



ELIZADE UNIVERSITY

ILARA-MOKIN

ONDO STATE

FACULTY: Basic and Applied Sciences

DEPARTMENT: Physical and Chemical Sciences

SECOND SEMESTER EXAMINATIONS 2017/2018 ACADEMIC SESSION

COURSE CODE: AGP 206

COURSE TITLE: GEOMATHEMATICS

DURATION: 2: 30 minutes

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HOD's SIGNATURE

TOTAL MARKS: 60 MARKS

Matriculation Number: _____

INSTRUCTIONS:

1. Write your matriculation number in the space provided above and also on the cover page of the exam booklet.
2. This question paper consists of 2 pages including this page.
3. Attempt any three (3) questions.

1 (a) Determine the Fourier series for a periodic function

$$f(x) = \begin{cases} -5 & -\pi < x < 0 \\ +5 & 0 < x < \pi \end{cases}$$

(b) Sketch the following mathematical functions

$$(i) f(x) = \begin{cases} 1 & -2 \leq x \leq 1 \\ 2 & -1 \leq x \leq 0 \\ 3 & 0 < x < 2 \end{cases} \quad ; \quad (ii) f(x) = \begin{cases} 0 & x < -2 \\ -3 & -1/2 \leq x \leq 1/2 \\ 1 & x > 1 \end{cases}$$

20 Marks

2 (a) For a Legendre polynomial, $P_n(x)$; Evaluate the values for $P_2(x)$ and $P_3(x)$

(b) Sketch the graph of the equation $y = x^2 - 4x + 7$ i.e. for $-3 < x \leq 3$ and determine its

(i) vertex (ii) intercept at both x and y axes.

20 Marks

3 (a) Use the method of inverse to solve the following set of simultaneous linear equations:

$$\begin{aligned} x + 2y + z &= 4 \\ 3x - 4y - 2z &= 2 \\ 5x + 3y + 5z &= -1 \end{aligned}$$

(b) Find the solution using Laplace equation of spherical coordinate for a scalar potential field, U with single variable, r and independent of θ .

20 Marks

4 The relationship between the voltages applied to an electrical circuit and the current flowing is as shown

X (volt)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
Y(mA)	3.9	4.4	5.8	6.6	7.0	7.1	7.3	7.7

(a) Plot a scatter diagram of current, y , against amount of voltage, x .

(i) Calculate the equation of the least squares regression line of y on x

(ii) Estimate the current flow assuming a voltage of 3.8 volts is applied

(b) Determine the product moment correlation coefficient.

20 Marks

5 (a) Assuming $p = 3i + j - k$ and $q = i - 4j + 2k$ determine:

(i) $p \cdot q$ (ii) $p+q$ (iii) $|p+q|$ (iv) $|p|+|q|$

(b) Plot the following mathematical functions $f(x) = 2x^2 + 12x + 20$ and $f(x) = -3x^2 + 12x - 15$

20 Marks