AN ROINN OIDEACHAIS M.46(a)

INTERMEDIATE CERTIFICATE EXAMINATION, 1986

MATHEMATICS - LOWER COURSE - PAPER II (150 marks)

MONDAY, 16 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. $12\frac{1}{2}\%$ expressed as a fraction is

(a) $\frac{1}{4}$	(b) $\frac{1}{8}$	(c) $\frac{25}{2}$	(d) $\frac{2}{25}$

2. $\frac{3}{4} \div \frac{5}{8}$ is

(a) $\frac{3}{5}$	(b) $\frac{6}{5}$	(c) $\frac{24}{5}$	(d) 6

3. $101_2 + 101_2$ is

(a) 202_2	(b) 2020_2	(c) 110_2	(d) 1010_2

4. $29{\cdot}84 \times 12 =$

(a) 358·08	(b) 348·08	(c) 257·96	(d) 357·96

5. The greatest number among the following is

(a) 0·9	(b) 0·92	(c) 0·919	(d) 0·9191

6. If the mean of $-1, 0, 1, x$ is 3, then x is

(a) 9	(b) 12	(c) 1	(d) -1

7. If $A \cap B = \{p\}$, which one of the following is possible ?

(a) $A = \{\ \}$	(b) $B = \{\ \}$	(c) $A = B$	(d) $A \cup B = \{\ \}$

8. $\frac{(2x)^2}{4} =$

(a) $\frac{x^2}{2}$	(b) $\frac{x^2}{4}$	(c) $4x^2$	(d) x^2

OVER →

9. $\frac{x^3y^4}{x^4} =$

☐ (a) x^2y (b) $\frac{y^4}{x}$ (c) x^3 (d) y^3

10. If $4 : 6 = 2 : y$, then y is

☐ (a) 2 (b) 3 (c) 6 (d) $\frac{4}{12}$

11. The nth term of a sequence is $2n^2 + 1$. Then 19 is the

☐ (a) 7th term (b) 5th term (c) 3rd term (d) 1st term

12. The domain of a relation R : $\{(3, 4), (1, 4), (3, 2), (2, 5)\}$ is

☐ (a) $\{1, 2, 3, 4\}$ (b) $\{2, 4, 5\}$ (c) $\{7, 5\}$ (d) $\{1, 2, 3\}$

13. $x - 3$ is a factor of $x^2 - 7x + 12$. The other factor is

☐ (a) $4 - x$ (b) $x + 4$ (c) $x + 3$ (d) $x - 4$

14. The Lowest Common Multiple of 3, x, 7 is 21. Then x cannot be

☐ (a) 1 (b) 2 (c) 3 (d) 7

15. $2 - x < 6 + 3x \Rightarrow$

☐ (a) $x = -1$ (b) $x < -1$ (c) $x > -1$ (d) $x > 1$

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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) Calculate the Compound Interest on IR£2700 for 2 years at 12% per annum.

   (b) A bicycle is obtained by paying a deposit of IR£20·00 followed by 35 weekly instalments of IR£2·20 each.

   (i) How much is paid altogether for the bicycle ?

   (ii) By how much does this exceed the cash price of IR£90 marked on the bicycle ?
   Express this difference as a percentage of IR£90, giving the answer correct to the nearest percent.

2. (a) Find the value of x and the value of y if

$$4x + 5y = 30$$
$$3x - 2y = 11.$$

   (b) Express $\dfrac{1}{x-1} - \dfrac{1}{x+1}$ as a single fraction.

   Find its value, if $x^2 - 1 = 1$.

3. (a) Factorise (i) $2ab - 2cd + bc - 4ad$

   (ii) $3x^2 - 4x - 4$

   (iii) $4a^2 - 1$.

   (b) Two apples and four pears cost IR£1·16.
   Six apples and three pears cost IR£1·59.
   Using algebraic equations only, find the cost of an apple and the cost of a pear.

4. A and B are two sets. There are 5 elements in A and 4 elements in B.
Draw Venn diagrams, using dots for elements, to show the following:

   (i) $\#(A \cap B) = 3$

   (ii) $\#(A \backslash B) = 3$

   (iii) $\#(A \cup B) = 8$

   (iv) $\#(A \cup B)$ is a maximum

   (v) $\#(A \cup B)$ is a minimum.

OVER →

5. Graph the function

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

in the domain $-2 \leqslant x \leqslant 4$ for $x \in \mathbf{R}$.

Using the graph, estimate the value(s) of

(i) $f(-1{\cdot}8)$

(ii) x when $f(x) = 8$

(iii) x when $f(3) - f(1) = f(4) - f(x)$.

Are there any values of x for which $f(x) = 0$?
If there are such values, state them and if there are no such values, say why this is so.

6. A weather station registered the following local rainfall in mm per month:

Month	May	June	July	Aug.	Sept.	Oct.	Nov.
Rainfall in mm	31	40	32	40	82	84	160

(i) Represent the data by a bar chart.

(ii) Calculate the average rainfall per month.

(iii) The readings taken during November were

1st - 10th	32·6
11th - 20th	67·4
21st - 30th	x

Find x.

(iv) The June rainfall at the station was 80% of the national average for that month. What was the national average rainfall for June ?

(v) The average rainfall from April to November inclusive was 64 mm. Find the rainfall in April.

7. There is a fixed charge for each local telephone call. The charge for long distance calls is not fixed.

A person made 110 local calls and 3 long distance calls A, B and C.
Call A cost the same as 23 local calls.
Call B cost the same as 7 local calls and
call C cost as much as A and B together.
The bill came to IR£51·19, which included rental of IR£33·00.
Find the cost in pence of a local call.