AN ROINN OIDEACHAIS M.46(a)

# INTERMEDIATE CERTIFICATE EXAMINATION, 1979

## MATHEMATICS - LOWER COURSE - PAPER II (150 marks)

WEDNESDAY, 13 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 highest common factor of 90, 180, 300 is

(a) 30 (b) 10 (c) 45 (d) 900

2. $1\frac{3}{5} \div \frac{4}{15}$ is

(a) $\frac{1}{6}$ (b) $\frac{32}{75}$ (c) $3\frac{1}{4}$ (d) 6

3. The largest number to the base ten of the following is

(a) $20_{\text{eight}}$ (b) $23_{\text{seven}}$ (c) $24_{\text{six}}$ (d) $31_{\text{five}}$

4. 0·0175 is equal to $1{\cdot}75 \times 10^n$.
Then $n$ is

(a) 1 (b) $-1$ (c) 2 (d) $-2$

5. An article is sold for £90 at $12\frac{1}{2}\%$ profit.
The cost price was

(a) £80 (b) £78·75 (c) £77·50 (d) £101·25

6. Mary is three years younger than Sean. In five years time their ages will total 23 years.
Sean's present age is

(a) 5 (b) 6 (c) 8 (d) 15

7. If $A$, $B$, $C$ are equal sets, then $A \cup (B \cup C)$ is

(a) $A \setminus B$ (b) $A \setminus (B \cup C)$ (c) $C \setminus B$ (d) $A$

OVER →

8. $(y - 3)$ is a factor of

(a) $y^2 + 2y - 3$ (b) $y^2 - 2y - 3$

(c) $y^2 + 5y + 6$ (d) $y^2 + y - 6$

9. The 10th term of a sequence is 10·1. Then the $n$th term could be

(a) $\frac{n^2 - 1}{n}$ (b) $\frac{n^2 + 1}{n}$ (c) $\frac{n - 1}{n^2}$ (d) $\frac{n + 1}{n^2}$

10. $4p^4q = 8p^8$ means $q$ is

(a) $2p^2$ (b) $4p^4$ (c) $2p^4$ (d) $4p^2$

11. The mean of two numbers is less than 4. One number is 5. The other number cannot be

(a) 0 (b) 1 (c) 2 (d) 3

12. When $(2x - 3)$ is multiplied by one of the following, the answer is $6x^2 - 5x - 6$. Which one ?

(a) $3x + 2$ (b) $3x - 2$ (c) $3x + 3$ (d) $2x + 2$

13. The function $f$ has as domain $\{-1, 0, 1\}$ and the range is $\{1, 2\}$. $f(x)$ could be

(a) $x^2 - 1$ (b) $x^2 + 1$ (c) $2x^2 - 1$ (d) $2x^2 + 1$

14. $\frac{1}{2x - 1} - \frac{1}{2x + 1}$ is

(a) 0 (b) 2 (c) $\frac{2}{4x^2 - 1}$ (d) $\frac{4x}{4x^2 - 1}$

15. If $x < y$, which one of the following is <u>false</u> ?

(a) $-x < -y$ (b) $-y < -x$

(c) $\frac{1}{y} < \frac{1}{x}$ (d) $x - y < 0$ .

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**SECTION B (105 marks)**

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

1. (a) Find the simple interest on £2,750 for 4 years at 11% per annum.

   (b) A shopkeeper bought

   30 boxes of apples at £3.00 a box
   24 crates of eggs at £3.75 a crate
   £80 worth of grapes

   The apples were all sold at a profit of 20%.
   The eggs were all sold at a loss of 5%.
   If the overall profit was 15%.
   Find (i) the selling price of the grapes
   (ii) the profit per cent on the grapes to the nearest per cent.

(25 marks)

2. (a) Simplify $3y - [3y - (3y - 3)]$

   (b) Divide $(2y^2 + 11y - 15)$ by $(y + 3)$

   (c) Find the couple $(x, y)$ which satisfies both the equations

$$5x + 3y = 11$$
$$5 - 2x = y$$

   and verify the answer

(20 marks)

3. (a) There are $x$ tourists from three countries in a hotel. Half of them are German, one third are French and the eight remaining are Irish. Write this information in an equation in $x$.

   (b) Factorise

   (i) $pm - qm - pn + qn$

   (ii) $7x^2 - 53x + 28$

(20 marks)

OVER →

4. (a) If $x \in R$ solve $2(x - 1) < 3(x + 1)$.
Graph the solution set on the number line.

(b) While coming to school, a set $C$ of pupils in a particular class use a car. A set $B$ from the same class use a bus. The rest of the class walk to school. If

$$\# (C) = 17$$
$$\# (C \cap B) = 7$$
$$\# (B) = 18$$

how many pupils in the class (i) use a car only
(ii) use a bus only, to come to school ?

If $\# (C \cup B)^1 = 12$, how many pupils are in the class ?

(25 marks)

5. Graph the function $f : x \to x^2 + x - 2$ in the domain $-3 \leqslant x \leqslant 3$.

Find from your graph

(i) the smallest value of $f(x)$,

(ii) the range of values of $x$ for which $f(x) \leqslant 0$,

(iii) the values of $x$ for which $f(x) = 2$.

(25 marks)

6. The table below shows the number of workers who missed exactly no day, one day only, two days only etc., in a factory during four weeks. The factory operates a five day week.

| No. of days missed | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| No. of workers | 10 | 14 | 13 | 8 | 4 | 1 |

(i) Represent this data on a bar chart.

(ii) Find the mean number of days missed by the workers.

(iii) Were <u>all</u> workers absent on any day ? Give a reason for your answer.

(iv) What is the greatest possible number of days when all workers were present ?

(25 marks)

7. During the month of May a salesman sold $y$ tables at £$x$ each.
In June when the price per table increased by £20, he sold 12 tables less. If his June income is greater than his income in May from the sale of tables, write down an inequality in $x$ and $y$.

If £90 was the price of a table in May, find the least number of tables he should sell in <u>May</u> so that his June income is the greater.

(30 marks)