Cork College of FET
Cork's Further Education & Training Service
TRAMORE ROAD CAMPUS
A Pathway for Every Learner

Component: Mathematics 5N1833 – Trial Paper

Month: 2024

Course(s):

AA [Applied Science: Laboratory Techniques]

AB [Applied Biology: Food Health & Nutrition]

Extra Maths

Total Marks: 800marks

Weighting: 40%

Time Allowed: 2 Hours

Instructions to candidates:

SECTION A

10 SHORT QUESTIONS IN THIS SECTION

Answer all 10 questions. Each question is worth 40 marks.

Total for this section is 400 marks

 SECTION B

2 structured answer questions in this section

Answer all questions. Each question is worth 100 marks.

Total for this section is 200 marks

 SECTION C

2 structured answer questions in this section

Answer all questions. Each question is worth 100 marks.

Total for this section is 200 marks

In this Examination calculators may be use and Log Table will be provided
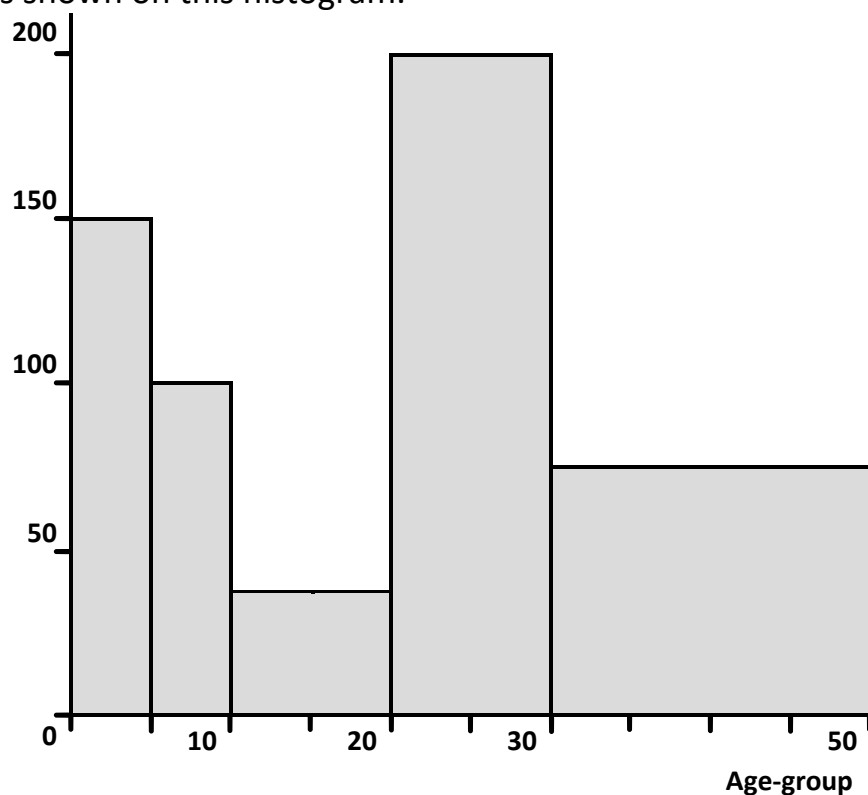
Section A (400 Marks)
10 short questions.
Answer **ALL** 10
40 marks each

1.   Determine the equation of a line in the form $y = mx + c$ **40 marks**
if the points (1,2) and (3,4) are on the line

2.   The age distribution of a group of people who wear glasses
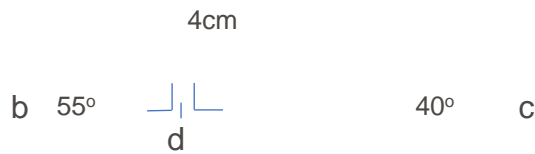is shown on this histogram.

If there are 200 people in the $20 - 30$ age-group, find
(i)   The number of people in the $30 - 50$ age group   **20 marks**
(ii)   The total number of people who wear glasses   **20 marks**

3.   How many different 3-digit numbers can be formed from
the digits 1, 2, 3, 4
(i)   If no digit is repeated in the number?   **20 marks**
(ii)   How many of these begin with 3?   **20 marks**

4.

4cm

b 55° ⌐|⌐ 40° c

d
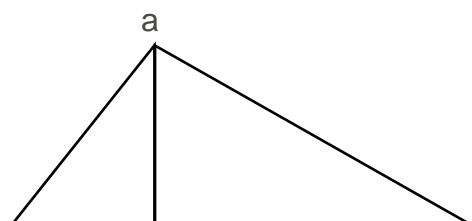
In the given triangle abc, ad ⊥ bc.
If |ad| = 4cm, |∠abd| = 55° and |∠acd| = 40°,

(i)   Find |bc| to 1 decimal place **20 marks**
(ii) Find |ac| to 1 decimal place **20 marks**

5. Using differentiation, calculate the slope of the tangent to **40 marks**
the curve

$$y = 2x^3 - x^2 + 5 \text{ at } x = 3$$

6. If $f(x) = \dfrac{x-1}{4}$

(i)   Find $f(6)$ **20 marks**
(ii) Find $f^{-1}(3)$ **20 marks**

7. If $y = 2sinx + 2e^{4x}$, find the derivative $\dfrac{dy}{dx}$ **40 marks**

8. Evaluate $\int(3x^3 - cos2x + e^{4x})dx$ **40 marks**

9. If $w = 3 - 5i$ and $z = 4 + 6i$ evaluate the following:

(i) $z - 3w$ **20 marks**

(ii) $\dfrac{z}{2w}$ **20 marks**

10. Calculate the size of the angle at vertex A (angle CAB) in **40 marks**
the triangle below. Give your answer correct to one
decimal place, if necessary.

A

AB = 8

AC = 6

B

C

BC = 7
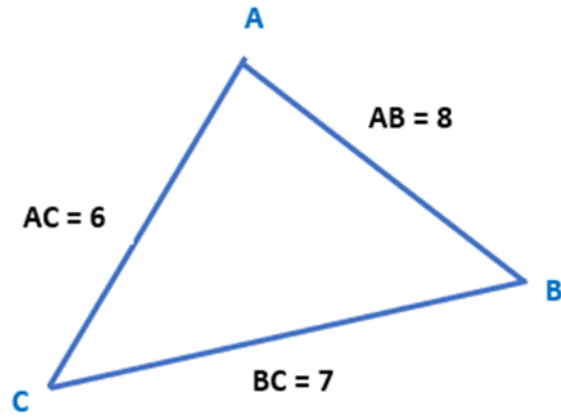
Section B (200 Marks)
2 Structured Questions.

Answer ALL questions
100 marks each

1. (a) The equation of the line l is $y = 5x + 2$

    (i) Find the slope of a line perpendicular to line l **10 marks**

    (ii) Find the equation of the line m perpendicular to line l and which passes through the point (-2, 1)   **10 marks**

(b) Draw a graph of $f(x) = x^3 + 3x^2 - 4x + 2$ **30 marks**
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in the domain $\{-3 \ll x \ll 2\}, x \in R$

Use the graph to write down the following

    (i) Roots of the equation $f(x) = 0$ **10 marks**

    (ii) Find the coordinates of the local minimum point.   **10 marks**

    (iii) Find the coordinates of the local maximum point.   **10 marks**

    (iv) The domain of values of x for which $f(x)$ is negative   **10 marks**

    (v) The domain of values of x for which $f(x)$ is negative and increasing.   **10 marks**

2. (a)

(i) Explain in your own words what is meant by the term 'mode' in relation to statistics?   **10 marks**

(ii) Complete the cumulative frequency table below from the given grouped frequency distribution table.

Length in mm (x)	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Frequency (f)	4	8	10	12	11	6	4

Length in mm (x)	≤5	≤10	≤15	≤20	≤25	≤30	≤35
Frequency (f)	2						

10 marks

Using the cumulative frequency table above, draw the cumulative frequency curve(ogive) on graph paper and use your graph to provide answers for the following: **10 marks**

(iii) Interquartile range   **10 marks**

(iv) Median   **10 marks**

(b) A card is selected at random from a pack of 52 and then replaced. A second card is then selected. What is the probability that

(i) The first card is a heart   **10 marks**

(ii) Both cards are hearts   **10 marks**

(iii) The first card is red and the second card is black   **10 marks**

(iv) The first card is a queen and the second card is black   **10 marks**

(v) Neither card is a heart   **10 marks**

Section C (200 Marks)
2 structured questions. Answer ALL 2.
100 marks each

3. **(a)** Differentiate with respect to x

$$y = \frac{2x^2 - 2x + 5}{x - 3}$$

30 marks

(b) Using integration, find the area bound by the curve $y = 2x^2 - 2x + 3$ the x $axis$ and the lines $x = 2$ and $x = 4$

30 marks

(c) Find the turning points of the curve $y = \frac{x^3}{3} + \frac{x^2}{2} - 2x$ and determine if they are minimum or maximum turning points

40 marks

4. **(a)** Solve for x and y in the following equation

$2(x + yi) = 4(2 + 3i) - 2(1 - 2i)$

30 marks

(b) Evaluate i^8

20 marks

(c) Solve the complex equation $z^2 - 5z + 15 = 0$
Write your answers in the form a+bi

50 marks