DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. : 8

Topic :- COMPLEX NUMBERS AND QUADRATIC EQUATIONS

1. If $(\sqrt{5}+\sqrt{3}i)^{33} = 2^{49}\,z$, then modulus of the complex number z is equal to
   a) 1 b) $\sqrt{2}$ c) $2\sqrt{2}$ d) 4

2. If centre of a regular hexagon is at origin and one of the vertex on argand diagram is $1+2i$, then its perimeter is
   a) $2\sqrt{5}$ b) $6\sqrt{2}$ c) $4\sqrt{5}$ d) $6\sqrt{5}$

3. The value of $\sum_{k=1}^{6}\left(\sin\frac{2\pi k}{7} - i\cos\frac{2\pi k}{7}\right)$ is
   a) -1 b) 0 c) $-i$ d) i

4. The cubic equation whose roots are thrice to each of the roots of $x^3+2x^2-4x+1=0$ is
   a) $x^3-6x^2+36x+27=0$ b) $x^3+6x^2+36x+27=0$
   c) $x^3-6x^2-36x+27=0$ d) $x^3+6x^2-36x+27=0$

5. Let $(\sin a)x^2+(\sin a)x+(1-\cos a=0)$. The value of a for which roots of this equation are real and distinct, is
   a) $(0,2\tan^{-1}1/4)$ b) $(0, 2\pi/3)$ c) $(0,\pi)$ d) $(0, 2\pi)$

6. If α and β $(\alpha<\beta)$ are the roots of the equation $x^2+bx+c=0$ where $c<0<b$,then
   a) $0<\alpha<\beta$ b) $\alpha<0<\beta<|\alpha|$ c) $\alpha<\beta<0$ d) $\alpha<0<|\alpha|<\beta|$

7. If $1+x^2=\sqrt{3}x$, then $\sum_{n=1}^{24}\left(x^n-\frac{1}{x^n}\right)^2$ is equal to
   a) 0 b) 48 c) -24 d) -48

8. The roots of the equation $|x^2-x-6|=x+2$ are
   a) $-2,1,4$ b) 0,2,4 c) 0,1,4 d) $-2,2,4$

9. Let α,β be the roots of the equation $ax^2+bx+c=0$, and let $\alpha^n+\beta^n=S_n$ for $n\geq 1$. Then, the value of the determinant
$$\begin{vmatrix} 3 & 1+S_1 & 1+S_2 \\ 1+S_1 & 1+S_2 & 1+S_3 \\ 1+S_2 & 1+S_3 & 1+S_4 \end{vmatrix}$$ is

a) $\frac{b^2-4ac}{a^4}$

b) $\frac{(a+b+c)(b^2+4ac)}{a^4}$

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

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

10. If $z_1, z_2, z_3, \ldots, z_n$ are n nth roots of unity, then for $k = 1,2,\ldots,n$

a) $|z_k| = k|z_{n+1}|$ b) $|z_{k+1}| = k|z_k|$ c) $|z_{k+1}| = |z_k| + |z_{k+1}|$ d) $|z_k| = |z_{k+1}|$

11. If α, β are the roots of the equation $x^2 - (1+n^2)x + \frac{1}{2}(1+n^2+n^4) = 0$, then $\alpha^2 + \beta^2$ is

a) n^2 b) $-n^2$ c) n^4 d) $-n^4$

12. If one root of equation $x^2 + ax + 12 = 0$ is 4 while the equation $x^2 + ax + b = 0$ has equal roots, then the value of b is

a) $\frac{4}{49}$ b) $\frac{49}{4}$ c) $\frac{7}{4}$ d) $\frac{4}{7}$

13. If $a = \log_2 3$, $b = \log_2 5$, $c = \log_7 2$, then $\log_{140} 63$ in terms of a, b, c is

a) $\frac{2ac+1}{2c+abc+1}$ b) $\frac{2ac+1}{2a+c+a}$ c) $\frac{2ac+1}{2c+ab+a}$ d) None of these

14. Number of non-zero integral solutions of the equation $(1-i)^n = 2^n$ is

a) 1 b) 2 c) Infinite d) None of these

15. The number of non-zero solutions of the equation $x^2 - 5x - (Sgn(x))6 = 0$, is

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

16. If n is a positive integer greater than unity and z is a complex number satisfying the equation $z^n = (z+1)^n$, then

a) Re $(z) < 0$ b) Re $(z) > 0$ c) Re $(z) = 0$ d) None of these

17. 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) 1 b) 0 c) ω^2 d) ω

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

a) $x = 3, y = 1$ b) $x = 13, y = 3$ c) $x = 0, y = 3$ d) $x = 0, y = 0$

19. If z_1, z_2, z_3 are vertices of an equilateral triangle with z_0 its centroid, then $z_1^2 + z_2^2 + z_3^2 =$

a) z_0^2 b) $9\, z_0^2$ c) $3\, z_0^2$ d) $2\, z_0^2$

20. For all `$x$', $x^2 + 2ax + (10 - 3a) > 0$, then the interval in which `a' lies, is

a) $a < -5$ b) $-5 < a < 2$ c) $a > 5$ d) $2 < a < 5$