ELIZADE UNIVERSITY ILARA-MOKIN, ONDO STATE

FACULTY: BASIC AND APPLIED SCIENCES, **DEPT:** MATHEMATICS AND COMPUTER SCIENCE
2nd **SEMESTER EXAMINATION,** 2016 / 2017 **ACADEMIC SESSION**

COURSE CODE: MTH 102 **COURSE TITLE:** General Mathematics II

COURSE LEADER(S): Mrs. T. Akinwumi & Dr. I. Olopade

DURATION: 2 Hours

HOD's SIGNATURE

INSTRUCTION: Candidates should answer any FOUR Questions

Question One

a) If $f(x) = 3x^2 - 5x + 1$ and $g(x) = \frac{1}{2}x + 2$. Find

(i) $(f \circ g)(x)$ 2marks

(ii) $(g \circ f)(-1)$ 2marks

(ii) Find the domain of definition of the function

$y = \frac{10x^3+5x-2}{\sqrt{9-x^2}}$ 2marks

b) Evaluate the following limits

(i) $\lim_{x\to\infty} \frac{x^2+10x+2}{x^2+1}$ 3marks

(ii) $\lim_{x\to 1}\left(\frac{\ln x}{x^2-1}\right)$ 3marks

(iii) When do we say a function f(x) is continuous 3marks

Question Two

a. Compute the derivative of $y = sinx$ from the first principle. 6 marks

b. Given that $y = (2x^2 + x)^{10}$ find $\frac{dy}{dx}$ 4 marks

c. (i) If $3y^2 + 2xy + 2x^2 - 5 = x^2$. Find the derivative of y with respect to x .5marks

Question Three

a. Evaluate $\int \sin x \cos^3 x dx$ 5 marks

b. Evaluate $\int xe^x dx$ 5 marks

c. Evaluate $\int (2x^2 + 7x + 16)(4x + 7)dx$ 5 marks

Question Four

(a) Evaluate (i) $\int \frac{x^2 + 1}{x^3 + 3x - 4} dx$ 5 marks

(b) A curve is given by the differential equation $\frac{dy}{dx} = 12x^2 + 8x + 1$ as it passes through the point (2, 0). Find its equation. 5 Marks

(c) Find $\frac{dy}{dx}$ of the parametric equation if $y = \frac{t^3}{1+t^2}$ and $x = \frac{t}{1+t^2}$ 5 Marks

Question Five

a. Find the stationary point of the function below and determine the stationary value

$f(x) = 4x^3 + 15x^2 - 18x + 7$ 7 marks

b. Evaluate $\int_1^2 \int_2^4 (x^2y^2)\, dxdy$ 4 marks

c. Differentiate $y = x^2$ with respect to x from the first principle. 4 marks

Question Six

a. Differentiate $y = 2xcosx$ with respect to x 5marks

b. Find $\frac{dy}{dx}$ if $y = \frac{\ln x}{x^3}$ 5 marks

c. Evaluate $\int_1^4 (2x^2 + 2x + 1)dx$ 5marks