AN ROINN OIDEACHAIS M.46(a)

INTERMEDIATE CERTIFICATE EXAMINATION, 1984

MATHEMATICS - LOWER COURSE - PAPER II (150 marks)

WEDNESDAY, 13 JUNE - MORNING, 9.30 to 12.00

Examination Number

SECTION A (45 marks)

Attempt all questions. You should not spend more than 45 minutes on this section.
Answer each question by writing one of (a), (b), (c), (d) in the box under each question number.
If you wish to change an answer, cross out your first choice and write your new answer near the box.
Mathematical tables may be obtained from the Superintendent.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. 0·75 as a percentage of 5 is

(a) 3% (b) 75% (c) 3·75% (d) 15%

2. 1111_2 is x_{10} then x is

(a) 4 (b) 15 (c) 16 (d) 17

3. $\frac{22 + 2{\cdot}2}{1{\cdot}1}$ is

(a) 4·2 (b) 22 (c) 22·2 (d) 24

4. $36 \div (6 - 2) + 5$ is

(a) 1·8 (b) 4 (c) 14 (d) 45

5. The Lowest Common Multiple of 3, 5 and 7 is

(a) 1 (b) 21 (c) 35 (d) 105

6. $(2 - 3) - (4 - 5)$ is

(a) $2 - (3 - 4 - 5)$ (b) $(2 - 3 - 4) - 5$

(c) $(2 - 3) + (5 - 4)$ (d) $(2 - 5) + (3 - 4)$

7. The mean of 0, 0, 1, 3 is

(a) 2 (b) $\frac{4}{3}$ (c) 1 (d) 4

8. $(x - 3)(x + 7)$ is

(a) $x^2 - 4x - 21$ (b) $x^2 + 4x + 21$

(c) $x^2 + 4x - 21$ (d) $x^2 - 4x + 21$

OVER →

9. $\frac{x^2 - 16}{x - 4} =$

☐ (a) $x + 4$ (b) $x^2 - 12$ (c) $x - 4$ (d) $x - 12$

10. Two thirds of a number is $\frac{1}{3}$. The number is

☐ (a) 2 (b) $\frac{9}{2}$ (c) $\frac{3}{4}$ (d) $\frac{1}{2}$

11. $\frac{a^3 \times a^5}{a^8} =$

☐ (a) 0 (b) 1 (c) a (d) $\frac{15}{8}$

12. The nth term of a sequence is $\frac{2}{3n}$. The 4th term is

☐ (a) $\frac{8}{3n}$ (b) $\frac{2}{12n}$ (c) $\frac{1}{6}$ (d) 6

13. Which of the following relations is a function ?

☐ (a) $\{(3, 3), (5, 3), (5, 1)\}$
(b) $\{(1, 3), (2, 3), (3, 4)\}$
(c) $\{(3, 2), (4, 3), (3, 4)\}$
(d) $\{(2, 3), (3, 4), (2, 5)\}$

14. If $A = \{3, 4, 5, 6\}$ and $A/B = \{3, 5\}$ then $A \cap B$ is

☐ (a) $\{4, 6\}$ (b) $\{4\}$ (c) $\{3, 5\}$ (d) $\{3, 4, 5, 6\}$

15. $3(x - 2) > 2(2x + 1)$ implies

☐ (a) $x < -8$ (b) $x > 8$ (c) $x < 8$ (d) $x > -8$

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SECTION B (105 marks)

Attempt **QUESTION 1** (30 marks) and **THREE** other questions (25 marks each)

Marks may be lost if all your work is not clearly shown

1. (a) A telephone bill, (with some items not filled in) is shown:

	IR£
Arrears	10·00
Rental	
845 unit calls at 9·6p each	
Operator assisted calls	8·18
Total	122·49

Calculate the cost of (i) the 845 unit calls,
(ii) rental.

(b) Calculate the compound interest on IR£1200 for two years at 15% per annum.

2. (a) Solve $5(x - 2) - 3(x + 4) = 8$.

(b) Find the value of x and the value of y if

$$3x - y = 6$$
$$x - 7y = 12.$$

(c) Express as a single fraction

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

(d) Find the remainder when

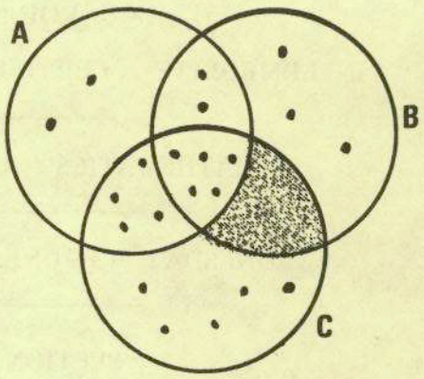
$$(6x^2 + x - 11) \div (3x - 4).$$

3. (a) Factorise (i) $2pq - ps + 6rq - 3rs$.
(ii) $3x^2 - x - 4$.
(iii) $4x^2 - (x - 1)^2$.

(b) The middle child in a family of three children is a year younger than the eldest and three and a half years older than the youngest. If their ages sum to 28 years, find the age of each child.

OVER →

4. The Venn diagram, opposite, shows the elements in the sets A, B and C.



State the value of

(i) # (A ∪ B ∪ C).
(ii) # ((A ∩ B) ∪ C).
(iii) # (C \ (A ∪ B)).
(iv) # ((A \ B) \ C).

Substitute one of ∪, ∩, \ for each question mark, so that,

((B ? C) ? A) = 0.

5. Complete the following table and draw a graph of the function

$$f : x \to x^2 - 3x + 2$$

in the domain $-2 \leqslant x \leqslant 5$, $x \in \mathbf{R}$.

x	−2	−1	0	1	2	3	4	5
$f(x)$			2					12

From the graph, estimate

(i) the minimum value of $f(x)$
(ii) the value of $f(-0{\cdot}9)$
(iii) the values of x for which $f(x) = 4$
(iv) the range of values of $f(x)$ when $0 \leqslant x \leqslant 3$.

Draw in the axis of symmetry of the graph.

6. A bus began its journey at stop 1 and ended at stop 5. The following table shows the number of people who got on and who got off at each stop:

STOP	1	2	3	4	5
got on	13	2	7	8	0
got off	0	4	3	?	18

(i) Find the number of passengers who got off at stop 4.
(ii) Draw a bar chart to illustrate the number of passengers who got off at each stop.
(iii) Draw a bar chart to illustrate the number of people who got on at each stop.
(iv) Explain why 1 of the passengers who got off at stop 5 must have travelled from the beginning.
(v) Find the maximum number of passengers that could have completed the whole journey.

7. The distance between Dublin and Portlaoise is d km. Portlaoise to Limerick and Limerick to Tralee are each twice this distance apart. If the journey from Dublin to Tralee is 320 km, calculate d.

The journey from Dublin to Tralee was travelled at a steady speed of x km per hour and the travelling time was $5\frac{1}{2}$ hours, calculate x correct to the nearest km.