4}$

(B) 0

(C) $^{-49}/_{4}$

(D) $^{11}/_{4}$

7. The slope of the curve $y^3 - xy^2 = 4$ at the point, where $y = 2$ and $x = 1$ is :

(A) -2

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

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

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

8. If $f(a) = f(b) = 0$ and $f(x)$ is continuous on $[a, b]$ and differentiable in (a, b) then :

(A) $f(x)$ must be identically equal to zero

(B) $f'(x)$ may be different from zero for all x on $[a, b]$

(C) There exist at least one number $c \in (a, b)$ s.t. $f'(c) = 0$

(D) None of these

9. If $\sin(xy) = x$ then $\frac{dx}{dy}$ is :

(A) $\sec(xy)$

(B) $\frac{\sec(xy)}{x}$

(C) $\frac{\sec(xy)-y}{x}$

(D) $\sec(xy) - 1$

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

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

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

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

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

11. $\lim_{x \to 0} \left(\tan x + \sec x + x \sin \frac{1}{x} \right)$ is :

(A) 2

(B) 0

(C) 1

(D) -1

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

(A) 3

(B) -3

(C) 2

(D) 1

13. If $f(x) = \begin{cases} \frac{\sin 2x}{x} & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous at $x = 0$, then value of k is :

(A) $k = 1$

(B) $k = 0$

(C) $k = -2$

(D) $k = 2$

14. If $f(x) = \begin{cases} \frac{x^2 - 4}{x - 2} & x \neq 2 \\ 4 & x = 2 \end{cases}$ then f(x) is :

(A) Continuous at $x = 2$

(B) Not continuous at $x = 2$

(C) $\lim_{x \to 2} f(x)$ does not exist

(D) None

15. Rolle's theorem is applicable for continuously differentiable function in $[a, b]$ if :

(A) $f(a) \neq f(b)$

(B) $f(a) = f(b)$

(C) $f(a) = -f(b)$

(D) None

16. $\lim_{x \to 0} \sin \frac{1}{x}$ is :

(A) ∞

(B) 0

(C) Does not exist

(D) None of these

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

(A) 1

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

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

(D) 0

18. If f(x) is continuous and differentiable in given interval then Lagrange Mean value theorem is applicable in $[a, b]$ if :

(A) $f(a) = f(b)$

(B) $f(a) + f(b) = 0$

(C) $f(a) \neq f(b)$

(D) $f(a) = -f(b)$

19. Lagrange mean value theorem is extension of :

(A) Rolle's theorem

(B) Newton's theorem

(C) Cauchy's theorem

(D) None of these

20. Value of c in Rolle's theorem for $f(x) = \cos\frac{x}{2}$ on $[\pi, 3\pi]$ is :

(A) 1

(B) 2π

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

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

21. Rolle's theorem is not applicable for f(x) in $[0, \pi]$:

(A) $f(x) = \sin x$

(B) $f(x) = x(x - \pi)$

(C) $f(x) = x^2(x - \pi)$

(D) $f(x) = \tan x$

22. $\lim_{x\to 0} \frac{|x|}{x}$ is :

(A) 0

(B) ∞

(C) Does not exist

(D) -1

23. If [x] is greatest integer in x, then $\lim_{x\to -1}[x + 1]$ is :

(A) -1

(B) 0

(C) 1

(D) Does not exist

24. $f(x) = \begin{cases} 1 & x \in Q \\ -1 & x \in Q^c \end{cases}$ then F(x) is :

(A) Continuous every where

(B) Continuous nowhere

(C) Continuous at $x = 0$

(D) Continuous at $x = 1$

25. $f(x) = \begin{cases} \frac{\sin x}{x} & x \neq 0 \\ 1 & x = 0 \end{cases}$ is :

(A) Continuous at $x = 0$

(B) Not continuous at $x = 0$

(C) Not defined at $x = 0$

(D) None of these

26. $f(x) = [x]$,greatest integer function is continuous at :

(A) $x = 2$

(B) $x = 3$

(C) $x = 1$

(D) $x = 1.1$

27. $\lim_{x \to \infty} x \sin \frac{1}{x}$ is :

(A) 1

(B) ∞

(C) 0

(D) Does not exist

28. $\lim_{x \to 0} x^2 \sin \frac{1}{x}$ is :

(A) 1

(B) 0

(C) ∞

(D) Does not exist

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

(A) 1

(B) 2

(C) 0

(D) ∞

30. $\lim_{x \to a} \frac{x^2 - a^2}{x - a}$ is :

(A) $-2a$

(B) a

(C) 2a

(D) Does not exist

31. Statement 'Every square matrix satisfies its own characteristic equation.' is known as :

(A) Caley's theorem

(B) Hamilton theorem

(C) Caley Hamilton theorem

(D) None

32. If $A = \begin{bmatrix} x & -7 \\ x & 5x+1 \end{bmatrix}$ then $|A|$ is :

(A) $3x^2 + 4$

(B) $5x^2 + 8x$

(C) $5x^2 - 8x$

(D) $3x^2 + 4x$

33. If $\Delta = \begin{vmatrix} 5 & 3 & 8 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{vmatrix}$, then minor of the element a_{23} is :

(A) -7

(B) 4

(C) 7

(D) 8

34. If $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$ then A^{-1} is :

(A) $\frac{1}{17}\begin{bmatrix} 2 & 3 \\ -3 & 4 \end{bmatrix}$

(B) $\frac{1}{17}\begin{bmatrix} 4 & 3 \\ -3 & 2 \end{bmatrix}$

(C) $\frac{-1}{17}\begin{bmatrix} 4 & 3 \\ -3 & 2 \end{bmatrix}$

(D) $\frac{1}{17}\begin{bmatrix} 4 & 3 \\ -3 & -2 \end{bmatrix}$

35. If $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ then A^{-1} is :

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

(B) $\frac{-A^2+3I}{2}$

(C) $\frac{A^2-3I}{2}$

(D) $\frac{-A^2-3I}{2}$

36. If $A = \begin{bmatrix} 1 & 2 & x \\ 1 & 1 & 1 \\ 2 & 1 & -1 \end{bmatrix}$ is singular then x is :

(A) 1

(B) 2

(C) 3

(D) 4

37. Adjoint of matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is :

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

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

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

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

38. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then :

(A) $A^2 - 5A - 2I = 0$

(B) $A^2 + 5A - 2I = 0$

(C) $A^2 - 5A + 2I = 0$

(D) $A^2 + 5A + 2I = 0$

39. If $A = \begin{bmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{bmatrix}$ then $|A|$ is :

(A) 1

(B) w

(C) -1

(D) 0

40. If A and B are square matrices of same order then :

(A) $(AB)^T = B^T A^T$

(B) $(AB)^T = A^T B^T$

(C) $(AB)^T = AB$

(D) None

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

(A) 5

(B) 6

(C) -6

(D) None

42. If $A^2 - A + I = 0$, and A is invertible than A^1 is :

(A) A^{-2}

(B) $A + I$

(C) $I - A$

(D) $A - I$

43. If A is invertible matrix then A^{-1} is :

(A) $\frac{\text{adjoint (A)}}{|A|}$

(B) $|A|$ adjoint (A)

(C) $\frac{\text{adjoint(A)}}{A}$

(D) None

44. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{bmatrix}$ then det (A) is :

(A) -24

(B) 10

(C) 11

(D) 24

45. If A is square matrix, then which of the following is not symmetric ?

(A) $A + A^T$

(B) AA^T

(C) A^TA

(D) $A - A^T$

46. 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) $\lambda^2 - 4\lambda - 3 = 0$

47. Which of the following is not true about the matrix $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

(A) A scalar matrix

(B) A diagonal matrix

(C) Upper triangular matrix

(D) Lower triangular matrix

48. If $a_{ij} = \frac{3i-2j}{2}$, and $A = [a_{ij}]_{2\times2}$ then A is :

(A) $\begin{bmatrix} \frac{1}{2} & 2 \\ -\frac{1}{2} & 1 \end{bmatrix}$

(B) $\begin{bmatrix} \frac{1}{2} & 2 \\ 1 & -\frac{1}{2} \end{bmatrix}$

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

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

49. If A is symmetric matrix than $A^T =$

(A) A

(B) $|A|$

(C) $-A$

(D) A^T

50. The transpose of a column matrix is :

(A) Diagonal matrix

(B) Row matrix

(C) Zero matrix

(D) Column matrix

51. $i \times (j \times k) + j \times (k \times i) =$

(A) 1

(B) 2

(C) 0

(D) -1

52. $(\bar{a} \times \bar{b}) \times \bar{c} =$

(A) $(\bar{a}\bar{c}) . \bar{b} - (\bar{b}\bar{c})\bar{a}$

(B) $(\bar{a} . \bar{c})\bar{b} - (\bar{b} . \bar{c})\bar{a}$

(C) $(\bar{a} \times \bar{c}) . \bar{b}$

(D) $(\bar{a} \times \bar{a})\bar{b} - (\bar{a} \times \bar{b}) \times \bar{c}$

53. Scalar triple product of three vectors $\bar{a}, \bar{b}$ and $\bar{c}$ is denoted as :

(A) $\bar{a} . (\bar{b} \times \bar{c})$

(B) $\bar{a}\bar{b}\bar{c}$

(C) $\bar{a} . \bar{b} . \bar{c}$

(D) $\bar{a} . \bar{b}\bar{c}$

54. Angle between $\hat{i}$ and $\hat{j}$ is :

(A) 45°

(B) 90°

(C) 180°

(D) 270°

55. Which of the following is a vector ?

(A) Acceleration

(B) Charge

(C) Energy

(D) Mass

56. Unit vectors along the axes ox, oy and oz are :

(A) $-i, -j, k$

(B) $i, j, -k$

(C) i, j, k

(D) $i, -j, k$

57. If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ then vectors $\vec{a}$ and $\vec{b}$ are :

(A) Parallel

(B) Perpendicular

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

(D) None of these

58. Vectors $\vec{a}$ and $\vec{b}$ are collinear if :

(A) They have equal magnitudes

(B) They are in the same line

(C) They are parallel to the same line irrespective of their magnitudes and directions.

(D) None of these

59. Direction cosines are :

(A) tangents of direction angles

(B) sines of direction angles

(C) cosines of direction angles

(D) cotangents of direction angles

60. Vector has :

(A) Direction only

(B) Direction as well as magnitude

(C) Magnitude only

(D) None of these

61. If $\vec{a} \cdot \vec{b} \geq 0$ then angle θ between $\vec{a}$ and $\vec{b}$ is :

(A) $0 \leq \theta \leq \frac{\pi}{2}$

(B) $0 < \theta < \frac{\pi}{2}$

(C) $0 < \theta < \pi$

(D) $\frac{-\pi}{2} < \theta < \frac{\pi}{2}$

62. If $\vec{a} = 3i + j + 2k$ and $\vec{b} = 2i - 2j + 4k$ then $|\vec{a} \times \vec{b}|$ is equal to :

(A) $19\sqrt{5}$

(B) $17\sqrt{2}$

(C) $8\sqrt{3}$

(D) $19\sqrt{3}$

63. Cross product $\bar{a} \times \bar{b} =$

(A) $|\bar{a}||\bar{b}| \sin \theta$

(B) $-|\bar{a}||\bar{b}| \sin \theta$

(C) $|\bar{a}||\bar{b}| \cos \theta$

(D) $|\bar{a}||\bar{b}| \sin \theta \, \hat{n}$

64. If $\bar{a} = a_1 i + a_2 j + a_3 k, \vec{b} = b_1 i + b_2 j + b_3 k$ then $\bar{a} . \bar{b} =$

(A) $a_1 b_1 - a_2 b_2 + a_3 b_3$

(B) $a_1 b_1 + a_2 b_2 - a_3 b_3$

(C) $a_1 b_1 - a_2 b_2 - a_3 b_3$

(D) $a_1 b_1 + a_2 b_2 + a_3 b_3$

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

(A) $\vec{a} . \vec{b} = 2 |\bar{a}||\bar{b}| \cos\theta$

(B) $\bar{a} . \bar{b} = |\bar{a}||\bar{b}| \cos\theta$

(C) $\bar{a} . \bar{b} = |\bar{a}||\bar{b}| \sin\theta$

(D) $\bar{a} . \bar{b} = 2 |\bar{a}||\bar{b}| \sin\theta$

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

(A) $\bar{a} . \bar{b}$

(B) $\bar{a} \times \bar{b}$

(C) $\overrightarrow{ab}$

(D) ab

67. Value of x for which $\vec{a} = x(i + j + k)$ is unit vector is :

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

(B) $x = \pm \frac{1}{\sqrt{7}}$

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

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

68. If $2i + 3j$ and $xi + yj$ are equal vectors then x and y are :

(A) $x = 3, y = 2$

(B) $x = 3, y = -2$

(C) $x = 2, y = 3$

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

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

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

(B) $i + j + k$

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

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

70. Magnitude of the vector $\vec{a} = 2i - 7j - 3k$ is :

(A) $\sqrt{63}$

(B) $\sqrt{62}$

(C) $\sqrt{61}$

(D) $\sqrt{65}$

71. $\int k\, f(x)\, dx =$

(A) $k \int f(x)\, dx$

(B) $k \int f'(x)\, dx$

(C) $k\, f(x)$

(D) $k \int f(x)\, dx + c$

72. If the derivative of sin x is cos x then integration of cos x is :

(A) $-\cos x$

(B) $-\sin x$

(C) $\sin x$

(D) None of these

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

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

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

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

(D) $\cos x\,[\log(\cos x) + 1] + c$

74. $\int 2x^3 e^{x^2}\, dx =$

(A) $e^{x^2}(x^2 - 1) + c$

(B) $-e^{x^2}(x^2 + 2) + c$

(C) $2e^{x^2}(x^2 + 1) + c$

(D) $e^{x^2}(x - 1) + c$

75. $\int \log x^2\, dx =$

(A) $\log x^2 + x + c$

(B) $x \log x^2 - 2x + c$

(C) $x \log x^2 - 1 + c$

(D) $x \log x - 2x + c$

76. $\int uv\, dx =$

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

(B) $u\int v\, dx - \int \frac{d}{dx} u\, dx$

(C) $u\int v\, dx - \int \left(\frac{du}{dx}\right) v\, dx$

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

77. $\int \cos\sqrt{x}\, dx =$

(A) $\sqrt{x} \sin \sqrt{x}$

(B) $2\sqrt{x} \sin \sqrt{x}$

(C) $2\sqrt{x} \sin \sqrt{x} + c$

(D) None

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

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

(B) $\frac{1}{3} \sin^3 x$

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

(D) $\sin^3 x + c$

79. $\int \sin^{-1} x\ dx =$

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

(B) $x \sin^{-1} x + \sqrt{1 - x^2} + c$

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

(D) None

80. $\int e^{-x}\, dx =$

(A) $e^{-x} + c$

(B) $-e^{-x} + c$

(C) $-e^{x} + c$

(D) $e^{-x} - c$

81. $\int \frac{1}{1+x^2}\,dx =$

(A) $\tan^{-1} x$

(B) $\tan^{-1} \frac{x}{2}$

(C) $\tan^{-1} x + c$

(D) $\cot^{-1} x$

82. $\int \frac{1}{\sqrt{1-x^2}}\,dx =$

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

(B) $\sin^{-1}x + c$

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

(D) $\sec^{-1}x + c$

83. $\int \sec^2(7-4x)\,dx =$

(A) $\frac{-1}{4}\tan(7-4x) + c$

(B) $\frac{1}{4}\tan(7-4x)$

(C) $\frac{1}{4}\tan(7+4x) + c$

(D) $\frac{-1}{4}\tan(7x-4) + c$

84. $\int x^2 \sin x^3\,dx =$

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

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

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

(D) $\frac{1}{2}\sin^2 x^3 + c$

85. $\int \log_{10} x \ dx =$

(A) $\log_e 10x \log_e \left(\frac{x}{e}\right) + c$

(B) $(\log_{10} e)x \log_e \left(\frac{x}{e}\right) + c$

(C) $(x-1) \ \log_e x + c$

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

86. $\frac{d}{dx} \int f(x) \ dx$ is equal to :

(A) $f'(x)$

(B) $f(x)$

(C) $f'(x')$

(D) $f(x) + c$

87. $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$ dx is :

(A) $\frac{1}{x}(x)^{\frac{1}{3}} + 2\sqrt{x} + c$

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

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

(D) $\frac{3}{2}(x)^{\frac{3}{2}} + \frac{1}{2}\sqrt{x} + c$

88. $\int_{-1}^{1} |x| \ dx$ is :

(A) 1

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

(C) -1

(D) 2

89. $\int x^5\, dx =$

(A) $\frac{x^6}{6}$

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

(C) $\frac{x^5}{5} + c$

(D) $x^6 + c$

90. $\int 1\, dx =$

(A) x

(B) k+1

(C) $x + k$

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

91. Taylor's expansion of $f(a + h)$ is :

(A) $f(a) + \frac{hf'(a)}{1} + \frac{h^2f''(a)}{2} + \ldots\ldots\ldots\ldots + \frac{h^nf^n(a)}{n} + \ldots\ldots\infty$

(B) $f(a) + \frac{hf'(a)}{1!} + \frac{h^2f''(a)}{2!} + \ldots\ldots\ldots\ldots + \frac{h^nf^n(a)}{n!} + \ldots\ldots\infty$

(C) $f(a) - \frac{hf'(a)}{1!} + \frac{h^2f''(a)}{2!} + \ldots\ldots\ldots\ldots + \frac{(-1)^nf^n(a)}{n!} + \ldots\ldots\infty$

(D) None of these

92. If $y = x^3 + 3$ then $\frac{dy}{dx}$ at $x = 1$ is :

(A) 3

(B) -3

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

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

93. The necessary condition for the Maclaurin expansion to be true for the function f(x) is :

(A) f(x) is continuous

(B) f(x) is differentiable

(C) f(x) exists at every point

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

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

(A) $\cos hx$

(B) $-\sin hx$

(C) $\sin hx$

(D) $-\cos hx$

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

(A) 2

(B) 1

(C) 3

(D) 0

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

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

(B) $f^n(0)$

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

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

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

(A) 0

(B) 1

(C) - 1

(D) None of these

98. If $f(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots\ldots\ldots\ldots\ldots\infty$ then f(x) is :

(A) sin hx

(B) cos x

(C) sin x

(D) None of these

99. Given series $1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} \ldots\ldots\ldots\ldots\ldots\infty$ is an expansion of :

(A) e^x

(B) e^{-x}

(C) $\log(1 + x)$

(D) $\log(1 - x)$

100. $y = f(x)$ has maxima at $x = a$ if :

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

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

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

(D) None of these

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