

The Open University of Sri Lanka
 Department of Mathematics
 Advanced Certificate in Laboratory Technology Programme
 ADC2206 - Mathematics for Laboratory Technology
 Final Examination 2025/2026



Duration: Two Hours

Date: 20/09/2025

Time: 9.30 a.m. – 11.30 a.m.

Instructions:

- Answer **Four (04)** Questions Only.
- There are two sections: PART A and PART B.
- Answer **TWO** Questions from **each** section.
- A total maximum mark obtainable is 100.

PART – A

Q1) a) Simplify each of the following expressions. Show the steps clearly.

i) $(5 - \sqrt{9}) \times (4^2 - 8 + 6) \div 2^2$

ii) $(2 \times 5^2 \div 5) - (16 - 14)^3$

(05 marks)

b) i) Solve the following equation for x .

$$2 \log x = \log 4 + \log(x - 1)$$

ii) If $a = 16$, $b = 2$, and $c = 3$, then show that

$$\ln a - 3 \ln b + 2 \ln c = \ln 18.$$

(10 marks)

c) Consider the Figure 1 and assume that $AC = 12 \text{ m}$, $\hat{ACB} = 30^\circ$ and $\hat{ABC} = 90^\circ$.

Find AB , BC and the perimeter of the triangle ABC .

(10 marks)

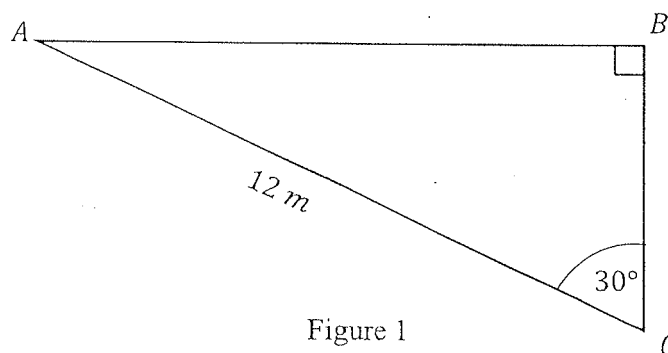


Figure 1

Q2) a) Consider the quadratic function $y = x^2 - 8x + 15$. (10 marks)

i) Find the roots of the function.

ii) Express the function in completed square form and sketch the graph of y as a function of x .

b) Expand $(1 - x)^3$ using the binomial theorem. (10 marks)

c) Solve the following equation. (05 marks)

$$\frac{x+1}{3} + \frac{3-2x}{4} + x = -1.$$

Q3) a) Let A, B and C are 2×2 matrices given below, where a, b and c are scalar constants.

$$A = \begin{pmatrix} a & 3 \\ 4 & 6 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 4 \\ b & 5 \end{pmatrix} \quad C = \begin{pmatrix} 1 & c \\ 2 & 8 \end{pmatrix}$$

i) If $3A - 2B = C$, then find the values of a, b and c .

ii) By substituting the values obtained in part (i), find A^{-1} and C^T .

(15 marks)

b) Four pens and three pencils cost Rs. 230. Two pens and five pencils cost Rs. 220. Find the cost of a pen and a pencil by solving simultaneous equations.

(05 marks)

c) A committee of 10 persons is to be constituted from a group of 8 men and 5 women.

In how many ways a committee of 6 men and 4 women can be formed?

(05 marks)

PART - B

Q4) The following marks (out of 50) were obtained by 20 students in a Mathematics test.

12, 15, 28, 19, 25, 33, 40, 37, 29, 31, 14, 18, 26, 21, 35, 27, 24, 39, 20, 16

- a) Prepare the frequency distribution table by taking the class intervals as $(10 - 15), (15 - 20), \dots, (40 - 45)$. (05 marks)
- b) Based on the distribution in part a), draw;
- the histogram, and (05 marks)
 - the frequency polygon on the same graph. (05 marks)
- c) Draw the increasing cumulative frequency curve. (10 marks)

Q5) The grouped frequency distribution illustrated in the Table 1 represents a sample of ages of 40 randomly selected members of a sports club.

Table 1

Ages (years)	Frequency
10 - 15	6
15 - 20	8
20 - 25	10
25 - 30	8
30 - 35	6
35 - 40	2

Considering the grouped frequency distribution, find;

- the mean, (10 marks)
- the median, (10 marks)
- If the standard deviation is 12, find the coefficient of variation. (05 marks)

- Q6) (a) The following are the daily ozone concentration levels (in ppm) measured over 15 days:

14, 12, 10, 7, 9, 8, 10, 6, 12, 11, 13, 9, 8, 14, 7

Calculate the;

- i) Inter quartile range,
 - ii) Quartile deviation. (10 marks)
- (b) In a school of 100 students, each student plays at least one of the three games; Hockey, Basketball, and Volleyball. 40 students play Hockey. 50 play Basketball and 45 play Volleyball. 15 students play both Hockey and Basketball. 18 play both Hockey and Volleyball. 20 play both Basketball and Volleyball. How many students play all three games? (10 marks)
- (c) In a class of 40 students, 10 enrolled for both Science and History. 22 enrolled for History. If every student in the class enrolled for at least one of the two subjects, how many students enrolled only for Science? (05 marks)

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