

1<sup>ST</sup> SEMESTER MATHEMATICS (Honours)

ASSIGNMENT, C1-2

TOTAL MARKS - 20

1. If  $x_r = \cos r\theta + i \sin r\theta$ , ( $r=1, 2, \dots, n$ );  
then show that  $x_1, x_2, x_3, \dots, x_n$  are in G.P. (5)

2. If the equation  $x^4 - px^3 + qx^2 - rx + s = 0$   
has two roots of the form  $(\alpha + i\beta)$ ,  $(\beta + i\alpha)$ ;  
where  $\alpha$  and  $\beta$  are real then show that  
 $p^2 = 2q$  and  $r^2 = 2qs$ . (5)

Hence or otherwise solve the equation

$$x^4 + 4x^3 + 8x^2 - 120x + 900 = 0$$

3. Find the values of  $k$ , for which the  
system of equations

$$kx + y + z = 1$$

$$x + ky + z = 1$$

$$x + y + kz = 1$$

(5)

will have

(i) a unique solution.

(ii) no solution. and

(iii) more than one solution.

4. For any  $x \in \mathbb{R}$ , the set of real numbers (5)

Prove that  $\frac{\frac{1}{\frac{1}{x}}}{\frac{1}{x}} = x$ .