NATIONAL OPEN UNIVERSITY OF NIGERIA
14/16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS
SCHOOL OF SCIENCE AND TECHNOLOGY
MARCH/APRIL 2014 EXAMINATION

COURSE CODE: MTH 311
COURSE TITLE: CALCULUS OF SEVERAL VARIABLES
TIME ALLOWED: 3 HOURS
INSTRUCTION:ANSWER ANY 5 QUESTIONS

1. (A) Find all the first order partial derivatives for the following functions

$$h(a,b)=b^2\ln(a^2)+\frac{6}{b^3}-\sqrt[7]{a^4}$$

-7marks

(B) Differentiate the following with respect to a;

Y = $a^4.\cos a$ -7marks

2. (A) Differentiate with respect to x; Y = Cos $h^{-1}\{5-4x\}$ -

7marks

(B) Find all the first order partial derivatives for the following function -

7marks

3. (A) l f z = $\frac{4x-y}{x-y}$, find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ -

7marks

(B)If z = tan(5x + 2y), find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$

-7marks

4.A Cylinder has dimensions r = 5cm, h = 10cm. Find the appropriate increase in volume by 0.2mcm and h decreases by 0.1cm.

-14marks

If f (x,y) = $\frac{xy^2}{x^2+y^2}$, $does \lim_{(x,y)\to(0,0)} f(x,y) exist?$

5. -14marks

6. Solve the equation. Begin with $(a-b)^2$ = a + b -1 -14marks

7. (A) State the Taylors series. -7marks

(B) Show that, if h is small, then;

$\tan^{-1}(x+h) = \tan^{-1}x + \frac{h}{1+x^2} - \frac{xh^2}{(1+x^2)^2}$ approximately -7marks