P.A. - 1

CLASS – XI

SUBJECT – MATHS

TIME – 1 H 30 MINS **MM – 30**

SECTION – A
(MCQ- 1 MARK EACH)

Q1) If (1 + 2i) .(2 + 3i). (3 + 4i) = x + iy where x , y ϵ R , then the value of $x^2 + y^2$ is equal to

a) 1450 b) 1625 c) 1575 d) 1725

Q2) The value of $\cos 1° \times \cos 2° \times \cos 3° \times \ldots\ldots\ldots\ldots\ldots\ldots\ldots \times \cos 179°$ is

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

Q.3) The real value of θ for which the expression $\frac{1+i\cos\theta}{1-2\,i\cos\theta}$ is a purely imaginary number is -

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

Q.4) If | 2x + 3 | < 7 , x ϵ R , then

a) $x \epsilon (-5\,,2]$ b) $x \epsilon (-5\,,2)$

c) $x \epsilon (-\infty,-5) \cup (2\,,\infty)$ d) $x \epsilon (-\infty,-5] \cup [2\,,\infty)$

Q.5) The range of $(4 + 5\cos x)$ is

a) (-1 , 9] b) [-1 , 9] c) (-1, 9) d) [-1, 9)

SECTION – B
(TWO MARKS EACH)

Q.6) Prove that $\frac{(sin\,7x+sin\,5x)+(sin\,9x+sin\,3x)}{(cos\,7x+cos\,5x)+(cos\,9x+cos\,3x)} = \tan 6x.$

Q.7) Solve $\frac{3x-4}{2} \geq \frac{x+1}{4} - 1$. Show the graph of the solution on the number line .

Q.8) If $z = -3\sqrt{2} + 3\sqrt{2}i$, then find modulus and multiplicative inverse of z.

Q.9) Find a complex number z satisfying the equation z + $\sqrt{2}|\,z+1\,| + i = 0$.

SECTION – C
(THREE MARKS EACH)

Q.10) (i) Find the value of $\tan\frac{\pi}{8}$.

(ii) Prove that $\tan 4x = \frac{4\tan x(1-\tan^2 x)}{1-6\tan^2 x+\tan^4 x}$.

Q.11) Solve $\frac{|x+3|+x}{x+2} > 1.$

Q.12) (i) If a + ib = $\frac{(x+i)^2}{4x^2+1}$, prove that $a^2 + b^2 = \frac{(x^2+1)^2}{(4x^2+1)^2}$.

SECTION – D
(FOUR MARKS EACH)

Q.13) i) Find the value of $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13}.$

ii) Prove that $\cos 20°.\cos 40°\ .\cos 60°.\cos 80° = \frac{1}{16}$

Q.14) A manufacturer has 600 lt. of a 12% solution of acid . How many litres of a 30% acid solution must be added to it so that the acid content in the resulting mixture will be more than 15% but less than 18% ?