



MARGSHREE CLASSES PVT. LTD.

IIT-JEE / NEET / FOUNDATION (IX & X)

Time: 2 hours

Maths

Marks: 50

(Trigonometry function and complex number)

NAME OF THE STUDENT:- _____

DATE:- _____

INSTRUCTION – ATTEMPT ALL QUESTIONS

Q.1. If $\tan x = \frac{m}{m+1}$, If $\tan \beta = \frac{m}{2m+1}$ then prove that $X + \beta = \frac{\pi}{4}$

Q.2. Find the value

(a) $\frac{\tan(90-\theta) \sec(180-\theta) \sin(-\theta)}{\sin(180+\theta) \cot(360-\theta) \operatorname{cosec}(90-\theta)}$

(b) $\frac{\cos(2\pi+\theta) \operatorname{cosec}(2\pi+\theta) \tan\left(\frac{\pi}{2}+\theta\right)}{\sec\left(\frac{\pi}{2}+\theta\right) \cos \theta \cot(\pi+\theta)}$

Q.3. Find the value of

(a) $\cos 15^\circ$

(b) $\sin 75^\circ$

(c) $\tan 75^\circ$

Q.4. Find the general solution –

(a) $\cot^2 \theta + \frac{3}{\sin \theta} + 3 = 0$

(b) $\tan \theta + \tan 2\theta + \tan \theta \tan 2\theta = 1$

Q.5. Solve the trigonometric equation :-

(a) $7\cos^2 \theta + 3\sin^2 \theta = 4$

Q.6. If $0 \leq x \leq 2\pi$, find $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$ when

(a) $\cos x = -\frac{1}{3}$, x lies in quadrant III

(b) $\sin x = \frac{\sqrt{5}}{3}$, x lies in quadrant II

Q.7. find the principal and general solutions of the equations –

(a) $\tan x = \sqrt{3}$

(b) $\cos x = \frac{1}{2}$

- Q.8. Let $\cos(x + \beta) = \frac{4}{5}$ and $\sin(x - \beta) = \frac{5}{15}$
where $0 \leq x, \beta \leq \frac{\pi}{4}$, then $\tan 2x = ??$
- Q.9. If $0 \leq x \leq 2\pi$, then find real value of x , which satisfy the equation
 $\cos x + \cos 2x + \cos 3x + \cos 4x = 0$
- Q.10. If $U = \sqrt{a^2 \cos^2 \theta + b^2 \sin^2 \theta} + \sqrt{a^2 \sin^2 \theta + b^2 \cos^2 \theta}$ then find the difference between maximum and minimum value of u^2 ?
- Q.11. If Z is complex number such that $|Z| = 1$ prove that $\left(\frac{Z-1}{Z+1}\right)$ is purely imaginary
- Q.12. If $(1 + i)(1 + 2i)(1 + 3i) \dots (1 + ni) = x + iy$
show that $2 \cdot 5 \cdot 10 \dots (1 + n^2) = x^2 + y^2$
- Q.13. If x and β are different complex number with $|\beta| = 1$ find $\left|\frac{\beta-x}{1-\bar{x}\beta}\right|$
- Q.14. Evaluate:-
(a) $(1 + i)^6 + (1 - i)^3$ (b) $[i^{18} + \left(\frac{1}{i}\right)^{25}]$
- Q.15. If $x - iy = \sqrt{\frac{a-ib}{c-id}}$ than
prove that $(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$
- Q.16. Convert the complex number
 $Z = \frac{i-1}{\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)}$ in the polar form.
- Q.17. Find the square root of following complex number
(a) $3 + 4i$ (b) $12 - 5i$
- Q.18. If $a = \cos \theta + i \sin \theta$, find the value of $\left(\frac{1+a}{1-a}\right) = ?$
- Q.19. Let z_1 and z_2 be two complex numbers satisfying $|z_1| = 9$ and $|z_2| - |3| - |4i| = 4$ then the minimum value of $|z_1 - z_2|$ is _____?
- Q.20. find the value of
$$\left(\frac{1 + \sin\frac{2\pi}{9} + i\cos\frac{2\pi}{9}}{1 + \sin\frac{2\pi}{9} - i\cos\frac{2\pi}{9}}\right)^3$$