

## ASSIGNMENT OF MATHEMATICS FOR L5 I.C.T

### **Q1.**

Given the function  $f$  of real variable  $x$  defined by

$$f(x) = x + |x| + 1 - \frac{1}{x+2}$$

- a) What is the domain of definition of  $f(x)$ ? **(1 mark)**
- b) Write  $f(x)$  without the symbol of absolute value. **(2 marks)**
- c) Calculate the limit on boundaries of domain of definition and deduce equation of asymptotes. **(3 marks)**
- d) Compute the first derivative and indicate the interval of increasing or decreasing. **(2 marks)**
- e) Construct the table of variation. **(2 marks)**
- f) Establish the direction of concavity. **(2 marks)**
- g) Plot the curve in Cartesian plane. **(3 marks)**

### **Q2.**

Given the function  $f$  of real variable  $x$  defined by:

$$f(x) = \frac{x^2 - 1}{x^2 - 4}$$

- a) Determine the domain of definition of  $f(x)$ . **(2 marks)**
- b) Calculate the limits at the boundaries of the domain. **(3 marks)**
- c) State any asymptotes. **(2 marks)**
- d) Make the variation table. **(3 marks)**
- e) Find the  $x$ -intercepts and  $y$ -intercepts for the graph of  $f$ . **(2 marks)**
- f) Sketch the graph of  $f$  in a Cartesian plane. **(3 marks)**

**Q4.**

Given the function  $f$  of real variable  $x$  defined by  $f(x) = \frac{x^2 - 1}{x^2 - 4}$

**15marks**

- a) What is the domain of definition of  $f(x)$  ?
- b) State any asymptotes
- c) Determine the nature of the turning point
- d) Find the coordinates of the point at which the curve  $C_f$  cuts the coordinates axes;
- e) Sketch the graph of the curve in Cartesian plan.

**Q5.**

Given function  $f(x) = \frac{x+3}{x-2}$

- a) Find domain of definition and boundary limits **(3marks)**
- b) Find asymptotes to the curve. **(3marks)**
- c) Compute the first derivative and study its sign. **(2.5marks)**
- d) Compute the second derivatives and study its sign. **(2.5marks)**
- e) Find intercept points if any. **(2marks)**
- f) Sketch the graph. **(2marks)**

**END**