



**ELIZADE UNIVERSITY,
ILARA-MOKIN,
ONDO STATE**

**FACULTY: BASIC AND APPLIED SCIENCES
DEPARTMENT: MATHEMATICS AND COMPUTER SCIENCE
2nd SEMESTER EXAMINATIONS
2015 / 2016 ACADEMIC SESSION**

COURSE CODE: MTH 102

COURSE TITLE: General Mathematics II

DURATION: 2 Hours

Course Leaders: Mrs T. Akinwumi & Mr. I. Olopade

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HOD's SIGNATURE

INSTRUCTION:

1. YOU ARE TO ANSWER ANY FOUR QUESTIONS FROM THE SIX QUESTIONS

Question One

a) If $f(x) = 2x^2 - 3x + 4$ and $g(x) = 7x + 2$. Find

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

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

(iii) Find the domain of definition of the function

$$y = \frac{10x^2 + 5x - 2}{\sqrt{4 - x^2}}$$

2marks

b) Evaluate the following limits

(i) $\lim_{x \rightarrow \infty} \frac{x^3 + 5x^2 + 6}{x^3 + 8}$ 2marks

(ii) $\lim_{x \rightarrow 1} \left(\frac{\log_e x}{x^2 - 1} \right)$ 2marks

c) (i) When do we say a function $f(x)$ is continuous 3marks

(ii) Find the point of discontinuity of the function

$f(x) = \frac{x^2 - 1}{x - 1}$ and remove the discontinuity. 2marks

Question Two

a. Compute the derivative of $y = \cos x$ from the first principle. 5 marks

b. Given that $y = (3x^2 + 4x)^{15}$ find $\frac{dy}{dx}$ 3 marks

c. (i) If $y^2 + 3xy + 2x^2 - x^2y - 8 = 2x^2$. Find the derivative of y with respect to x . 4marks

(ii) Differentiate $y = \log_e \sin 2x$ with respect to x 3 marks

Question Three

a. Evaluate $\int \cos x \sin^5 x dx$ 4 marks

b. (i) Evaluate $\int x^2 e^x dx$ 3 marks

(ii) Evaluate $\int \frac{7x+8}{(2x+5)(x+3)} dx$ 5 marks

c. The point on the curve $xy = 8$ from $y = 2$ to $y = 4$ is rotated about y -axis, find the volume generated. 3 marks

Question Four

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

(ii) Evaluate $\int \frac{dx}{x^2 + 9}$ 4 marks

(b) Find y in terms of x if $\frac{d^2y}{dx^2} = 6x - 4$, given that when $y = 0$, $x = 0$ and $\frac{dy}{dx} = 3$

4 Marks

(c) Find $\frac{dy}{dx}$ of the parametric equation if $y = \frac{t}{1+t^2}$ and $x = \frac{t^3}{1+t^2}$ 4 Marks

Question Five

a. Find the stationary point of the function below and determine the stationary value $f(x) = 4x^3 + 15x^2 - 18x + 7$ 6 marks

b. Evaluate $\int_1^2 \int_2^4 (x^2y) dx dy$ 5 marks

c. Evaluate $\int_1^2 (x^2 + 3x + 4) dx$ 4 marks

Question Six

a. A particle starts from rest at the origin and moves along the x-axis. The acceleration of the particle after time t is given by $\frac{d^2x}{dt^2} = 12t^2 - 60t + 32$ find an expression for x at time t . Hence find the times at which the particle again passes through the origin.

6 marks

b. Find $\frac{dy}{dx}$ if $y = \cos^{-1} \left(\frac{1-x}{1+x} \right)$ 6 marks

c. Differentiate $y = x^3$ with respect to x from the first principle. 3 marks