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
C

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

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

(A) 1

(B) 2

(C) 0

(D) -1

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

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

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

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

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

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

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

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

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

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

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

(A) $45°$

(B) $90°$

(C) $180°$

(D) $270°$

5. Which of the following is a vector ?

(A) Acceleration

(B) Charge

(C) Energy

(D) Mass

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

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

(B) $i, j, -k$

(C) i, j, k

(D) $i, -j, k$

7. 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

8. 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

9. Direction cosines are :

(A) tangents of direction angles

(B) sines of direction angles

(C) cosines of direction angles

(D) cotangents of direction angles

10. Vector has :

(A) Direction only

(B) Direction as well as magnitude

(C) Magnitude only

(D) None of these

11. 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) $\frac{-\pi}{2} < \theta < \frac{\pi}{2}$

12. 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) $19\sqrt{3}$

13. 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) $|\bar{a}||\bar{b}| \sin\theta\, \hat{n}$

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

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

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

(A) $\vec{a} \cdot \vec{b} = 2\,|\bar{a}|\left|\bar{b}\right| \cos\theta$

(B) $\bar{a} \cdot \bar{b} = |\bar{a}|\left|\bar{b}\right| \cos\theta$

(C) $\bar{a} \cdot \bar{b} = |\bar{a}|\left|\bar{b}\right| \sin\theta$

(D) $\bar{a} \cdot \bar{b} = 2\,|\bar{a}|\left|\bar{b}\right| \sin\theta$

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

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

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

(C) $\overrightarrow{ab}$

(D) ab

17. 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) $x = \pm\frac{1}{\sqrt{3}}$

18. 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) $x = 3, y = 3$

19. 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) $\frac{i+j+k}{\sqrt{9}}$

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

(A) $\sqrt{63}$

(B) $\sqrt{62}$

(C) $\sqrt{61}$

(D) $\sqrt{65}$

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

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

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

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

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

22. 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

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

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

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

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

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

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

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

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

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

26. $\int uv\, dx =$

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

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

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

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

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

(D) None

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

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

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

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

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

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

(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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

35. $\int \log_{10} x \, dx =$

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

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

(A) $f'(x)$

(B) $f(x)$

(C) $f'(x')$

(D) $f(x) + c$

37. $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx$ 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) $\frac{3}{2}(x)^{\frac{3}{2}} + \frac{1}{2}\sqrt{x} + c$

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

(A) 1

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

(C) -1

(D) 2

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

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

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

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

(D) $x^6 + c$

40. $\int 1 \, dx =$

(A) x

(B) k+1

(C) $x + k$

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

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

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

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

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

(D) None of these

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

(A) 3

(B) -3

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

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

43. 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

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

(A) $\cos hx$

(B) $-\sin hx$

(C) $\sin hx$

(D) $-\cos hx$

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

(A) 2

(B) 1

(C) 3

(D) 0

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

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

(A) 0

(B) 1

(C) - 1

(D) None of these

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

(A) $\sin hx$

(B) $\cos x$

(C) $\sin x$

(D) None of these

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

(A) e^x

(B) e^{-x}

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

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

50. $y = f(x)$ 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

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

(A) 1, 1

(B) 1, - 1

(C) -1, -1

(D) None of these

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

(A) 0

(B) 1

(C) 2

(D) -2

53. 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

54. 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

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

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

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

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

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

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

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

(B) 0

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

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

57. 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) $\frac{1}{2}$

58. 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

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

(A) $\sec(xy)$

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

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

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

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

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

(A) 2

(B) 0

(C) 1

(D) -1

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

(A) 3

(B) -3

(C) 2

(D) 1

63. 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) $k = 2$

64. 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

65. 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

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

(A) ∞

(B) 0

(C) Does not exist

(D) None of these

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

(A) 1

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

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

(D) 0

68. 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) $f(a) = -f(b)$

69. Lagrange mean value theorem is extension of :

(A) Rolle's theorem

(B) Newton's theorem

(C) Cauchy's theorem

(D) None of these

70. 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) $\frac{3\pi}{2}$

71. 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) $f(x) = \tan x$

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

(A) 0

(B) ∞

(C) Does not exist

(D) -1

73. 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

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

(A) Continuous every where

(B) Continuous nowhere

(C) Continuous at $x = 0$

(D) Continuous at $x = 1$

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

(A) Continuous at $x = 0$

(B) Not continuous at $x = 0$

(C) Not defined at $x = 0$

(D) None of these

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

(A) $x = 2$

(B) $x = 3$

(C) $x = 1$

(D) $x = 1.1$

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

(A) 1

(B) ∞

(C) 0

(D) Does not exist

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

(A) 1

(B) 0

(C) ∞

(D) Does not exist

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

(A) 1

(B) 2

(C) 0

(D) ∞

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

(A) $-2a$

(B) a

(C) $2a$

(D) Does not exist

81. 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

82. 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) $3x^2 + 4x$

83. 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

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

85. 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) $\frac{-A^2-3I}{2}$

86. 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

87. 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) $\begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$

88. 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) $A^2 + 5A + 2I = 0$

89. 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

90. 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

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

(A) 5

(B) 6

(C) -6

(D) None

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

(A) A^{-2}

(B) $A + I$

(C) $I - A$

(D) $A - I$

93. 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

94. 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

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

(A) $A + A^T$

(B) AA^T

(C) A^TA

(D) $A - A^T$

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

97. 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

98. If $a_{ij} = \frac{3i-2j}{2}$, and $A = [a_{ij}]_{2\times 2}$ 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) $\begin{bmatrix} -\frac{1}{2} & \frac{1}{2} \\ 1 & 2 \end{bmatrix}$

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

(A) A

(B) $|A|$

(C) $-A$

(D) A^T

100. The transpose of a column matrix is :

(A) Diagonal matrix

(B) Row matrix

(C) Zero matrix

(D) Column matrix

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