

JEECUP 2021 Mathematics Question Paper

Time Allowed :2 Hours 30 Mins	Maximum Marks :400	Total Questions :100
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General Instructions

Read the following carefully and follow them strictly:

1. The paper consists of **100 multiple-choice questions (MCQs)**. For each correct answer, **+4 marks** will be awarded, and for each incorrect answer, **-1 mark** will be deducted.
2. If a candidate fills more than one circle for a question, the answer will be considered **invalid**.
3. The OMR answer sheet instructions will be given separately. Follow these instructions carefully, and ensure that all entries and circles are filled with a **ballpoint pen**.
4. Candidates must follow all instructions given by the **Centre Superintendent, Invigilator, or Board Authorities**. Failure to do so, or engaging in misconduct, such as tearing the question paper, exchanging written materials, or assisting others, will result in cancellation of the exam.
5. The use of **log tables, electronic calculators, pagers, mobile phones, and slide rules** is strictly prohibited during the examination.
6. The answer sheet should be filled carefully with a **ballpoint pen**. Make sure to mark the correct answer, as no changes will be allowed once the circle is filled.
7. After the examination, candidates may keep the question paper, but the answer sheet should be submitted as per the instructions.

5. The value of the determinant $\begin{vmatrix} \cos \alpha & \sin \alpha & 0 \\ -\sin \alpha & \cos \alpha & 0 \\ 0 & 0 & 1 \end{vmatrix}$ is:

- (A) -1
- (B) 0
- (C) 1
- (D) $\cos 2\alpha$

6. If ω is the cube root of unity then the value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ will be :

- (A) ω
- (B) $\omega^2 + 1$
- (C) 0

(D) 1

7. If $(1+x)^n = C_0 + C_1x + C_2x^2 + \cdots + C_nx^n$, then $C_0 + \frac{C_1}{2} + \frac{C_2}{3} + \cdots + \frac{C_n}{n+1}$ is equal to :

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

8. If $(1+x)^n = C_0 + C_1x + C_2x^2 + \cdots + C_nx^n$, then $C_0C_2 + C_1C_3 + C_2C_4 + \cdots + C_{n-2}C_n$ is equal to :

- (A) $\frac{2n}{n-2n-2}$
 - (B) $\frac{2n}{nn}$
 - (C) $\frac{2n}{n-2n+2}$
 - (D) none of these
-

9. If the ratio of the second and third term in the expansion of $(a+b)^2$ is equal to the ratio of third and fourth term in the expansion of $(a+b)^{n+3}$ then the value of n is equal to :

- (A) 6
 - (B) 4
 - (C) 5
 - (D) 3
-

10. The number of different words that can be formed by using the letters of the word 'MISSISIPPI' is :

- (A) 5067
 - (B) 6705
 - (C) 1520
 - (D) 2520
-

11. If a^2, b^2, c^2 are in A.P. then $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ will be :

- (A) in H.P.
- (B) in G.P.
- (C) in A.P.

(D) in arithmetic geometric progression

12. A bag contains 5 white and 3 black balls. Two balls are drawn at random then the probability that out of the two one ball is red and other is black will be :

- (A) $\frac{15}{56}$
 - (B) $\frac{11}{28}$
 - (C) $\frac{15}{28}$
 - (D) $\frac{2}{7}$
-

13. Two dice are thrown together then the probability that the sum of numbers appearing on the dice is 7 :

- (A) $\frac{1}{6}$
 - (B) $\frac{1}{12}$
 - (C) $\frac{5}{36}$
 - (D) none of these
-

14. The position vectors of the two points A and B are $\mathbf{a}$ and $\mathbf{b}$ respectively then the position vector of the point C which divides AB in the ratio 2 : 1 will be :

- (A) $\frac{\mathbf{1}+\mathbf{b}}{3}$
 - (B) $\frac{2\mathbf{a}+\mathbf{b}}{3}$
 - (C) $\frac{\mathbf{a}+2\mathbf{b}}{3}$
 - (D) none of these
-

15. If $|\mathbf{a} + \mathbf{b}| = |\mathbf{a} - \mathbf{b}|$, then the angle between $\mathbf{a}$ and $\mathbf{b}$ will be :

- (A) 180°
 - (B) 90°
 - (C) 60°
 - (D) 0°
-

16. The area of the region bounded by the curve $y = \sin^2 x$, x-axis and the lines $x = 0, x = \frac{\pi}{2}$ is

- (A) π
- (B) $\frac{\pi}{8}$
- (C) $\frac{\pi}{4}$
- (D) $\frac{\pi}{2}$

17. $\int_0^{\pi/2} \frac{\sin x}{\sqrt{1+\sin 2x}} dx$ is equal to :

- (A) π
- (B) 2π
- (C) $\frac{\pi}{4}$
- (D) $\frac{\pi}{2}$

18. $\int x e^x dx$ is equal to :

- (A) $(x-1)e^x + C$
- (B) $(1-x)e^x + C$
- (C) $(1-x)e^x + C$
- (D) none of these

19. $\int x^2 \sin x^3 dx$ is equal to :

- (A) $\frac{1}{3} \sin x^3 + C$
- (B) $-\frac{1}{3} \sin x^3 + C$
- (C) $\frac{1}{3} \cos x^3 + C$
- (D) $-\frac{1}{3} \cos x^3 + C$

20. The max. value of $\sin x + \cos x$:

- (A) 1
- (B) $\frac{1}{\sqrt{2}}$
- (C) $\sqrt{2}$
- (D) none of these

21. The angle between the curves $y = x$ and $y^2 = 4x$ at origin will be :

- (A) 0
- (B) $\frac{\pi}{3}$
- (C) $\frac{\pi}{4}$
- (D) none of these

22. If the volume of a balloon is increasing at the rate of $25 \text{ cm}^3/\text{sec.}$, then if the radius of the balloon is 5 cm. then the rate of change of the surface area is :

- (A) $20 \text{ cm}^2/\text{sec.}$

- (B) $10 \text{ m}^2/\text{sec}$.
(C) $5 \text{ cm}^2/\text{sec}$.
(D) $10 \text{ cm}^2/\text{sec}$.
-

23. The differential of coefficient of x^x is :

- (A) $x^x \log_e x$
(B) $x^x (1 + \log_e x)$
(C) $x^x (1 - \log_e x)$
(D) none of these
-

24. $\frac{d}{dx}(\sin x)^{\tan x}$ is equal to :

- (A) $(\sin x)^{\tan x} [1 - \sec^2 x \log \sin x]$
(B) $(\tan x)^{\sin x} [\log \sec^2 x \log \sin x]$
(C) $(\sin x)^{\tan x} [\sec^2 x \log \sin x + 1]$
(D) none of these
-

25. If $y = \sec^{-1} \frac{x+1}{x-1} + \sin^{-1} \frac{x-1}{x+1}$ then $\frac{dy}{dx}$ is equal to :

- (A) ∞
(B) 0
(C) 1
(D) -1
-

26. If $y = \sin^{-1} \frac{2x}{1+x^2}$, then $\frac{dy}{dx}$ is equal to :

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

27. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then $\frac{dy}{dx}$ is equal to :

- (A) $\frac{1}{1+x^2}$
(B) $-\frac{1}{1+x^2}$
(C) $\frac{2}{(1+x)^2}$
(D) none of these

28. The continuous product of the roots of $(-1)^{2/3}$ is :

- (A) ω^2
- (B) ω
- (C) 0
- (D) 1

29. The value of $\sinh^{-1} x$:

- (A) $\log(x - \sqrt{x^2 - 1})$
- (B) $\log(x + \sqrt{x^2 - 1})$
- (C) $\log(x + \sqrt{x^2 + 1})$
- (D) $\frac{1}{2} \log \frac{1+x}{1-x}$

30. The equation of a st-line passing through the point $(1, 2)$ and making equal angles to with axes, will be :

- (A) $x - y - 2 = 0$
- (B) $x + y + 1 = 0$
- (C) $x - y = 1$
- (D) $x + y = 1$

31. If the vertices of a parallelogram are $(0, 0)$, $(2, 1)$, $(1, 3)$ and $(1, 2)$ then the angle between their diagonals will be:

- (A) $\frac{\pi}{4}$
- (B) $\frac{3\pi}{2}$
- (C) $\frac{\pi}{2}$
- (D) $\frac{\pi}{3}$

32. The equation of line which is parallel to the straight line $3x + 4y - 7 = 0$ and passing through $(1, 2)$ is :

- (A) $3x + 4y = 11$
 - (B) $3x + 4y + 11 = 0$
 - (C) $4x - 3y + 2 = 0$
 - (D) $3x + 4y + 7 = 0$
-

33. The pole of the straight line $9x + y - 28 = 0$ w.r.t. the circle $x^2 + y^2 = 16$ will be:

- (A) $(\frac{33}{7}, \frac{3}{7})$
 - (B) $(\frac{33}{7}, \frac{4}{7})$
 - (C) $(\frac{4}{7}, \frac{36}{7})$
 - (D) $(\frac{36}{7}, \frac{4}{7})$
-

34. The equation of the tangent from origin to the circle $x^2 + y^2 - 2rx - 2hy + h^2 = 0$ is:

- (A) $(h^2 - r^2)x + 2rhy = 0$
 - (B) $y = 0$
 - (C) $x - y = 0$
 - (D) $(h^2 - r^2)x - 2rhy = 0$
-

35. If a tangent at a point P to the parabola meets to the directrix at Q. If S is the focus of the parabola then $\angle PSQ$ is equal to :

- (A) π
 - (B) $\frac{\pi}{2}$
 - (C) $\frac{\pi}{3}$
 - (D) $\frac{\pi}{4}$
-

36. If $f(y) = \log y$, then $f(y) + f(1/y)$ is equal to :

- (A) 2
 - (B) 0
 - (C) -1
 - (D) 1
-

37. $\lim_{x \rightarrow 0} \frac{\sec x - \log(1+x)}{x^2}$ is equal to :

- (A) $\frac{1}{2}$
 - (B) $\frac{1}{3}$
 - (C) $\frac{3}{2}$
 - (D) $\frac{2}{3}$
-

38. If α and β are the roots of the equation $1(1 + n^2 + n^2) = 0$ then $\alpha\alpha + \beta\beta$ is equal to :

- (A) $2n^2$
- (B) n^2

- (C) $-n^2$
(D) $n^2 + 2$
-

39. The H.M. between 1 and $\frac{1}{16}$ will be :

- (A) $\frac{17}{2}$
(B) $\frac{2}{17}$
(C) $\frac{17}{32}$
(D) $\frac{32}{17}$
-

40. If for two numbers G.M. is 4 and A.M. is 5, then H.M. will be :

- (A) $\frac{25}{15}$
(B) $\frac{17}{8}$
(C) $\frac{16}{5}$
(D) $\frac{5}{16}$
-

41. If ${}^{10}C_r = {}^{10}C_{r+2}$ then rC_5 is equal to :

- (A) 360
(B) 120
(C) 10
(D) 5
-

42. The value of $1 + \frac{1}{4} + \frac{1 \cdot 3}{4 \cdot 8} + \frac{1 \cdot 3 \cdot 5}{4 \cdot 8 \cdot 12} + \dots$ is :

- (A) $\sqrt{3/2}$
(B) $\sqrt{2}$
(C) 2
(D) $3/2$
-

43. If $(1+x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$ then $\frac{C_1}{C_0} + \frac{2C_2}{C_1} + \frac{3C_3}{C_2} + \dots + \frac{nC_n}{C_{n-1}}$ is equal to :

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

44. In the expansion of $(2x^2 - \frac{1}{x})^9$ the term independent of x is :

- (A) -32190
- (B) 114050
- (C) 42240
- (D) 330

45. The value of the determent $\begin{vmatrix} 4 & -6 & 1 \\ -1 & -1 & 1 \\ -4 & 11 & -1 \end{vmatrix}$ is :

- (A) 0
- (B) -25
- (C) 25
- (D) none of these

46. If $\begin{vmatrix} 1 & 2 & 4 \\ 3 & 6+x & 7 \\ 5 & 10 & 4+x \end{vmatrix} = 0$, then the value of x will be :

- (A) 3
- (B) 0
- (C) 1
- (D) none of these

47. If $A = \begin{pmatrix} d_1 & 0 & 0 \\ 0 & d_2 & 0 \\ 0 & 0 & d_3 \end{pmatrix}$, then $\text{adj } A =$

- (A) $\begin{pmatrix} d_1^{-1} & 0 & 0 \\ 0 & d_2^{-1} & 0 \\ 0 & 0 & d_3^{-1} \end{pmatrix}$
- (B) $\begin{pmatrix} d_2d_3 & 0 & 0 \\ 0 & d_1d_3 & 0 \\ 0 & 0 & d_1d_2 \end{pmatrix}$
- (C) $\begin{pmatrix} d_2d_2 & 0 & 0 \\ 0 & d_1d_3 & 0 \\ 0 & 0 & d_1d_2 \end{pmatrix}$
- (D) $\begin{pmatrix} d_1d_3 & 0 & 0 \\ 0 & d_2d_3 & 0 \\ 0 & 0 & d_1d_2 \end{pmatrix}$

48. If $A = \begin{pmatrix} 2 & 4 \\ 0 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 \\ 0 & 5 \end{pmatrix}$, then $4A - 3B$ is equal to :

- (A) $\begin{pmatrix} 1 & 2 \\ 0 & 2 \end{pmatrix}$
 - (B) $\begin{pmatrix} -5 & -10 \\ 0 & 3 \end{pmatrix}$
 - (C) $\begin{pmatrix} 5 & 10 \\ 0 & -3 \end{pmatrix}$
 - (D) $\begin{pmatrix} 7 & 14 \\ 0 & 7 \end{pmatrix}$
-

49. If $A = \begin{pmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{pmatrix}$, then A^{-1} is equal to :

- (A) $\begin{pmatrix} \cos x & \sin x \\ \sin x & \cos x \end{pmatrix}$
 - (B) $\begin{pmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{pmatrix}$
 - (C) $\begin{pmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{pmatrix}$
 - (D) none of these
-

50. A card is drawn at random from a pack of playing cards. The probability that it is red or an ace, is :

- (A) $\frac{1}{13}$
 - (B) $\frac{1}{52}$
 - (C) $\frac{17}{52}$
 - (D) $\frac{4}{13}$
-

51. If the sum of two unit vector is also a unit vector then the magnitude of their difference will be :

- (A) 1
 - (B) $\sqrt{3}$
 - (C) $\frac{1}{\sqrt{3}}$
 - (D) $\sqrt{2}$
-

52. The unit vector perpendicular to the vectors $6\mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$ and $3\mathbf{i} - 6\mathbf{j} - 2\mathbf{k}$ will be:

- (A) $\frac{2\mathbf{i} - 3\mathbf{j} - 6\mathbf{k}}{7}$

- (B) $\frac{2\mathbf{i}-3\mathbf{j}+6\mathbf{k}}{7}$
(C) $\frac{2\mathbf{i}+3\mathbf{j}+6\mathbf{k}}{7}$
(D) $\frac{2\mathbf{i}+3\mathbf{j}+6\mathbf{k}}{7}$
-

53. The area of the region bounded by the curves $y^2 = 4ax, x = 0$ and $x = a$ is

- (A) $4\pi a^2$
(B) $3\pi a^2$
(C) $2\pi a^2$
(D) πa^2
-

54. The area of the region bounded by the curves $y^2 = 4ax, x = 0$ and $x = a$ is :

- (A) $\frac{5}{3}a^2$
(B) $\frac{3}{2}a^2$
(C) $\frac{8}{3}a^2$
(D) $\frac{4}{3}a^2$
-

55. $\int \cos^3 x \, dx$ is equal to

- (A) $\frac{\sin 3x}{4} + 3 \sin x + C$
(B) $\frac{\sin 3x}{3} + \frac{\sin x}{2} + C$
(C) $\frac{\sin 3x}{3} + C$
(D) $\frac{\sin 3x}{12} + \frac{3 \sin x}{4} + C$
-

56. If $x = a(t + \sin t)$ and $y = a(1 - \cos t)$ then $\frac{dy}{dx}$ is equal to :

- (A) $\tan t$
(B) $\tan 2t$
(C) $\cot(t/2)$
(D) $\tan(t/2)$
-

57. If $x = t^2$ and $y = 2t$, then the normal at $t = 1$ is :

- (A) $x + y - 3 = 0$
(B) $x + y - 1 = 0$
(C) $x + y + 1 = 0$
(D) $x + y + 3 = 0$

58. If $f(x) = 2x^3 - 9x^2 + 12x + 29$ is a monotonic decreasing function when :

- (A) $1 < x < 2$
- (B) $x > 1$
- (C) $x > 2$
- (D) $x < 2$

59. The height of the cylinder of maximum volume that can be inscribed in a sphere of radius r is :

- (A) $2\sqrt{3}r$
- (B) $\frac{2r}{\sqrt{3}}$
- (C) $r\sqrt{3}$
- (D) $\frac{r}{\sqrt{3}}$

60. $\int \sec x \, dx$ is equal to :

- (A) $\log \sin x + C$
- (B) $\log \tan(x/2) + C$
- (C) $-\log(\sec x - \tan x) + C$
- (D) $\log \tan(\frac{\pi}{4} + \frac{x}{2}) + C$

61. The differential coefficient of $\sin^{-1} \sqrt{\frac{1-x^2}{1+x^2}}$ w.r.t. x is :

- (A) $-\frac{2}{1+x^2}$
- (B) $\frac{2}{1+x^2}$
- (C) $\frac{1}{1+x^2}$
- (D) none of these

62. $\frac{d}{dx}(\sec^{-1} x)$ is equal to :

- (A) $\frac{1}{x\sqrt{x^2-1}}$
 - (B) $\frac{1}{x\sqrt{x^2+1}}$
 - (C) $\frac{1}{x\sqrt{1+x^2}}$
 - (D) $\frac{1}{x\sqrt{1-x^2}}$
-

63. The differential coefficient of $\tan^{-1} \sqrt{\frac{1-x}{1+x}}$ w.r.t. x is:

- (A) $\frac{1}{2}$
 - (B) 1
 - (C) $-\frac{1}{2}$
 - (D) none of these
-

64. $\lim_{x \rightarrow 0} \frac{\tan 2x - x}{3x - \sin x}$ is equal to :

- (A) 0
 - (B) 1
 - (C) $\frac{1}{3}$
 - (D) $\frac{1}{4}$
-

65. The differential coefficient of $\sin^{-1} x$ w.r.t. $\cos^{-1} \sqrt{1-x^2}$ is :

- (A) $-\frac{1}{\sqrt{1+x^2}}$
 - (B) $\frac{1}{\sqrt{1-x^2}}$
 - (C) $\frac{2}{1-x^2}$
 - (D) none of these
-

66. The sum of 20 terms of the series $1 + 4 + 7 + 10 + \dots$ is :

- (A) 290
 - (B) 490
 - (C) 590
 - (D) none of these
-

67. Which terms of the series $\frac{1}{2}, -\frac{1}{2}, 1, -2, \dots$ Is -128 :

- (A) 10th
 - (B) 8th
 - (C) 9th
 - (D) 12th
-

68. If ${}^n P_4 : {}^n P_5 = 1 : 2$, then n is equal to :

- (A) 2
- (B) 4
- (C) 5

(D) 6

69. $\frac{(\cos 3\theta + i \sin 3\theta)^5 (\cos 2\theta + i \sin 2\theta)^6}{(\cos \theta + i \sin \theta)^4 (\cos \theta + i \sin \theta)^6}$ is equal to :

- (A) $\cos 27\theta - i \sin 27\theta$
 - (B) $\cos 33\theta - i \sin 33\theta$
 - (C) $\cos 33\theta + i \sin 33\theta$
 - (D) $\cos 27\theta + i \sin 27\theta$
-

70. The value of $\cosh^{-1} x$ is :

- (A) $\log(x - \sqrt{x^2 - 1})$
 - (B) $\log(x + \sqrt{x^2 - 1})$
 - (C) $\log(x + \sqrt{x^2 + 1})$
 - (D) $\log(x - \sqrt{x^2 + 1})$
-

71. Find the equation of the straight line which is perpendicular to the line $\frac{x}{a} - \frac{y}{b} = 1$ and passes through the point where the given st-line cuts the x-axis :

- (A) $ax + by = a^2$
 - (B) $ax - by = a^2$
 - (C) $ax + by = b^2$
 - (D) $bx - ay = ab$
-

72. If the lines $x + y = 1$, $2x - y = 0$ and $x + 2y + \lambda = 0$ are concurrent then λ is equal to:

- (A) $-2/3$
 - (B) $2/3$
 - (C) $-5/3$
 - (D) $5/3$
-

73. If two vertices of a triangle are $(6, 4)$, $(2, 6)$ and its centroid is $(4, 6)$ then its third vertex will be :

- (A) $(6, 4)$
- (B) $(8, 4)$
- (C) $(4, 8)$
- (D) none of these

74. The radical axis of the circles $2x^2 + 2y^2 - 7x = 0$ and $x^2 + y^2 - 4y - 7 = 0$ is :

- (A) $8x - 7y + 14 = 0$
- (B) $7x - 8y + 14 = 0$
- (C) $7x - 8y - 14 = 0$
- (D) $7x + 8y + 14 = 0$

75. The equation of the polar line w.r.t. the pole $(1, -2)$ to the circle $x^2 + y^2 - 2x - 6y + 5 = 0$ is:

- (A) $x + y - 1 = 0$
- (B) $x + y + 1 = 0$
- (C) $y = 2$
- (D) $x = 2$

76. The vertex of the parabola $x^2 - y + 6x + 10 = 0$ is :

- (A) $(3, 1)$
- (B) $(3, -1)$
- (C) $(3, -2)$
- (D) $(-3, 1)$

77. If $f(\theta) = \tan \theta$ then the value of $\frac{f(\theta) - f(\phi)}{1 + f(\theta)f(\phi)}$ is :

- (A) $\theta - \phi$
- (B) $f(\theta/\phi)$
- (C) $f(\theta - \phi)$
- (D) $f(\theta + \phi)$

78. $\lim_{x \rightarrow 1} \frac{x^2 - 3x + 2}{2x^2 + x - 3}$ is equal to :

- (A) 0
- (B) 2
- (C) $-\frac{1}{5}$
- (D) ∞

79. $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$ is equal to :

- (A) -1

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

80. The equation of the normal at a point of intersection of line $2x + y = 3$ and curve $yx^2 + y^2 = 5$ is :

- (A) $2x + 2y + 3 = 0$
- (B) $x - y + 4 = 0$
- (C) $x - 4y + 3 = 0$
- (D) $x + y + 2 = 0$

81. If $f(x) = \frac{x-3}{x+1}$, then $f[f\{f(x)\}]$ is equal to :

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

82. The modules of $\frac{1+i}{1-i}$ is:

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

83. The value of $\frac{4\sqrt{3}}{7} - \frac{\sqrt{3}}{7}$ is

- (A) $\frac{3\sqrt{3}}{7}$
- (B) $-\frac{3\sqrt{3}}{7}$
- (C) $\frac{3\sqrt{3}}{7}i$
- (D) none of these

84. $\frac{1-2i}{2+i} + \frac{4-i}{3+2i}$ is equal to :

- (A) $\frac{10}{13} + \frac{24}{13}i$
- (B) $\frac{10}{13} - \frac{24}{13}i$
- (C) $\frac{24}{13} - \frac{10}{13}i$

(D) $\frac{24}{13} + \frac{10}{13}i$

85. If $z = 5 + 3i$ then the value of $|z - 2|$ will be :

- (A) $\sqrt{13}$
 - (B) $2\sqrt{3}$
 - (C) $3\sqrt{2}$
 - (D) 13
-

86. The imaginary part of $\frac{1-i}{1+i}$ is :

- (A) $-i$
 - (B) -1
 - (C) 1
 - (D) i
-

87. If $z_1 = 1 + 2i$ and $z_2 = i - 1$, then z_1/z_2 is equal to :

- (A) $\frac{1}{2} - \frac{3}{2}i$
 - (B) $-\frac{1}{2} + \frac{3}{2}i$
 - (C) $\frac{1}{2} + \frac{3}{2}i$
 - (D) none of these
-

88. The amplitude of $1 - \sqrt{3}i$ is :

- (A) $\frac{2\pi}{3}$
 - (B) $-\frac{\pi}{3}$
 - (C) $\frac{2\pi}{3}$
 - (D) $-\frac{2\pi}{3}$
-

89. If α and β are the roots of the equation $x^2 + px + q = 0$ then the value of $\alpha^3 + \beta^3$ will be :

- (A) $p^3 - 3pq$
 - (B) $-(p^3 + 3pq)$
 - (C) $p^3 + 3pq$
 - (D) $-p^3 + 3pq$
-

90. If α and β are the roots of the equation $x^2 + x + 1 = 0$ then the equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is:

- (A) $x^2 + x + 1 = 0$
 - (B) $x^2 - x + 1 = 0$
 - (C) $x^2 - x = 1$
 - (D) $x^2 - x = 1$
-

91. If $z = \frac{(1+i)(2+i)}{3+i}$, then $|z|$ is equal to :

- (A) $-1/2$
 - (B) $1/2$
 - (C) 1
 - (D) -1
-

92. The slope of the tangent to the parabola $y^2 = 4ax$ point $(at^2, 2at)$ will be :

- (A) $-t$
 - (B) $-1/t$
 - (C) $1/t$
 - (D) t
-

93. If $\mathbf{a} = \mathbf{i} + 2\mathbf{j}$ and $\mathbf{b} = 2\mathbf{i} + \lambda\mathbf{j}$ are the parallel vectors then λ is equal to :

- (A) -2
 - (B) 2
 - (C) 4
 - (D) -4
-

94. A stone is thrown in silent water, the ripples are moving at the rate of 6 cm/sec. then the rate of change of the area when the radius of the circle is 10 cm. at the time when radius of the circle is 10 cm, then the rate at which its area increases is :

- (A) $120 \text{ m}^2/\text{sec.}$
 - (B) $\pi \text{ cm}^2/\text{sec.}$
 - (C) $120 \text{ cm}^2/\text{sec.}$
 - (D) $120\pi \text{ cm}^2/\text{sec.}$
-

95. A dice is thrown then the probability that the sum of the number is 1 or 6 is :

- (A) $1/6$

- (B) $1/3$
 - (C) $2/3$
 - (D) $3/4$
-

96. The value of $\cosh(ni)$ is :

- (A) 0
 - (B) 1
 - (C) -1
 - (D) none of these
-

97. For $Z_1, Z_2 \in C$ the value of $|Z_1 + Z_2|^2 + |Z_1 - Z_2|^2$ will be :

- (A) $2(|Z_1|^2 + |Z_2|^2)$
 - (B) $|Z_1|^2 + |Z_2|^2$
 - (C) $|Z_1|^2 + |Z_2|^2 - |Z_1| - |Z_2|$
 - (D) $2(|Z_1|^2 - |Z_2|^2)$
-

98. The real part of $\cosh(\alpha + i\beta)$ is :

- (A) $\sinh \alpha \cos \beta$
 - (B) $\cosh \alpha \cos \beta$
 - (C) $-\cosh \alpha \cos \beta$
 - (D) $\sinh \alpha \cos \beta$
-

99. If three vertices of a square are $3i, 1 + i$ and $3 + 2i$ then its fourth vertex will be :

- (A) $(3, 3)$
 - (B) $(2, 4)$
 - (C) origin
 - (D) $(1/2, 1/2)$
-

100. $\lim_{x \rightarrow b} \frac{x-b}{x-b}$ is equal to :

- (A) 1
- (B) b
- (C) 0
- (D) does not exist

ANSWER SHEET

1.(1)	2.(2)	3.(2)	4.(2)	5.(3)	6.(3)	7.(4)	8.(3)	9.(4)	10.(4)	11.(3)
12.(3)	13.(1)	14.(3)	15.(2)	16.(3)	17.(3)	18.(1)	19.(4)	20.(3)	21.(3)	22.(4)
23.(2)	24.(3)	25.(2)	26.(3)	27.(2)	28.(4)	29.(3)	30.(2)	31.(3)	32.(3)	33.(4)
34.(4)	35.(2)	36.(2)	37.(3)	38.(2)	39.(2)	40.(3)	41.(4)	42.(2)	43.(1)	44.(3)
45.(2)	46.(2)	47.(2)	48.(3)	49.(2)	50.(4)	51.(2)	52.(3)	53.(4)	54.(3)	55.(4)
56.(4)	57.(1)	58.(1)	59.(2)	60.(3)	61.(1)	62.(3)	63.(1)	64.(4)	65.(3)	66.(3)
67.(1)	68.(4)	69.(3)	70.(2)	71.(1)	72.(3)	73.(3)	74.(3)	75.(3)	76.(4)	77.(3)
78.(3)	79.(2)	80.(3)	81.(4)	82.(4)	83.(3)	84.(2)	85.(3)	86.(2)	87.(3)	88.(2)
89.(4)	90.(1)	91.(3)	92.(3)	93.(3)	94.(4)	95.(2)	96.(3)	97.(1)	98.(2)	99.(2)
100.(4)										