



**THE UNIVERSITY OF THE WEST INDIES
FIVE ISLANDS CAMPUS**

Semester II

Examinations of APRIL/MAY 2023

Course Code: ECON0101

Course Title: Preliminary Mathematics for Social Sciences

Date of Assessment: May 3, 2023

Time: 9:00 am

Duration: Two (2) Hours

INSTRUCTIONS TO CANDIDATES:

This paper has 4 pages and 5 questions.

YOU ARE REQUIRED TO ANSWER ALL 5 QUESTIONS.

THIS ASSESSMENT IS WORTH 60% OF YOUR FINAL GRADE.

ASSESSMENT DETAILS FROM INSTRUCTOR(S):

Answer all 5 questions. A silent non-programmable electronic calculator is permitted

Question 1

(a) Given $U = \{a, b, c, \dots, j\}$, $A = \{a, b, c, d\}$, $B = \{a, b, e, f\}$, $C = \{a, b, g, h, \}$.

(i) Draw a Venn diagram to represent the sets. [6]

(ii) Determine $(A \cap B)' \cup C$ [3]

(b) Students in a certain class do Mathematics, Accounting or Economics. The following list gives the breakdown of the numbers doing different combinations of subjects.

21 do Mathematics,
 19 do Accounting,
 20 do Economics,
 9 do Mathematics and Accounting,
 6 do Accounting and Economics
 7 do Mathematics and Economics,
 4 do all three
 6 do none of these.

(i) Draw a Venn diagram to represent the information. [6]

(ii) How many students are there in the class [2]

(c) List all the subsets of the set $A = \{p, q, r\}$ [3]

Question 2

(a) Simplify $\frac{6\frac{1}{3} + 1\frac{1}{2}}{5\frac{1}{2} - 3\frac{5}{6}}$ [3]

(b) Calculate $200(0.925)^3 - 0.000625$

(i) Exactly. [1]

(ii) Correct to 1 decimal places. [1]

(iii) Correct to 2 significant figures. [1]

(iv) In standard form [1]

(c) 9.4% of a sum of money is \$30.08. What is the sum of money? [2]

(d) Sharon invested \$45 000.00 in a fund that gives an interest rate of 6.34 % compounded annually. What would be the value of this investment in 10 years? [3]

- (e) The value of a vehicle is expected to depreciate by 8.45 % yearly. If a car is presently valued at \$60 000.00, what will be its value in 6years? [3]
- (f) If TT\$ 1.00 = EC\$0.52, and BDS\$1.00 = EC\$1.35, Convert TT\$600 to BDS\$. [2]
- (g) A company has to divide its annual profit among 3 share- holders A, B and C in the ratio 2 : 3 : 5 respectively. If C got \$ 12 000.00 more than A, determine the amount of profit the company made. [3]

Question 3

(a) Simplify the following:

(i) $7y - 5(3y - z) - 2(-y - 4b)$ [3]

(ii) $\frac{r-2}{4} - \frac{3r-7}{5}$ [3]

(iii) $(7s - 2)(2s - 3)$ [3]

(b) Factorise the following completely:

(i) $a^2b - ab^2$ [2]

(ii) $x^2 - 2x - 5x + 10$ [3]

(iii) $2x^2 - 9x - 5$ [3]

(iv) $4p^2 - 100$ [3]

Question 4

(a) Solve the following equations.

(i) $\frac{2x-1}{5} - \frac{x-3}{3} = 2\frac{1}{2}$ [3]

(ii) $3x^2 + 5x - 2 = 0$ by factorization [4]

(iii) $x^2 + 10x = 400$ by using the quadratic formula (to 2 decimal places). [5]

(b) If $f(x) = 5x - 4$, $g(x) = 3x + 2$ & $h(x) = \frac{2x+1}{3x+2}$
Determine and simplify:

(i) $f(g(2))$ [1]

(ii) $h(g(x))$ [3]

(iii) $h^{-1}(x)$ [4]

Question 5

(a) Write the following system of linear equations in matrix form: [3]

$$\begin{aligned} 5x + 2y &= -3 \\ 3x - y &= 7 \end{aligned}$$

(b) Solve the system in (a) above using Cramer's Rule. [5]

(c) Find the equation of the line segment that connects A(2, 3) and B(6, 13). [3]

(d) Find the equation of the perpendicular bisector of the line segment AB
in (a) above. [3]

(e) The Inverse Supply function for a commodity is given by $p = q^2 + 200$. The Inverse Demand function is given by $p = 1400 - 40q$. Given that p represents the unit price of the commodity and q represents quantity. Determine:

(i) The equilibrium quantity. [4]

(ii) The equilibrium price. [2]

END OF QUESTION PAPER