1..If $i=\sqrt{-1}$ and n is a +ve integer, then $i^n+i^{n+1}+i^{n+2}+i^{n+3}=$

(a) 1 (b) i (c) i^n (d) 0

2. $\left(\frac{1+i}{1-i}\right)^n=1$, then $n=$

(a) 4 (b) 5 (c) 9 (d) 7

3. If ω is a cube root of unity, then $(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8)=$

(a) 3 (b) ω (c) 9 (d) 1

4. If $(1+i)(1+2i)\ldots\ldots(1+ni)=x+iy$, then the value of $2.5.10\ldots\ldots(1+n^2)=$

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

5. If $x+iy=\sqrt{\frac{a+ib}{c+id}}$, then $(x^2+y^2)^2=$

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

6. If $z=1+i$, then the multiplicative inverse of z^2 is

(a) $2i$ (b) $1-i$ (c) $\frac{i}{2}$ (d) $-\frac{i}{2}$

7. If $a=\cos\theta+i\sin\theta$, then $\frac{1+a}{1-a}=$

(a) $i\cot\frac{\theta}{2}$ (b) $i\tan\frac{\theta}{2}$ (c) $\cot\frac{\theta}{2}$ (d) $\cot\theta$

8. The modulus and amplitude of $\frac{1+i}{1-i}$ are

(a) $-1,-\frac{\pi}{2}$ (b) $1,\frac{\pi}{2}$ (c) $\sqrt{2},\frac{\pi}{3}$ (d) $1,\frac{\pi}{4}$

9. $1,\omega,\omega^2$ are cube roots of unity, then their product is

(a) 1 (b) -1 (c) ω (d) 0

10. In the Argand diagram the points representing the complex numbers $7+9i, 3-7i$ and $-3+3i$

(a) are collinear (c) form the vertices of an equilateral triangle

(d) form the vertices of an isosceles triangle (d) from the vertices of a right angled isosceles triangle

11. If we express $\frac{(\cos 2\theta-i\sin 2\theta)^4(\cos 4\theta+i\sin 4\theta)^{-5}}{(\cos 3\theta+i\sin 3\theta)^{-2}(\cos 3\theta-i\sin 3\theta)^{-9}}$ in the form $x+iy$, we get

(a) $\cos 21\theta+i\sin 21\theta$ (b) $\cos 49\theta+i\sin 19\theta$ (c) $\cos 23\,\theta+i\sin 43\,\theta$ (d) $\cos 49\,\theta-i\sin 49\theta$

12. Let P be the point represented by the complex number z. Rotate OP (O is the origin) through $\frac{\pi}{2}$ in the anticlock direction, the new position of the complex number is represented by

(a) $z+i$ (b) iz (c) $z-i$ (d) $\frac{z}{i}$

13. The value of $\prod_{k=0}^{6}\left(\sin\frac{2\pi k}{7} - i\cos\frac{2\pi k}{7}\right)$ is

(a) 0 (b) i (c) -1 (d) $\frac{z}{i}$

14. If $z(2-i) = 3+i$, thus $z^{20} =$

(a) -1024 (b) $1-i$ (c) $1+i$ (d) 1024

15. Let z_1 and z_2 be nth roots of unity which subtend a right angle at the origin. Then n must be of the form

(a) $4k$ (b) $4k+3$ (c) $4k+2$ (d) $4k+1$

16. The amplitude of $\sin\frac{\pi}{5} + i\left(1 - \cos\frac{\pi}{5}\right)$ is

(a) $\frac{2\pi}{5}$ (b) $\frac{\pi}{5}$ (c) $\frac{\pi}{15}$ (d) $\frac{\pi}{10}$

17. If $\sqrt{x} + \frac{1}{\sqrt{x}} = 2\cos\theta$, then $x^6 + x^{-6} =$

(a) $2\cos 12\theta$ (b) $2\cos 6\theta$ (c) $2\sin 3\theta$ (d) $2\cos 3\theta$

18. Which of the following is a fourth root of $\frac{1}{2} + i\frac{\sqrt{3}}{2}$?

(a) $\text{cis}\frac{\pi}{12}$ (b) $\text{cis}\frac{\pi}{2}$ (c) $\text{cis}\frac{\pi}{3}$ (d) $\text{cis}\frac{\pi}{6}$

19. The smallest positive integer n for which $(1+i)^{2n} = (1-i)^{2n}$ is

(a) 1 (b) 2 (c) 3 (d) 4

20. If $\omega = \frac{-1+\sqrt{3}i}{2}$, then $(3+\omega+3\omega^2)^4 =$

(a) 10 (b) -16 (c) 16ω (d) $16\omega^2$

21. The modulus and amplitude of $\frac{1+2i}{1-(1-i)^2}$ are

(a) $\sqrt{2}$ and $\frac{\pi}{6}$ (b) 1 and 0 (c) 1 and $\frac{\pi}{3}$ (d) 1 and $\frac{\pi}{4}$

22. The amplitude of $\frac{1+i\sqrt{3}}{\sqrt{3}+i}$ is

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{4}$ (c) $\frac{2\pi}{5}$ (d) $\frac{\pi}{6}$

23. The real part of $\frac{1}{1+\cos\theta+i\sin\theta}$ is

(a) $-\frac{1}{2}$ (b) $\frac{1}{2}$ (c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{2}}$

24. The complex number $\frac{(-\sqrt{3}+3i)(1-i)}{(3+\sqrt{3}i)(i)(\sqrt{3}+\sqrt{3}i)}$ when represented in the argand diagram is

(a) In the first quadrant (b) in the second quadrant (c) on the x-axis(Real axis) (d) on the y-axis (Imaginary axis)

25. If $2x = -1+\sqrt{3}i$, then the value of $(1-x^2+x)^6 - (1-x+x^2)^6 =$

(a) -64 (b) 32 (c) 0 (d) 64

26. The modulus and amplitude of $\left(1+i\sqrt{3}\right)^8$ are respectively

(a) 256 and $\frac{2\pi}{3}$ (b) 256 and $\frac{\pi}{3}$ (c) 256 and $\frac{8\pi}{3}$ (d) 2 and $\frac{2\pi}{3}$

27. The real and imaginary part of $\log_e\left(1+\sqrt{3}i\right)$ are

(a) $\log_e 2\ and\ \frac{\pi}{3}$ (b) $\log_e \sqrt{2}\ and\ \frac{\pi}{3}$ (c) $\log_e 2\ and\ \frac{\pi}{6}$ (d) $\log_e \sqrt{2}\ and\ \frac{\pi}{6}$

28. The conjugate of the complex number $\frac{(1+i)^2}{1-i}$ is

(a) $1+i$ (b) $1-i$ (c) $-1+i$ (d) $-1+i$

29. The imaginary point of i^i is

(a) 1 (b) 0 (c) -1 (d) 2

30. The amplitude of $(1+i)^5$ is

(a) $-\frac{3\pi}{4}$ (b) $\frac{3\pi}{4}$ (c) $\frac{5\pi}{4}$ (d) $-\frac{5\pi}{4}$

31. If $1, \omega, \omega^2$ are the cube roots of unity ,then $(1+\omega)(1+\omega^2)(1+\omega^4)(1+\omega^8)$ is equal to

(a) 0 (b) 1 (c) ω (d) ω^2

32. If z is complex number such that $z=-\bar{z}$, then

(a) Real point of z is the same as its imaginary part (b) z is any complex number
(c) z is purely imaginary (d) z is purely real

33. The maximum value of $|z|$ when z satisfies the condition $\left|z+\frac{2}{z}\right| = 2$ is

$\sqrt{3}-1$ (b) $\sqrt{3}+2$ (c) $\sqrt{3}+1$ (d) $\sqrt{3}$

34. All complex numbers z which satisfy the equation $\left|\frac{z-6i}{z+6i}\right|$ =1 lie on

(a) Imaginary axis (b) real axis (c) neither of the axis (d) none of these .

35. The complex number $\frac{1+2i}{1-i}$ lies in

(a) third quadrant (b) fourth quadrant (c) first quadrant (d) second quadrant

36. If p is the point in the Argand diagram corresponding to the complex to the complex number $\sqrt{3}+i$ and if OPQ is an isosceles right angled triangle at ‘O’ ,then Q represents the complex number .

(a) $-1 \pm i\sqrt{3}$ (b) $-1+i\sqrt{3}\ or\ 1-i\sqrt{3}$ (c) $1 \pm i\sqrt{3}$ (d) $\sqrt{3}-i\ or\ 1-i\sqrt{3}$

37. The smallest positive integral value ‘n’ such that $\left(\frac{1+\sin\frac{\pi}{8}+i\cos\frac{\pi}{8}}{1+\sin\frac{\pi}{8}-i\cos\frac{\pi}{8}}\right)^n$ is purely imaginary is, n=

(a) 3 (b) 2 (c) 8 (d) 4

38. The least positive integer n for which $\frac{(1+i)^n}{(1-i)^{n-2}}$ is positive is

(a) 4 (b) 3 (c) 2 (d) 1

39. If $x + iy = \left(-1 + i\sqrt{3}\right)^{2010}$ then x is

(a) 2^{2010} (b) -2^{2010} (c) 1 (d) -1

40. The value of $\left|\frac{1+i\sqrt{3}}{\left(1+\frac{1}{i+1}\right)^2}\right|$ is

(a) 20 (b) 9 (c) $\frac{5}{4}$ (d) $\frac{4}{5}$

41. If ω is an imaginary cube root of unity, then the value of $(1-\omega+\omega^2)(1-\omega^2+\omega^8)(1-\omega^4+\omega^8)\ldots 2n\ factors$ is

(a) 2^{2n} (b) 2^n (c) 1 (d) 0

42. The conjugate of $\frac{3-2i}{5+7i}$ is

a. $\frac{1}{74}(1-31i)$ b. $\frac{1}{74}(31+i)$ c. $\frac{1}{74}(31-i)$ d. $\frac{1}{74}(1+31i)$

43. If z_1, z_2, z_3 are complex numbers such that $|z_1| = |z_2| = |z_3| = \left|\frac{1}{z_1}+\frac{1}{z_2}+\frac{1}{z_3}\right| = 1$ then $|z_1+z_2+z_3|$ is

a. 3 b. > 3 c. < 1 d. 1

44. If $i = \sqrt{-1}$, then $4 + 5\left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)^{334} + 3\left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)^{335}$ is equal to

a. $1 - i\sqrt{3}$ b. $-1 + i\sqrt{3}$ c. $i\sqrt{3}$ d. $-i\sqrt{3}$

45. A point P represents a complex number Z which moves such that $|z - z_1| = |z - z_2|$, then its locus is

a> a circle with centre at z_1 b> a circle with centre at z

c> an ellipse d> perpendicular bisector of the line joining z_1 & z_2

46. If $z = cis\left[\frac{\pi}{3^n}\right], n = 1,2,3, \ldots$ then $z_1 z_2 z_3 \ \ldots$ is

a. i b. $-i$ c. 1 d. -1

47. If α is a complex number satisfying the equation $\alpha^2 + \alpha + 1 = 0$ then α^{2011} is

a. α^2 b. α c. $-i$ d. 1

48. If $=$ cis $\frac{2\pi}{3}$, then the value of $\frac{a+b\omega+c\omega^2}{c+a\omega+b\omega^2} + \frac{a+b\omega+c\omega^2}{b+c\omega+a\omega^2}$ is

a. 0 b. 2 c. 1 d. -1

49. If $|Z^2 - 1| = |Z| + 1$, then Z lies on

a. an ellipse b. imaginary axis c. circle d. real axis

50. If $|Z| = 1$, then $\frac{1+Z}{1+\bar{Z}}$ is

a. Z b. $\bar{Z}$ c. 1 d. $Z + \bar{Z}$

51. If Z_1 & Z_2 are two non zero complex numbers such that $|Z_1 + Z_2| = |Z_1| + |Z_2|$ then $argZ_1 - argZ_2$ is

a. 0 b. $\frac{\pi}{2}$ c. π d. $-\frac{\pi}{2}$

52. If $(1+i)(1+2i)(1+3i)(1+4i) = (i-1)(i-2)(i-3)k$, K is real then $k =$

a. $\sqrt{17}$ b. $\pm\sqrt{17}$ c. ω d. none

53. Let Z_1 & Z_2 be nth roots of unity which subtends right angle at the origin. Then n must be in the form

a. $4k+3$ b. $4k$ c. $4k+1$ d. $4k+2$

54. If $Z = i\log(2+\sqrt{3})$, then $\sin Z$ is

a. $\sqrt{3}i$ b. $2i$ c. $\frac{\sqrt{3}}{2}i$ d. 0

55. The area of the triangle formed by the points representing the complex number Z , iZ and $Z + iZ$ where $Z = x + iy$ is a. $\frac{|Z|}{2}$ b. $\frac{1}{2}|Z|^2$

c. $|Z|^2$ d. $\frac{1}{2}|x^2 - y^2|$

56. If $\arg Z < 0$, then $\arg(-Z) - \arg Z$ is equal to

a. π b. $-\pi$ c. $-\frac{\pi}{2}$ d. $\frac{\pi}{2}$

57. For all complex numbers Z_1, Z_2 satisfying $|Z_1| = 12$ and $|Z_2 - 3 - 4i| = 5$, then the minimum value of $|Z_1 - Z_2|$ is a. 0 b. 2

c. 7 d. 17

58. The locus represented by $|Z - a|^2 + |Z - b|^2 = 5$ represents

a. parabola b. circle c. ellipse d. hyperbola

59. If $Z \neq 0$, then $\int_0^{50} \arg(-|Z|)\, dx$ equals

a. 50 b. 0 c. not defined d. $\log\sqrt{\frac{|Z|}{2}}$

60. The amplitude of $(-i)^5$ is

(a) $-\pi$ (b) π (c) $\frac{\pi}{2}$ (d) $-\frac{\pi}{2}$

61. If $\omega \neq 1$ is a cube root of 1 then the value of $\omega^{16} - \omega^{13}$ is

(a) $\omega - 1$ (b) $\omega + 1$ (c) -1 (d) 0

62. The value of $(\omega - \omega^2)^4$ is

(a) -9 (b) $9i$ (c) 9 (d) $-9i$

63. If $1, \omega, \omega^2$ are cube roots of unity then they are in

(a) A.P (b) G.P (c) H.P (d) A.G.P

64. If α is n[th] root of unity then the value of $\sum_{r=1}^{n} \alpha^r$ is

(a) α^n (b) α (c) 1 (d) 0

65. If $x = \cos\alpha + i\sin\alpha$ then $\frac{x^2-1}{x^2+1}$ is

(a) $\tan\alpha$ (b) $\cot\alpha$ (c) $i\tan\alpha$ (d) $-i\tan\alpha$

66. The expression $(a+ib)^{\frac{1}{n}} + (a-ib)^{\frac{1}{n}}$ has

(a) only the real part (b) only the imaginary part

(c) both real and imaginary part (c) 0

67. The real part of $e^{(x+iy)^2}$ is

(a) $e^{(x^2+y^2)}$ (b) $e^{x^2-y^2}$ (c) $e^{x^2+y^2}\cos 2xy$ (d) $e^{x^2-y^2}\cos 2xy$

68. The value of $\sinh ix$ is

(a) $\sin x$ (b) $i\sin x$ (c) – $i\sin x$ (d) $\sinh x$

69. If the area of triangle formed by $z,\ z+iz\ \&\ iz$ is 50, then the value of $|z|$ is

(a) 1 (b) 5 (c) 10 (d) 15

70. If $(x+2y)+i(2x+y)=1+i$ then (x,y) is

(a) $(3,3)$ (b) $\left(-\frac{1}{3},-\frac{1}{3}\right)$ (c) $\left(\frac{1}{3},\frac{1}{3}\right)$ (d) $(-3,-3)$

71. If $\frac{1}{i}+\frac{3}{i^2}+\frac{1}{i^7}+\frac{3}{i^8}=x+iy$, then (x,y) is

(a) $(1,1)$ (b) (i,i) (c) $(0,0)$ (d) $(-1,-1)$

72. If $x=a-b, y=a\omega-b\omega^2, z=a\omega^2-b\omega$ then the value of xyz is

(a) 0 (b) a^3-b^3 (c) a^3+b^3 (c) $(a-b)^3$

73. If $\alpha_1,\alpha_2,\alpha_3,\alpha_4,\alpha_5,\alpha_6$ are sixth roots of unity then the value of $(1+\alpha_1)(1+\alpha_2)(1+\alpha_3)(1+\alpha_4)(1+\alpha_5)(1+\alpha_6)$ is

(a) 0 (b) 2 (c) 1 (d) -1

74. If $\alpha_1,\alpha_2,\alpha_3,\alpha_4,\alpha_5$ are fifth roots of unity then the value of $(1+\alpha_1)(1+\alpha_2)(1+\alpha_3)(1+\alpha_4)(1+\alpha_5)$ is

(a) 0 (b) 2 (c) 1 (d) -1

75. If α & β are different complex numbers with $|\beta|=1$, then $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$ is equal to

(a) 0 (b) $\frac{1}{2}$ (c) 1 (d) 2

76. If A, B, C, D are angles of a quadrilateral then the values of $cisA\ cis\ B\ cis\ C\ cis\ D$ is

(a) i (b) – i (c) 1 (d) $1+i$

77. If $x=\cos\alpha+i\sin\alpha$, $y=\cos\beta+i\sin\beta$, $z=\cos\gamma+i\sin\gamma$ and $x^2y+y^2z+z^2x=xyz$, then $\cos(\alpha-\beta)+\cos(\beta-\gamma)+\cos(\gamma-\alpha)$ is

(a) 1 (b) 0 (c) -1 (d) does not exist

78. The real part of $\log(\log i)$ is

(a) $\frac{\pi}{2}$ (b) $\log\frac{\pi}{2}$ (c) 0 (d) does not exist.

79. If $z^4=i$ then z is

(a) 1 (b) i (c) $cis\frac{\pi}{4}$ (d) $cis\frac{\pi}{8}$

80. If ω is an imaginary cube root of unity, then the conjugate of $\frac{1}{1+\omega}$ is

(a) $1-\omega$ (b) $1+\omega$ (c) ω (d) ω^2

81. In any ΔABC , the value of $\left(e^{iA}e^{iB}e^{iC}\right)^{2012}$ is

(a) 1 (b) -1 (c) 0 (d) $A+B+C$

82. If $\alpha, \beta, \gamma, \delta$ are the roots of the equation $x^4 - 1 = 0$, then $|1+\alpha|^{10} + |1+\beta|^{10} + |1+\gamma|^{10} + |1+\delta|^{10}$ is divisible by

(a) 17 (b) 10 (c) 5 (d) 19

83. The value of $(\cosh x + \sinh x)^n$ is

(a) $\cosh x + \sinh x$ (b) $\cosh nx + \sinh nx$ (c) $\cosh nx - \sinh nx$ (d) none

84. The value of sum $\sum_{n=1}^{13}(i^n + i^{n+1})$, is

(a) i (b) $i - 1$ (c) – i (d) 0

85. If n is an odd integer , then $(1+i)^{6n} + (1-i)^{6n}$ is equal to

(a) 0 (b) 2 (c) -2 (d) none of these

86. The value of $\sin^{-1}\left\{\frac{1}{i}(z-1)\right\}$, where z is non real , can be the angle of a triangle , if

(a) $Re(z) = 1, Im(z) = 2$ (b) $Re(Z) = 1, -1 \le y \le 1$ (c) $Re(z) + Im(z) = 0$ (d) none

87. The Im(z) is equal to

(a) $\frac{1}{2}(Z + \bar{Z})$ (b) $\frac{1}{2}(Z - \bar{Z})$ (c) $\frac{1}{2}(\bar{Z} - Z)i$ (d) none of these

88. If $= 1 + i\tan\alpha$, $\pi < \alpha < \frac{3\pi}{2}$, then $|Z|$ is equal to

(a) $\sec\alpha$ (b) – $\sec\alpha$ (c) $\operatorname{cosec}\alpha$ (d) none of these

89. If $(x-1)^4 - 16 = 0$, then the sum of non real complex values of x is

(a) 2 (b) 0 (c) 4 (d) none

90. The value of $amp(i\omega) + amp(i\omega^2)$, where ω is a non real cube root of unity is

(a) 0 (b) $\frac{\pi}{2}$ (c) π (d) $-\frac{\pi}{2}$

91. If α is a non real $\sqrt[5]{1}$, then the value of $2^{|1+\alpha+\alpha^2+\alpha^{-1}+\alpha^{-2}|}$ is equal to

(a) 4 (b) 2 (c) 1 (d) none

92. If the fourth roots of unity are z_1, z_2, z_3, z_4 , then $z_1^2 + z_2^2 + z_3^2 + z_4^2$ is

(a) 1 (b) 0 (c) i (d) none

93. $\sqrt{-1 - \sqrt{-1 - \sqrt{-1 - \cdots \infty}}}$ is equal to

(a) $\omega \; or \; \omega^2$ (b) $-\omega \; or \; -\omega^2$ (c) $1 + i \; or \; 1 - i$ (d) $-1 + i \; or \; -1 - i$

94. The inequality $|z - 4| < |z - 2|$ represents the region given by

(a) $Re(z) > 0$ (b) $Re(z) < 0$ (c) $Re(z) > 2$ (d) $Re(z) > 3$

95. If $|z_1| = |z_2| = |z_3| = |z_4|$, then the points representing z_1, z_2, z_3, z_4

(a) concyclic (b) vertices of a square (c) vertices of a rhombus (d) none

96. The expression $\tan\left[i\log\left(\frac{a-ib}{a+ib}\right)\right]$ reduces to

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

97. If z is a complex number , then $z^2 + \bar{z}^2 = 2$ represents

(a) circle (b) parabola (c) hyperbola (d) ellipse

98. If $\begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix} = x + iy$, then

(a) $x = 0 , y = 1$ (b) $x = 1 , y = 3$ (c) $x = 0 , y = 3$ (d) $x = 0, y = 0$

99. The value of $\left(\frac{1+i}{\sqrt{2}}\right)^8 + \left(\frac{1-i}{\sqrt{2}}\right)^8$ is

(a) 4 (b) 6 (c) 8 (d) 2

100.If $x + iy = \frac{u+iv}{u-iv}$, then $x^2 + y^2$ is

(a) 1 (b) -1 (c) 0 (d) none

1. The general solution of $\tan 3x = 1$ is

(a) $n\pi + \frac{\pi}{4}$ (b) $\frac{n\pi}{3} + \frac{\pi}{12}$ (c) $n\pi$ (d) $n\pi \pm \frac{\pi}{4}$

2. The solution of $\tan 2\theta \tan \theta = 1$ is

(a) $\frac{\pi}{3}$ (b) $(3n \pm 1)\frac{\pi}{6}$ (c) $(4n \pm 1)\frac{\pi}{6}$ (d) $2n\pi \pm \frac{\pi}{3}$

3. If $\sin x - \cos x = \sqrt{2}$, then $x =$

(a) $2n\pi$ (b) $n\pi$ (c) $(2n + 1)\pi$ (d) $2n\pi + \frac{3\pi}{4}$

4. If $\sin A = \sin B$ and $\cos A = \cos B$, then

(a) $A = n\pi + B$ (b) $A = n\pi - B$ (c) $A = 2n\pi + B$ (d) $A = 2n\pi - B$

5. If A and B are acute angles such that $\sin A = \sin^2 B$ and $2\cos^2 A = 3\cos^2 B$, then A is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{8}$ (d) $\frac{\pi}{3}$

6. General solution of $\tan 5\theta = \cot 2\theta$ is

(a) $\theta = \frac{n\pi}{7} + \frac{\pi}{2}$ (b) $\theta = \frac{n\pi}{7} + \frac{\pi}{3}$ (c) $\theta = \frac{n\pi}{7} + \frac{\pi}{14}$ (d) $\theta = \frac{n\pi}{7} - \frac{\pi}{14}$

7. If $\cos \theta = -\frac{1}{2}$ and $0 < \theta < 360°$, then the solutions are

(a) $\theta = 60°, 240°$ (b) $\theta = 120°, 240°$ (c) $\theta = 120°, 210°$ (d) $\theta = 120°, 300°$

8. The general solution of the equation $\sin \theta + \cos \theta = 1$ is

(a) $\theta = n\pi + ((-1)^n + 1)\frac{\pi}{4}, n = 0, \pm 1, \pm 2, \ldots$ (b) $\theta = 2n\pi, n = 0, \pm 1, \pm 2, \ldots$

(c) $\theta = 2n\pi + \frac{\pi}{2}, n = 0, \pm 1, \pm 2, \ldots$ (d) $\theta = n\pi - (1 - (-1)^n)\frac{\pi}{4}, n = 0, \pm 1, \pm 2, \ldots$

9. The general solution of the equation $\tan 2\theta \tan \theta = 1$ for $n \in Z$ is $\theta =$

(a) $(2n + 1)\frac{\pi}{4}$ (b) $(4n + 1)\frac{\pi}{6}$ (c) $(2n + 1)\frac{\pi}{2}$ (d) $(2n + 1)\frac{\pi}{3}$

10. If $0 \leq x \leq \pi$ and $81^{\sin^2 x} + 81^{\cos^2 x} = 30$, then $x =$

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) $\frac{3\pi}{4}$

11. The general solution of $\sin x - \cos x = \sqrt{2}$, for any integer n is

(a) $n\pi$ (b) $2n\pi + \frac{3\pi}{4}$ (c) $2n\pi$ (d) $(2n + 1)\pi$

12. If $\sin 3\theta = \sin\theta$, how many solutions exist such that $-2\pi < \theta < 2\pi$?
(a) 9 (b) 8 (c) 7 (d) 4

13. If $1 + \sin x + sin^2 x + \ldots\ldots\ldots\ldots$upto $\infty = 4 + 2\sqrt{3}, 0 < x < \pi$ and $x \neq \frac{\pi}{2}$, then $x =$
(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{3}$

14. The general solution of $1 + \sin^2 x = 3\sin x\cos x$, $\tan x \neq \frac{1}{2}$ is
(a) $2n\pi - \frac{\pi}{4}$ (b) $2n\pi + \frac{\pi}{4}$ (c) $n\pi + \frac{\pi}{4}$ (d) $n\pi - \frac{\pi}{4}$

15. A value of satisfying $\sin 5\theta - \sin 3\theta + \sin\theta = 0$ such that $0 < \theta < \frac{\pi}{2}$
(a) $\frac{\pi}{12}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$

16. The general solution of $\cos x + \sin x = \sqrt{2}$
(a) $x = 2n\pi + \frac{\pi}{4}$ (b) $2n\pi - \frac{\pi}{4}$ (c) $x = n\pi - \frac{\pi}{4}$ (d) $x = n\pi + \frac{\pi}{4}$

17. If $\log_{10}(1 - \cos x) + \log_{10}(1 + \cos x) = 0$, then $x =$
a) $\frac{\pi}{3}$ b) $-\frac{\pi}{3}$ c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

18. If $= \cos x$ & $y = \sin 3x$, then x is
a) $\frac{\pi}{8}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) π

19. General solution of $\tan\theta + \tan 2\theta + \sqrt{3}\tan\theta\tan 2\theta = \sqrt{3}$ is ▯ =
a) $n\pi + \frac{\pi}{3}$ b) $n\pi + \frac{\pi}{6}$ c) $n\pi - \frac{\pi}{3}$ d) $\frac{1}{3}\left(n\pi + \frac{\pi}{3}\right)$

20. If $\sin 11x\sin 4x + \sin 5x\sin 2x = 0$, then x is
(a) $\frac{n\pi}{9}$ (b) $\frac{n\pi}{3}$ (c) $\frac{n\pi}{4}$ (d) $\frac{n\pi}{2}$

21. If $\tan\theta + \sec\theta = p$, then ▯ can be written as
(a) $\sec^{-1}\left[\frac{1+p^2}{2p}\right]$ (b) $\cos^{-1}\left[\frac{1+p^2}{2p}\right]$ (c) $\tan^{-1}\left[\frac{2p}{p^2-1}\right]$ (d) $\tan^{-1}\frac{p^2-1}{2p}$

22. The general solution of the equation$(2 - \sqrt{3})\cos\theta - \sin\theta = \sqrt{3} - 1$ is $\theta =$
a) $2n\pi - 5\frac{\pi}{12}$ b) $2n\pi \pm \frac{\pi}{3} - \frac{5\pi}{12}$ c) $2n\pi \pm \frac{\pi}{4}$ d)$2n\pi \pm \frac{\pi}{4} - \frac{5\pi}{12}$

23. If $0 \leq x \leq \pi$ and $81^{sin^2 x} + 81^{cos^2 x} = 30$, then $x =$
a) $\frac{\pi}{6}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{4}$ d) $\frac{3\pi}{4}$

24. The general solution ofsin $x + \cos x = k$, where k is the minimum of 1 and $a^2 - 4a + 6, a \in R$ is $x =$
a) $2n\pi$ b) $2n\pi + (-1)^n\frac{\pi}{6}$ c) $2n\pi + (-1)^n\frac{\pi}{4} - \frac{\pi}{4}$ d) $2n\pi + (-1)^n\frac{\pi}{4}$

25. The most general value of θ which satisfies $\sin\theta = -\frac{1}{2}$ & $\tan\theta = \frac{1}{\sqrt{3}}$ is
a) $2n\pi + \frac{\pi}{6}$ b) $2n\pi + \frac{11\pi}{6}$ c) $2n\pi + \frac{7\pi}{6}$ d) $2n\pi + \frac{\pi}{4}$

26. The equation $\sin x + \sin y + \sin z = -3$ for $0 \leq x \leq 2\pi, 0 \leq y \leq 2\pi, 0 \leq z \leq 2\pi$ has
a) one solution b) two sets of solution c) four sets of solution d) no solution

27. The number of values of x in the interval $[0,5\pi]$ satisfying the equation $3sin^2 x - 7\sin x + 2 = 0$ is
a) 0 b) 5 c) 10 d) 6

28. If $1 + \cos x + cos^2x + cos^3x + \cdots = 2 - \sqrt{2}$, then $x(0 < x < \pi)$ is

a) $\frac{3\pi}{4}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{6}$ d) $\frac{\pi}{8}$

29. The equation $\sin x + \cos x = 2$ has

a) one solution b) infinite many solution c) no solution d) three solution in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

30. The number of values of x in the interval $(0,2\pi)$ such that $4\sin^2 x = 1$ is

(a) 2 (b) 3 (c) 4 (d) 6

31. If $x = \tan\theta$ and $x + \frac{1}{x} = 2$ then θ is

(a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$ (c) $\frac{5\pi}{4}$ (d) $\frac{\pi}{2}$

32. The equation $e^{\sin x} + e^{-\sin x} + 1 = 0$ has

(a) only one solution (b) infinite solutions (c) no real solutions (d) 3 solutions

33. If $2^{\sin x + \cos y} = 1, 16^{\sin^2 x + \cos^2 y} = 4$, then $\sin x$ is

(a) $\frac{1}{2}$ (b) $\pm\frac{1}{\sqrt{2}}$ (c) $\pm\frac{\sqrt{3}}{2}$ (d) $\pm\frac{1}{2}$

34. If $2^{1+\cos^2 x + \cos^4 x + \cdots} = 4$ then the value of x are

(a) $\frac{\pi}{4}, -\frac{\pi}{4}$ (b) $\frac{\pi}{6}, -\frac{\pi}{6}$ (c) $\frac{\pi}{3}, -\frac{\pi}{3}$ (d) $\frac{\pi}{2}, -\frac{\pi}{2}$

35. The smallest positive integer satisfying $\log_{\cos x}\sin x + \log_{\sin x}\cos x = 2$ is

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{4}$