AN ROINN OIDEACHAIS M.46(a)

INTERMEDIATE CERTIFICATE EXAMINATION, 1981

MATHEMATICS - LOWER COURSE - PAPER II (150 marks)

MONDAY, 15 JUNE - MORNING 9.30 to 12.

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. The set of divisors of 6 is

(a) $\{2, 3\}$ (b) $\{1, 2, 3\}$ (c) $\{1, 2, 3, 4\}$ (d) $\{1, 2, 3, 6\}$

2. $\frac{10 - (5 \times 8)}{10}$ is

(a) -39 (b) -40 (c) -3 (d) 3

3. Which of the following is nearest to $\sqrt{0{\cdot}4}$?

(a) 0·6 (b) 0·7 (c) 0·2 (d) 0·02

4. 0·875 is equal to

(a) $\frac{8}{7}$ (b) $\frac{875}{100}$ (c) $\frac{7}{80}$ (d) $\frac{7}{8}$

5. The mean of 3, 4, 7, 7, 7, 7, 28 is

(a) 7 (b) 9 (c) 63 (d) 8

6. $x\%$ of Ir£10 is Ir£15. x is

(a) 75 (b) 150 (c) $66\frac{2}{3}$ (d) 5

7. $\frac{1}{5}$ of $\frac{3}{5}$ is

(a) $\frac{4}{10}$ (b) 3 (c) $\frac{3}{25}$ (d) $\frac{4}{5}$

8. The 100th term of a sequence is 1·01. The nth term could be

☐ (a) $n + \frac{1}{n}$ (b) $n - \frac{1}{n}$ (c) $\frac{n-1}{n}$ (d) $\frac{n+1}{n}$

9. $10^7 \times 10^{-2}$ is equal to 10^y. y is

☐ (a) -14 (b) -5 (c) 5 (d) 14

10. How many natural numbers are greater than 1010_2 but less than 1111_2 ?

☐ (a) 4 (b) 3 (c) 2 (d) 5

11. $A = \{1, 2, 3\}$, $B = \{1, 2\}$. Then $A \backslash B \cap A$ is

☐ (a) $\{3\}$ (b) null set (c) $\{1, 2\}$ (d) $\{1, 2, 3\}$

12. If $11^2 = a \times 10^2$, then a is

☐ (a) 121 (b) 12·1 (c) 0·121 (d) 1·21

13. If $f(x) = 7 - x^2$, then $f(-3)$ is

☐ (a) -2 (b) 16 (c) 2 (d) 13

14. If $3x = \frac{1}{3x}$, then x can be

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

15. $3(x + 1) > 4x \Rightarrow$

☐ (a) $x > 3$ (b) $x > -3$ (c) $x = 3$ (d) $x < 3$

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SECTION B (105 marks)

Attempt **QUESTION 1** and **THREE** other questions

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

1. (a) In how many years will Ir£600 earn a simple interest of Ir£144 at 8% per annum ?

   (b) In a coinbox collection there were 497 fiftypenny pieces, 12001 tenpenny pieces, 1760 pennies and 760 halfpennies.
   Find the total amount collected.
   Ir£22·05 was spent on collectors' refreshments. What percentage of the total was this ?

(25 marks)

2. (a) Remove the brackets and simplify

$$3(1 - x - 2x^2) - 3(1 - x + 2x^2).$$

   (b) Divide $x^3 - 4x^2 + 2x - 8$ by $x - 4$.

   (c) When 5 is added to two times a number, the answer is 4.
   Write this as a number sentence and then find the number.

(20 marks)

3. (a) If $x = -\frac{1}{2}$ and $y = \frac{1}{4}$, express

$$x^2 - 3x^2y + y^2$$

   in the form $\frac{a}{b}$ where $a, b \in \mathbf{N}$.

   (b) Factorise $3x^2 - 7x + 2$

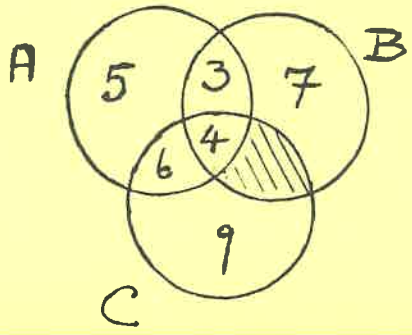
   (c) Solve for x

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

(20 marks)

4. The diagram shows the numbers of pupils in a class including boys and girls, playing the games A, B, C.
   How many pupils play
   (i) game A only
   (ii) game A and B but not C
   (iii) two games only ?

   If no girl in the class plays game A and more boys than girls play game B, find the greatest possible number of girls
   (iv) that could play game B
   (v) that could be in the class.



5. Graph the function $x \to 1 + 5x - x^2$ in the domain $0 \leqslant x \leqslant 5$, $x \in \mathbf{R}$.
Using the graph, or otherwise, estimate

(i) $f(1{\cdot}4)$

(ii) the two values of x for which $f(x) = 3{\cdot}6$

(iii) the greatest value of $f(x)$

(iv) the area of the largest possible triangle $a\,b\,c$ where a, b and c are points of the graph and ab is parallel to the x-axis.

(25 marks)

6. The ages of all the children in a swimming club are classified as follows

Age	5 – 7	7 – 9	9 – 11	11 – 14
Children	8	9	3	10

where 5 – 7 is taken to mean 5 years or older, but not yet 7, etc.

(i) What is the model age group ?

(ii) How many children in the club ?

(iii) How many children are nine years or older ?

(iv) What is the greatest possible number of five year old children in the club ?

(v) Illustrate the data in the above table by a pie chart.

(25 marks)

7. A car does 6 km per litre of petrol in city traffic and does 9 km per litre of petrol on the open road.

(i) Find how many litres of petrol are used in a journey of 15 km in city traffic and 30 km on the open road.

(ii) A journey consists of x km in city traffic and $2x$ km on the open road. If $4\frac{2}{3}$ litres of petrol are used for this journey, calculate x.

(30 marks)