Tut 9 : Complex Numbers

On the first page top right corner, write the following

Name:

Roll No:

Batch: & Div:

Tut 9 : Complex Numbers

Date :

Q1 If α, β are the roots of the equation $x^2 - 2x + 2 = 0$, prove that

$\alpha^n + \beta^n = 2.2^{n/2} \cos n\pi/4$, Hence deduce $\alpha^8 + \beta^8 = 32$

Q2 Find all the values of $(1+i)^{3/4}$ and find continued product of all the roots.

Q3 If $u = log\ tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)$, Prove that

(i) $cosh\ u = sec\ \theta$ **(ii)** $sinh\ u = tan\ \theta$

(iii) $tanh\ u = sin\ \theta$ **(iv)** $tanh\ \frac{u}{2} = tan\ \frac{\theta}{2}$

Q4 If $cos(x + i\ y) = cos\ \alpha\ + isin\ \alpha\ , prove\ that$

(i) $sin\ \alpha\ = \pm\ sin^2 x = \pm sin\ h^2 y$

(ii) $cos\ 2x + cosh\ 2y = 2$

Q5 Prove that $cosh^{-1}\left(\sqrt{1+x^2}\right) = tanh^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)$

Q6 Find the value of log $[sin\ (x + i\ y)]$