The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Mathematics and Philosophy of Engineering

Study Programme	: Bachelor of Industrial Studies Honours (Agriculture)
Name of the Examination	: Final Examination
Course Code and Title	**: AGZ3538/AEZ3238 Mathematics for Agriculture**
Academic Year	: 2019/20
Date	:07th October 2019
Time	: ~~1330 – 1630~~ 9.30 – 12.30 hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Eight (8)** questions in **Seven** (7) pages.
3. Answer any **Six (6)** questions only. All questions carry equal marks.
4. Answer for each question should commence from a new page.
5. Relevant charts/ codes are provided.
6. This is a Closed Book Test (CBT).
7. Answers should be in clear handwriting.
8. Do not use Red colour pen.

Question 01

a) Given that $f(x) = 3x^4 + x^3 - 3x - 2020$, find $f(1)$ and $f(-1)$. [10 %]

b) Solve the following inequalities and represent the solutions on a number line.

i. $3x > 5x + 8$ [10%]

ii. $-\frac{3}{2}x + 20 \geq -4$ [10 %]

c) Simplify the following algebraic expressions.

i. $3a + 4b + ab - 5ab + 3b + 4a - 7a + 4ab$ [05 %]

ii. $2x^4 + 9x^2 + x - 5 - 6x^4 - 2x^2 + x + 15$ [10 %]

d) Find the quotient and the remainder of following expression.

$$\frac{2x^4 + 5x^2 - x + 5}{x - 2}$$

[15 %]

e) Solve the following equation.

$3(2x - 8) = 4x$ [10 %]

f) Solve the following system of linear equations.

$$x + y - z = 0$$
$$2x - 3y + z = 1$$
$$2x + y + 2z = 7$$

[30 %]

Question 02

a) Solve the following quadratic equations.

i. $x^2 + 14x + 33 = 0$, using completing the square method [10 %]

ii. $3x^2 - 18x + 24 = 0$ using factorizing method [10 %]

iii. $(x + 4)^2 = 2x - 17$, using the formula [15 %]

b) Prove that $x^2 - 4x + 12 = 2$ has no real roots. [25 %]

c) A stone is thrown from a bridge that crosses a river. The height of the stone from the water level of the river $(h(t))$ which depends on the time after the throwing (in seconds(t)), can be modeled as,

$$h(t) = -5t^2 + 10t + 15$$

i. What is the height of the stone from the water level of the river when it is thrown? [20 %]

ii. How many seconds does it take to hit the water? [20 %]