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MATHS 1997

1. The value of k for which the points (0,0), (2,0), (0,1) and (0,k) lies on a circle is :
(1) 1,2 (2) -1,2 (3) 0,2 (4) 0, 1

2. The area of the triangle formed by the tangent and normal at (1, $\sqrt{3}$) to the circle x^2+y^2 = y and positive x-axis will be :

(1) 1 $\sqrt{3}$ (2) 4$\sqrt{3}$ (3) $\sqrt{3}$ (4) 2$\sqrt{3}$

3. A straight line makes a triangle of area 5 units with the axis of coordinates and is perpendicular to the line 5x – y = 1, the equation of the line is :

(1) x + 5y ± 5 = 0 (2) x – 5y ± 5 $\sqrt{2}$ = 0

(3) x + 5y ± 5 $\sqrt{2}$ (4) 5 x + y ± $\sqrt{2}$ = 0

4. If the points (λλ– 2, λλ-4), (λ,λλλ+ 1) and (λ,λλλ+ 1) and (λλ+ 4, 16) are collinear then the value of λλwill be :
(1) – 4 (2) – 5 (3) 4 (4) 5

5. The imaginary part of $\tan^{-1}$ (5i/3) is :
(1) log 4 (2) log 2 (3) ∞ (4) 0

6. If x = a + υ, y = ay = bββand z = αββ+ br (where ββand γγare the imaginary cube roots of unity) then the value of xyz is :
(1) 3 ab (2) $a^3 + b^3$ (3) a^3+b^3+3ab (4) $a^3 – b^3$

7. $\left(\frac{\sqrt{3} + i}{2}\right)^6 + \left(\frac{i - \sqrt{3}}{2}\right)^6$ **is equal to :**

(1) -1 (2) 2 (3) -1 (4) 1

8. If A is a square matrix their A + A^T will be :
(1) unit matrix
(2) symmetric matrix
(3) spew symmetric matrix
(4) envertible matrix

9. $\begin{vmatrix} y+z & x & x \\ y & z+x & y \\ z & z & x+y \end{vmatrix}$ **is equal to :**

(1) $4x^2y^2z^2$ (2) 4xyz (3) $x^2y^2z^2$ (4) xyz

10. The value of $(\sqrt{2}+1)^6 + (\sqrt{2}-1)^6$ is :

(1) – 99 (2) 99 (3) – 198 (4) 198

11. If $(1+x)^n = C_0 + C_1 + C_2x^2 + \ldots + C_nx^n$, then the value of $C_1 + 2C_2 + 3C_3 + \ldots + nC_n$:

(1) 2^{n-1} (2) $n.2^{n-1}$ (3) 2^n (4) 0

12. The number of way in which 5 boys and 5 girl can be arranged in line such that not two girls come together will be :

(1) 6x5! (2) 5 ! x 4! (3) 5! x 6! (6) $(5!)^2$

13. If $^nC_{r-1} = 36$, $^nC_r = 84$ and $^nC_{r+1} = 216$ then n is equal to :

(1) 5 (2) 10 (3) 9 (4) 8

14. If the roots of the equation $a(b-c)x^2 + b(c-a)x + c(c-b)$ are equal then a, b, c will be :

(1) in H.P. (2) in G.P. (3) in A.P. (4) none of these

15. If the 5^{th} and 11^{th} term of H.P. are $\frac{1}{45}$ and $\frac{1}{69}$ respectively then its 16^{th} terms is:

(1) $\frac{1}{77}$ (2) $\frac{1}{81}$ (3) $\frac{1}{85}$ (4) $\frac{1}{89}$

16. The sum of the numbers which are divisible by 3 and lies behveen 250 to 1000 is equal to :

(1) 156375 (2) 161575 (3) 136577 (4) 135657

17. If the equations $x^2+9x+q = 0$ and $x^2+p'x + q' = 0$ $(p \neq p', q \neq q')$ have one common root then the value of the root will be :

(1) $\frac{q-q'}{p-p'}$ or $\frac{pq-p'q'}{q-q'}$

(2) $\frac{q-q'}{p'p}$ or $\frac{pq'-p'q}{q-q'}$

(3) $\frac{pq'-p'q}{q-q'}$

(4) $\frac{q-q'}{p-p'}$

18. If x = a (cos t + tan t/2), y = a sin t, then the value of $\frac{dy}{dx}$ at $t = \frac{\pi\pi}{4}$ is :

(1) a (2) 0 (3) – 1 (4) 1

19. $\frac{d}{dx}$ **cos h-1 (sec x) is equal to :**

(1) cosec x (2) tan x (3) sec x (4) sin x

20. The angle of intersection between two curves $x^2 = 8y$ and $y^2 = 8x$ at origin will be:

(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{6}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{4}$

21. If the function $2x^3 - (x + 5)$ is an increasing function then the value x is :

(1) $0 < x < 1$ (2) $-1 < x < 1$

(3) $x < -1$ and $x > 1$ (4) $-1 < x < -\frac{1}{2}$

22. At the point where the function $\sin^p x \cos^q x$ has maximum value is :

(1) $x = \tan^{-1} \sqrt{pq}$ (2) $x = \tan^{-1} \sqrt{(q/p)}$

(3) $x = \tan^{-1} \sqrt{(p/q)}$ (4) $x = \tan^{-1} (p/q)$

23. The maximum value of $\frac{\log x}{x}$ will be :

(1) 2/e (2) 2e (3) 1/e (4) e

24. The odds against an event is 5 : 2 and in favour of other event is 6 : 5. If the events are independent then the probability that at least one event will happen will be :

(1) $\frac{25}{88}$ (2) $\frac{63}{88}$ (3) $\frac{52}{77}$ (4) $\frac{50}{77}$

25. A bag contains 30 balls marked 1 to 30 one ball is drawn at random the probility that the number on the ball is a multiple of 5 or 7 is :

(1) $\frac{73}{75}$ (2) $\frac{2}{3}$ (3) $\frac{2}{75}$ (4) $\frac{1}{3}$

26. If $a \times b = b \times c \neq 0$ where a, b, c are coplanar then the corrent statement will be :

(1) $a + c = ka$ (2) $a + c = kc$

(3) $a + c = kb$ (4) $a + c = 0$

27. Projection of vector 2i + 3j - 2k on the vector I + 2j + 3k will be :

(1) $\sqrt{14}$ (2) $\frac{3}{\sqrt{14}}$ (3) $\frac{1}{\sqrt{14}}$ (4) $\frac{2}{\sqrt{14}}$

28. $i \times (a \times i) + j \times (a \times j) + k \times (a \times k)$ is equal to :

(1) – a (2) a (3) – 2a (4) 2a

29. The area of the region bounded by the parabola $y^2 = 4x$ and its latus rectum is :

(1) $\frac{5}{3}$ (2) $\frac{2}{3}$ (3) $\frac{8}{3}$ (4) $\frac{4}{3}$

30. The area of the region bounded by the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is :

(1) $\frac{16}{3}a^2$ (2) $\frac{32}{3}a^2$ (3) $\frac{4}{3}a^2$ (4) $\frac{8}{3}a^2$

31. $\int_0^{\pi/4} (\sqrt{\tan x} + \sqrt{\cot x})\, dx$ **is equal to :**

(1) 2π (2) $\frac{\pi}{\sqrt{2}}$ (3) $\frac{\pi}{2}$ (4) $\sqrt{2\pi}$

32. $\int_0^1 \log \sin\left(\frac{\pi x}{2}\right) dx$ **is equal to :**

(1) $-\frac{\pi}{2}\log 2$ (2) $\frac{\pi}{2}\log 2$

(3) – log 2 (4) log 2

33. $\int_0^1 \tan^{-1} x\, dx$ **is equal to :**

(1) $\frac{\pi}{2} + \log 2$ (2) $\frac{\pi}{4} - \log\sqrt{2}$

(3) $\frac{\pi}{4} + \frac{1}{2}\log 2$ (4) $\frac{\pi}{4}$

34. $\int_0^1 \sqrt{\frac{1-x}{1+x}}\, dx$ **is equal to :**

(1) $\pi + 1$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{2} + 1$ (4) $\frac{\pi}{2} - 1$

35. $\frac{dx}{\sin x + \cos x}$ **is equal to :**

(1) $\log \tan\left(\frac{\pi}{8+x}\right) + C$

(2) $\log \tan\left(\frac{\pi}{\ } + \frac{\pi}{\ }\right) + C$

8 2

(3) $\frac{1}{\sqrt{2}} \log \tan \left(\frac{\pi}{8} + \frac{\pi}{2}\right) + C$

(5) none of these

36. $e^x \left(\frac{1 + \sin x}{1 + \cos x}\right) dx$ **is equal to :**

(1) $e^x \cot x + C$ (2) $e^x \tan x$ C
(3) $e^x \cot (x/2) + C$ (4) $e^x \tan (x/2) + C$

37. $\frac{dx}{2x^2 + x + 1}$ **is equal to :**

(1) $\frac{2}{\sqrt{7}} \tan^{-1} \left(\frac{4x + 1}{\sqrt{7}}\right) + C$

(2) $\frac{1}{2} \tan^{-1} \left(\frac{4x + 1}{\sqrt{7}}\right) + C$

(3) $\frac{1}{\sqrt{7}} \tan^{-1} \left(\frac{4x + 1}{\sqrt{7}}\right) + C$

(4) $\frac{1}{2\sqrt{7}} \tan^{-1} \left(\frac{4x + 1}{\sqrt{7}}\right) + C$

38. The two parts of 20 such that the product of the cube of one and the square of the other is maximum is :

(1) 12,8 (2) 8, 12 (3) 16,4 (4) 10,10

39. The equation of the tangent to the curve $y = 2 \cos x$ at $x = \pi/4$ is:

(1) $y - \sqrt{2} = \sqrt{2}(x - \pi/4)$

(2) $y + \sqrt{2} = \sqrt{2}(x + \pi/4)$

(3) $y - \sqrt{2} = 2\sqrt{2}(x - \pi/4)$

(4) $y - \sqrt{2} = \sqrt{2}(x - \pi/4)$

40. If $u = \tan^{-1}\left\{\frac{\sqrt{1 + x^2} - 1}{x}\right\}$ and $v = 2\tan^{-1} x$ then $\frac{du}{dv}$ is equal to :

(1) ¼ (2) 1 (3) 4 (4) 0

41. If $y = \tan^{-1}\left(\frac{\cos x}{1 + \sin x}\right)$ then dy is equal to :

(1) 0 (2) 1 (3) - ½ (4) ½

42. If f (x) = |x - 3|, then f is :

(1) continuous but not differentiable at x = 3
(2) differentiable at x = 3
(3) not differentiable at x = 3
(4) not continuous x = 2

43. $\lim_{x \to \infty} x \sin \frac{\pi\pi}{4x} \cos \frac{\pi\pi}{4x}$ is equal to :

(1) $\frac{\pi}{4}$ (2) $\frac{2}{\pi}$ (3) $\frac{4}{\pi}$ (4) $\frac{\pi}{2}$

44. The equation of the common tangent to the circle $x^2 + y^2 = 2$ and the parabola $y^2 = 8x$ will be :

(1) y = x + 2 (2) y = x – 2 (3) y = x + 2 (4) y = x +1

45. The coordinates of the ends of the latus rectum to the parabola x2 = 4ay are :

(1) (-2a, a), (2a, a) (2) (a, - 2a), (2a, a)
(3) (-a, 2a), (2a, a) (4) (a, 2a), (2a, - a)

46. If the line ιx = my + = 1 is tangent to the parabola $y^2 = 4ax$ then :

(1) $mn=a\iota^2$ (2) $\iota m= an^2$

(3) $\iota n=am^2$ (3) none of these

47. If the line ιx + my = 1 is tangent to the circle x2 + 42 = r2 then locus of the point (ι,m) will be :

(1) $x^2 + y^2 = 2r^2$ (3) $x^2 + y^2 = r^2$
(3) $r^2(x^2 + y^2) = 1$ (4) $x^2 + y^2 =1$

48. If 3x – 4y + 4 = 0 and 6x – 8y-7= 0 are the tangent line of same circle then the radius of the circle will be:

(1) $\frac{1}{10}$ (2) $\frac{11}{10}$ (3) $\frac{3}{4}$ (4) $\frac{3}{2}$

49. The angle between the tangent lines to the circle $(x - 7)^2 + (y + 1)^2 = 25$ will be :

(1) $\frac{\pi}{3}$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{6}$ (4) $\frac{\pi}{3}$

50. The area of the square formed by the lines |x| + |y| = 1 is:

(1) 1 square unit (2) 8 square unit
(3) 2 square unit (4) 4 square unit

51. If both the ends of a moving rod of length 1 lines on two perpendicular lines then the locus of the point which divide the rod in the ratio 1 ; 2 is :

(1) $9x^2 + 36y^2 = 1^2$ (2) $9x^2 + 36y^2 = 41^2$
(3) $x + \frac{y}{2} = \frac{1}{3}$ (4) $\frac{x}{2} + y = \frac{1}{3}$

52. The orthocenter of the triangle whose vertices are (0, 0), (3.0) and (0,4) is :

(1) (2,1) (2) (-1,0) (3) (0,1) (4) 0,0)

53. The real part of $\sin^{-1}(e^{i\theta})$ is :

(1) $\sin^{-1}(\sqrt{\cos\theta})$

(2) $\cos^{-1}(\sqrt{\sin\theta})$

(3) $\sin^{-1}(\sqrt{\sin\theta})$

(4) $\sin h^{-1}(\sqrt{\sin\theta})$

54. The argument of $e^{e^{-i\theta}}$ is :

(1) $e^{\sin\theta}$ (2) $e^{\cos\theta}$ (3) $-\sin\theta$ (4) $\sin\theta$

55. If ω is the cube root of unity then the value of $(1-\omega+\omega^2)^5 + (1+\omega-\omega^2)^5$ is :

(1) 64 (2) 48 (3) 32 (4) 16

56. If $A = \begin{pmatrix} 3 & 2 \\ 1 & -4 \end{pmatrix}$, then A (adj A) is equal to :

equal to :

(1) - ¼1 (2) 81 (3) -10A (4) -141

57. If $\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix}$ 0 then the value of x is :

(1) $\frac{11}{3}, 1$ (2) $\frac{1}{2}, 1$ (3) $\frac{2}{3}, \frac{11}{3}$ (4) $0, \frac{1}{3}$

58. If in the expansion of $(x + a)^n$ the sum of all odd terms is P and the sum of all even terms is Q then the value of $(P^2 – Q^2)$ will be :

(1) $(x^2-a^2)^n$ (2) $(x^2 + a^2)^n$ (3) $(x^2 + a^2)^{2n}$ (4) $(x^2 – a^2)^{2n}$

59. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \ldots + C_nx^n$ then the value of $C_0^2 + C_1^2 + \ldots + C_n^2$ is :

(1) ${}^{2n}C_n$ (2) ${}^{2n}C_{n-1}$ (3) ${}^{2n}C_{n+1}$ (4) ${}^{2n}C_{2n}$

60. The number of total permutations of the letters of the word 'BANANA' are :

(1) 24 (2) 720 (3) 120 (4) 60

61. How many ways five awards can be distributed among 4 students such that each student can wins any number of awards :

(1) 120 (2) 600 (3) 625 (4) 1024

62. The sum of the infinite terms of $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \ldots$ will be:

(1) $\frac{7}{4}$ (2) $\frac{15}{16}$ (3) $\frac{16}{35}$ (4) $\frac{35}{16}$

63. If A_1, A_2, G_1, G_2, H_1, H_2 are the two A.M. , G.M. and H.M. between two numbers then $\frac{A_1 + A_2}{H_1 + H_2} \cdot \frac{H_1 – H_2}{G_1 + G_2}$ is equal to :

(1) 8 (2) 1 (3) 4 (4) 0

64. If in a G.P. the (m + n)th term is p and $(m – n)^{th}$ term is q then its mth term will be:

(1) $\sqrt{p/q}$ (2) p/q (3) pq (4) $\sqrt{pq}$

65. The G.M. of the roots of the equation $x^2 – 18x + y = 0$ will be :

(1) $2\sqrt{3}$ (2) 3 (3) 9 (4) $9\sqrt{2}$

66. If in the expansion of $(1 + x)^{20}$ the coefficient of the rth and $(r + 4)^{th}$ term are equal then the value of r will be :

(1) 10 (2) 9 (3) 8 (4) 7

67. If $x = \log \tan \left(\frac{\pi\pi}{4} + \frac{\theta\theta}{2}\right)$ then tanh (x/2) will be :

(1) tan (θ/2) (2) – tan (θ/2) (3) –cot (θ/2) (4) cot (θ/2)

68. If the sum of the distancesdf of variable point to the origin and from the line x = 2 is 4, then the locus of the variable point will be :

(1) $x^2 + 12y = 36$ (2) $x^2 - 12y = 36$

(3) $y^2 - 12x = 26$ (3) $y^2 + 12x = 36$

69. The equation $ax^2 + bx^2 + 2hxy + 2gx + 2fy + c = 0$ is the equation circle, if :

(1) ab= h, c = 0 (2) a = b, c = 0

(3) a = b ≠0, h = 0 (4) a = b = 0, h = 1

70. The locus of the middle points of the system of chords to the circle x2 + y 2 = 4 which subtends the right angle at the centre will be :

(1) x + y = 1 (2) $x^2 + y^2 = 2$

(3) $x^2 + y^2 = 1$ (4) x + y = 2

71. The locus of the middle point of system of the chords to the parabola y2= 4ax which are passing through the origin is :

(1) $x^2 = 4ay$ (2) $y^2 = 4ax$ (3) $y^2 = ax$ (4) $y^2 = 2ax$

72. The Focus of the parabola $4y^2 - 6x - 4y = 5$ is:

(1) $\left(-\frac{1}{2}, \frac{1}{2}\right)$ (2) $\left(\frac{1}{2}, \frac{5}{8}\right)$

(3) $\left(-\frac{5}{8}, \frac{1}{2}\right)$ (4) $\left(-\frac{8}{5}, 2\right)$

73. If the line 2 x + y + λλ= 0 is normal to the parabola y2 = - 8x then the value of λλwill be :

(1) 24 (2) – 24 (3) – 8 (4) – 16

74. The period of $\sin^4 x + \cos^4 x$ will be :

(1) $\frac{3\pi}{2}$ (2) 2π (3) π (4) $\frac{\pi}{2}$

75. $\lim_{x\to 1} (1-x) \tan \frac{\pi x}{2}$ **is :**

(1) 0 (2) $\frac{2}{\pi}$ (3) π (4) $\frac{\pi}{2}$

76. A die is thrown two times, the probability that sum of the digits in two throws will be 7 is :

(1) $\frac{8}{36}$ (2) $\frac{7}{36}$ (3) $\frac{5}{6}$ (4) $\frac{1}{6}$

77. The probability that a person can hit a bird is ¾ . He tries 5 times, the probability that he fails all the time is :

(1) $\frac{5}{8}$ (2) $\frac{3}{8}$ (4) $\frac{23}{24}$ (4) $\frac{1}{24}$

78. There are four letters to which four different envelopes are available. The probability that all the four letters are placed in wrong envelopes is :

(1) $\frac{1023}{1024}$ (2) $\frac{1}{1024}$ (3) $\frac{781}{1024}$ (4) $\frac{243}{1024}$

79. If a = 2i – j + k, b = j + k and c = i – k then the area of the parallelogram whose diagonals are (a + b) and (b + c) will be :

(1) $\vec{i} + \vec{j} - \vec{k}$ (2) $\vec{i} - \vec{j} + \vec{k}$

(3) $-\vec{i} + \vec{j} + \vec{k}$ (4) $\vec{i} + \vec{j} + \vec{k}$

80. If a , b and c are non coplanar vectors then [a + bb + cc + a} is equal to :

(1) 0 (2) $[abc]^2$ (3) 2[abc] (4) [abc]

81. if 4i – 3j, i + 4j – 3k and i + ij + k are the position vectors of the vertices A, B, C respectively then ∠ABC is equal to :

(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{4}$ (4) $\frac{\pi}{6}$

82. The area of the region bounded by the curve $x^2 + y^2 = 4$. line $x = \sqrt{3}y$ and the axis of x is :

(1) π (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{4}$ (4) $\frac{\pi}{2}$

83. $\frac{dx}{x(x^4-1)}$ **is equal to**

(1) $\log \frac{x^4}{x^4-1} + C$ (2) $\frac{1}{4}\log \frac{x^4-1}{x^4} + C$

(3) $\frac{1}{4}\log \frac{x^4}{x^4-1} + C$ (4) $\log \frac{x^4-1}{x^4} + C$

84. $\frac{dx}{3 + 4\cos x}$ **is equal to :**

(1) $\frac{1}{\ } \log \left(\frac{\sqrt{7} - \tan(x/2)}{\ } \right) + C$

$\sqrt{7}$ $\sqrt{7} + \tan(x/2)$

(2) $\frac{1}{\sqrt{7}} \log \left(\frac{\tan(x/2) + \sqrt{7}}{\tan(x/2) - \sqrt{7}} \right) + C$

(3) $\frac{1}{\sqrt{7}} \log \left(\frac{\tan(x/2) - \sqrt{7}}{\tan(x/2) \quad \sqrt{7}} \right) + C$

(4) $\frac{1}{\sqrt{7}} \log \left(\frac{\sqrt{7} + \tan(x/2)}{\sqrt{7} - \tan(x/2)} \right) + C$

85. **x sin x dx is equal to :**

(1) – x cos x + sin x + C
(2) x sin x – cos x + C
(3) x cos x + sin x + C
(4) x cos x – sin x + C

86. $\int_{-n}^{n}$ **sin xf (cos x) dx is equal to :**

(1) 1 (2) 0 (3) m sin xf (cos x) dx (4) none of these

87. $\int_{0}^{\pi/2}$ **x cot x dx is equal to :**

(1) - π log 2 (2) π log 2 (3) $\frac{\pi}{2}$ log 2 (4) - $\frac{\pi}{2}$ log 2

88. $\int_{-1}^{1}$ **x tan-1 x dx is equal to :**

(1) 0 (2) π - 1 (3) $\frac{\pi}{2}$ + 1 (4) $\frac{\pi}{2}$ - 1

89. $\int_{0}^{\pi/2}$ **log sin x dx is equal to :**

(1) - π log 2 (2) - $\frac{\pi}{2}$ log 2 (3) π log 2 (4) $\frac{\pi}{2}$ log 2

90. If the roots of the equation $\iota x^2 + mx + n = 0$ are in the ratio p : q then $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{\iota}}$ is **equal to :**

(1) 0 (2) $\frac{n}{q}$ $\frac{n}{1}$ (3) $\frac{p+q}{1}$ (4) none of these

91. If the roots of the equation $x^2 – 8x + a^2 – 6a = 0$ are real then the value of a will be:

(1) $2 \le a \le 8$ (2) $2 < a < 8$ (3) $-2 < a < 8$ (4) $-2 \le a \le 8$

92. If z_1 and z_2 are two non zero complex numbers such that $|z_1 + z_2| = |z_1| + |z_2|$ then amp (z_1) – amp (z_2) is equal to :

(1) $\pi/4$ (2) $-\pi/2$ (3) $\pi/2$ (4) 0

93. If z = x + y iy and $\left|\frac{1 - iz}{z - i}\right| = 1$, the z lies on :

(1) axis of x (2) axis of y (3) circle of radius one (4) none of these

94. The value of $|z_1 + z_2|^2 + |z_1 - z_2|^2$:

(1) $1\,[|z_1|^2 - |z_2|^2]$ (2) $2[|z_1|^2 - |z_2|^2$
(3) $2[|z_1|^2 + |z_2|^2]$ (4) $1\,[|z_1|^2 + |z_2|^2]$

95. The minimum value of $|2z - 1| + |3z - 2|$ is :

(1) 2/3 (2) 1/3 (3) ½ (4) 0

96. If z = x + iy and $|z| = 1$ ($z \ne \pm 1$) then $\frac{z - 1}{z + 1}$ is :

(1) zero (2) purely imaginary (3) purely real (4) not defined

97. If $x + iy = \sqrt{\frac{a + ib}{c + id}}$, then $x^2 + y^2$ is equal to :

(1) $\sqrt{\frac{a^2 - b^2}{c^2 - d^2}}$ (2) $\sqrt{\frac{a^2 - b^2}{c^2 + d^2}}$

(3) $\frac{a^2 + b^2}{c^2 + d^2}$ (4) $\frac{a^2 - b^2}{c^2 - d^2}$

98. If x is real then the minimum value of $\frac{1 - x + x^2}{1 + x + x^2}$ will be :

(1) 3 (2) 1/3 (3) 1 (4) 0

99. If the matrix $P = \begin{pmatrix} 1 & 2 \\ -3 & 0 \end{pmatrix}$ and $Q = \begin{pmatrix} -1 & 0 \\ 2 & 3 \end{pmatrix}$ then correct statement is :

(1) P + Q = I (2) PQ ≠ QP (3) $Q^2 = Q$ (4) $P^2 = P$

100. If the exponential form of the complex number $-1 = \sqrt{3}$ is $re^{i\theta}$ then θ is equal to :

(1) $\frac{-4\pi}{3}$ (2) $\frac{2\pi}{3}$ (3) $\frac{-2\pi}{3}$ (4) $\frac{8\pi}{3}$

ANSWER SHEET

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