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

COURSE CODE: MTH311
COURSE TITLE: CALCULUS OF SEVERAL VARIABLES
TIME ALLOWED:3HOURS
INSTRUCTION: ANSWER ANY FIVE QUESTIONS

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

$$h(s,t)=t^2\ln(s^2)+\frac{9}{t^3}-\sqrt[7]{s^4}$$

-7marks (B) Differentiate the following with respect to x;

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

2. (A) Differentiate with respect to x;

Y = Cos $h^{-1}\{7-5x\}$ -7marks

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

$$w=x^2y-10y^2z^3+43x-7\tan(4y)$$

-7marks

3. (A) l f z = $\frac{2x-y}{x-y}$, find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$

-

7marks

(B)If z = tan(2x + 5y), 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

5. If f (a,b) = $\frac{ab^2}{a^2+b^2}$, $does \lim_{(a,b)\to(0,0)} f(a,b) exist?$

-14marks

6. Solve the equation. Begin with $(x-y)^2$ = x + y -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