

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  $(1, \sqrt{2})$  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)  $x + 5y \pm 5 = 0$       (2)  $x - 5y \pm 5\sqrt{2} = 0$   
 (3)  $x + 5y \pm 5\sqrt{2} = 0$       (4)  $5x + y \pm \sqrt{2} = 0$
4. If the points  $(\lambda - 2, \lambda - 4)$ ,  $(\lambda, \lambda + 1)$  and  $(\lambda + 4, 16)$  are collinear then the value of  $\lambda$  will be :  
 (1) -4      (2) -5      (3) 4      (4) 5
5. The imaginary part of  $\tan^{-1}(5/3)$  is :  
 (1)  $\log 4$       (2)  $\log 2$       (3)  $\infty$       (4) 0
6. If  $x = a + \alpha$ ,  $y = ay = b\beta$  and  $z = \alpha\beta + br$  (where  $\beta$  and  $\gamma$  are the imaginary cube roots of unity) then the value of  $xyz$  is :  
 (1)  $3ab$       (2)  $a^3 + b^3$       (3)  $a^3 + b^3 + 3ab$       (4)  $a^3 - b^3$
7.  $\left(\frac{\sqrt{3} + 1 + i}{2}\right)^6 \left(\frac{1 - \sqrt{3} - i}{2}\right)^6$  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) skew symmetric matrix  
 (4) invertible 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  $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$ , then the value of  $C_1 + 2C_2 + 3C_3 + \dots + nC_n$  :  
 (1)  $2^{n-1}$       (2)  $n \cdot 2^{n-1}$       (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)  $5! \times 4!$       (3)  $5! \times 6!$       (4)  $(5!)^2$
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<sup>th</sup> and 11<sup>th</sup> term of H.P. are  $\frac{1}{45}$  and  $\frac{1}{69}$  respectively then its 16<sup>th</sup> 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 between 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  $t = \frac{\pi}{4}$  is :  
 (1) a      (2) 0      (3) - 1      (4) 1

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

- (1)  $\operatorname{cosec} x$     (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 probability 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 correct 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)
- $2\pi$
- (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.  $\int \frac{dx}{\sin x + \cos x}$  is equal to :

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

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

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

(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)  $\frac{1}{4}$       (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)  $-\frac{1}{2}$       (4)  $\frac{1}{2}$

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.  $\lim_{x \rightarrow \infty} x \sin \frac{\pi}{4x} \cos \frac{\pi}{4x}$  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  $x^2 = 4ay$  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  $tx + my + 1 = 0$  is tangent to the parabola  $y^2 = 4ax$  then :

- (1)  $mn = at^2$       (2)  $tm = an^2$   
 (3)  $tn = am^2$       (3) none of these

47. If the line  $tx + my = 1$  is tangent to the circle  $x^2 + y^2 = r^2$  then locus of the point  $(t, m)$  will be :

- (1)  $x^2 + y^2 = 2r^2$       (3)  $x^2 + y^2 = r^2$   
 (2)  $r^2(x^2 + y^2) = 1$       (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)  $\sin^{-1}(\sqrt{\sin \theta})$

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  $\omega$  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  $A(\text{adj } A)$  is equal to :

equal to :

- (1)  $-\frac{1}{4}1$       (2) 81      (3)  $-10A$       (4)  $-14I$

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  $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$  then the value of  $C_0^2 + C_1^2 + \dots + C_n^2$  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 win any number of awards :

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

62. The sum of the infinite terms of  $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \dots$  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  $x = \log \tan \left( \frac{\pi}{4} + \frac{\theta}{2} \right)$  then  $\tanh(x/2)$  will be :



- (1)  $\tan(\theta/2)$       (2)  $-\tan(\theta/2)$       (3)  $-\cot(\theta/2)$       (4)  $\cot(\theta/2)$

68. If the sum of the distances of a 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)  $y^2 - 12x = 26$       (4)  $y^2 + 12x = 36$

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

- (1)  $ab = h, c = 0$       (2)  $a = b, c = 0$   
 (3)  $a = b \neq 0, h = 0$       (4)  $a = b = 0, h = 1$

70. The locus of the middle points of the system of chords to the circle  $x^2 + y^2 = 4$  which subtend 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  $y^2 = 4ax$  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  $2x + y + \lambda = 0$  is normal to the parabola  $y^2 = -8x$  then the value of  $\lambda$  will 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)  $2\pi$       (3)  $\pi$       (4)  $\frac{\pi}{2}$

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

- (1) 0      (2)  $\frac{2}{\pi}$       (3)  $\pi$       (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  $\frac{3}{4}$ . He tries 5 times, the probability that he falls all the time is :
- (1)  $\frac{5}{8}$       (2)  $\frac{3}{8}$       (3)  $\frac{23}{24}$       (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  $i + j + k$  are the position vectors of the vertices A, B, C respectively then  $\angle ABC$  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)  $\pi$       (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)  $\frac{1}{\sqrt{7}} \log \left[ \frac{\sqrt{7} - \tan(x/2)}{\sqrt{7} + \tan(x/2)} \right] + C$

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

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

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

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

85.  $\int x \sin x \, dx$  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.  $\int_{-n}^n x f(\cos x) \, dx$  is equal to :

$$(1) 1$$

$$(2) 0$$

$$(3) n \int_{-n}^n x f(\cos x) \, dx$$

$$(4) \text{none of these}$$

87.  $\int_0^{\pi/2} x \cot x \, dx$  is equal to :

$$(1) -\pi \log 2$$

$$(2) \pi \log 2$$

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

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

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

$$(1) 0$$

$$(2) \pi - 1$$

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

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

89.  $\int_0^{\pi/2} \log \sin x \, dx$  is equal to :

$$(1) -\pi \log 2$$

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

$$(3) \pi \log 2$$

$$(4) \frac{\pi}{2} \log 2$$

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

$$(1) 0$$

$$(2) \frac{n}{q} \cdot \frac{n}{1}$$

$$(3) \frac{p+q}{1}$$

$$(4) \text{none of these}$$

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

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

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

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

93. If  $z = x + iy$  and  $\left| \frac{1 - iz}{z - 1} \right| = 1$ , 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)  $1/2$  (4) 0

96. If  $z = x + iy$  and  $|z| = 1$  ( $z \neq \pm 1$ ) 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)  $PQ \neq QP$  (3)  $Q^2 = Q$  (4)  $P^2 = P$

100. If the exponential form of the complex number  $-1 = \sqrt{3} e^{i\theta}$  then  $\theta$  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)										

