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
C

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।

573

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।**

Rough Work / रफ कार्य

1. 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) $-(\vec{b} \times \vec{a})$

2. 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

3. Direction cosines are :

(A) Tangent of the direction angles

(B) Cosine of direction angles

(C) Sine of direction angles

(D) None of these

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

(A) 0

(B) 1

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

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

5. 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)

6. 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 $\vec{a} \,.\, \vec{b} =$

(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) $a_1b_1 + a_2b_2 + a_3b_3$

7. 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) $x = \pm\frac{1}{\sqrt{5}}$

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

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

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

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

(D) None of these

9. Which of the following is a vector ?

(A) Acceleration

(B) Charge

(C) Energy

(D) Mass

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

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

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

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

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

11. 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) $\frac{\hat{\imath}+\hat{\jmath}+\hat{k}}{\sqrt{9}}$

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

(A) $\sqrt{11}$

(B) $\sqrt{15}$

(C) $\sqrt{13}$

(D) $\sqrt{14}$

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

(A) 45°

(B) 270°

(C) 90°

(D) 180°

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

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

(A) 1

(B) 2

(C) 0

(D) - 1

16. 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) $\hat{\imath}, \hat{\jmath}, \hat{k}$

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

(A) 1

(B) 0

(C) - 1

(D) ± 1

18. 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) $\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \cos\theta$

19. 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) $x = 3, y = -4$

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

(A) 0

(B) π

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

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

21. Vector has :

(A) Direction only

(B) Magnitude only

(C) Direction as well as magnitude

(D) None of these

22. 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

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

(A) -1

(B) 1

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

(D) 2

24. $\int_{1}^{2} \log x \; dx =$

(A) $2 \log 2 - 1$

(B) $2 \log 2 + 1$

(C) $2 \log 2 - 3$

(D) $2 \log 2 + 3$

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

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

(A) 1

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

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

(D) None of these

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

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

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

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

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

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

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

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

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

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

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

(D) None of these

30. $\Gamma(n+1) = n!$ 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

31. 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

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

(A) $\log x + c$

(B) $-1 + c$

(C) $-x + c$

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

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

(A) $f'(x)$

(B) $f(x)$

(C) 0

(D) None of these

34. $\int 1 dx =$

(A) $x + c$

(B) $1 + c$

(C) $\log x + c$

(D) $x^2 + c$

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

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

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

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

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

(C) $\cos 2x + c$

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

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

(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

38. $\int uv\ dx =$

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

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

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

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

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

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

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

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

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

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

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

41. $\int 5 \, cos \, mx \, dx =$

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

(B) $x \sin mx + c$

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

(D) $\sin mx + c$

42. $y = e^{-x}\cos 2x$,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

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

(A) $-\sin^2 x$

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

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

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

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

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

(B) $\sin 2x$

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

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

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

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

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

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

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

46. $y = 2\sqrt{x} - \frac{1}{2\sqrt{x}}$, 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) $\frac{4x-1}{4x\sqrt{x}}$

47. 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

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

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

(B) 0

(C) e

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

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

(A) $-6 \sin 6x$

(B) 0

(C) 1

(D) $-6 \cos 6x$

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

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

(A) $-\sin hx$

(B) $\sin hx$

(C) $\cos hx$

(D) $-\cos hx$

52. 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

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

(A) $\sin x$

(B) $\sin hx$

(C) $\cos hx$

(D) $\cos x$

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

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

(A) 2

(B) 1

(C) 3

(D) 0

56. 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

57. 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

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

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

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

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

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

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

(A) 0

(B) 1

(C) -1

(D) None of these

60. 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

61. 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)

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

63. 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

64. 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

65. 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

66. 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

67. 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

68. 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

69. 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) $\frac{13}{4}$

70. 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

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

(A) -3

(B) 2

(C) 0

(D) 3

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

(A) -3

(B) 3

(C) 2

(D) 1

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

(A) π

(B) 1

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

(D) Limit does not exist

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

(A) 1

(B) 2

(C) 0

(D) None of these

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

(A) 1

(B) 2

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

(D) 0

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

(A) 0

(B) 1

(C) π

(D) Limit does not exist

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

(A) 0

(B) 1

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

(D) None of these

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

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

(B) 0

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

(D) 1

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

80. 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) $n \times m$

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

(A) Zero matrix

(B) 0

(C) Singular matrix

(D) Non-singular matrix

82. 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) $i \neq j$

83. 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) $a_{ij} = 1$

84. 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

85. 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

86. If $A = [a_{ij}]_{2\times2}$ 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) $\begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$

87. 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

88. 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

89. 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

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

(A) $I - A$

(B) $A - I$

(C) A

(D) $A + I$

91. 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

92. 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

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

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

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

(A) 5

(B) 6

(C) - 6

(D) - 5

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

(A) A

(B) $|A|$

(C) $-A$

(D) A^T

97. 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

98. 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) $x = -2, y = 7$

99. 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

100. 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

******

DO NOT OPEN THE QUESTION BOOKLET UNTIL ASKED TO DO SO

1. Examinee should enter his / her roll number, subject and Question Booklet Series correctly in the O.M.R. sheet, the examinee will be responsible for the error he / she has made.
2. **This Question Booklet contains 100 questions, out of which only 75 Question are to be Answered by the examinee. Every question has 4 options and only one of them is correct. The answer which seems correct to you, darken that option number in your Answer Booklet (O.M.R ANSWER SHEET) completely with black or blue ball point pen. If any examinee will mark more than one answer of a particular question, then the first most option will be considered valid.**
3. Every question has same marks. Every question you attempt correctly, marks will be given according to that.
4. Every answer should be marked only on Answer Booklet **(O.M.R ANSWER SHEET).**Answer marked anywhere else other than the determined place will not be considered valid.
5. Please read all the instructions carefully before attempting anything on Answer Booklet**(O.M.R ANSWER SHEET).**
6. After completion of examination please hand over the Answer Booklet **(O.M.R ANSWER SHEET)** to the Examiner before leaving the examination room.
7. There is no negative marking.

Note: On opening the question booklet, first check that all the pages of the question booklet are printed properly in case there is an issue please ask the examiner to change the booklet of same series and get another one.