

EN 266-01 2016

**SMA 233/EMG 244: NUMERICAL ANALYSIS CAT 1 TIME: ONE HOUR**

a) Find a polynomial of degree 3 or less for the function  $f(x) = \ln(1+x)$  near  $x = 1$  hence use your polynomial to compute  $\ln(1.3)$  (6 marks)

b) Obtain Lagrange interpolating polynomial of the form  $ax^2 + bx + c$  given

x	1	3	4
f(x)	1	27	64

Hence use your polynomial to estimate  $P_2(2)$

0.3333 - 27 - 21.33  
(8 marks)

c) Use matrix inversion method to solve for x, y and z

$$2x - 3y - 5z = 11$$

$$5x + 2y - 7z = -12$$

$$-4x + 3y + z = 5$$

(8 marks)

d) Compute the integral  $\int_0^{\frac{\pi}{2}} \sqrt{1 - 0.162 \sin^2 \theta} d\theta$  by Simpson's rule with  $n = 8$  correct to 4 decimal places.

(8 marks)

5.12 = 4(y+2)