AN ROINN OIDEACHAIS M.46(a)

INTERMEDIATE CERTIFICATE EXAMINATION 1978

MATHEMATICS - LOWER COURSE - PAPER II (150 marks)

TUESDAY, 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.
Mathematics tables may be obtained from the Superintendent.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. The number 6·666 is

(a) a natural number (b) rational (c) an integer (d) a negative integer.

2. $10_{two} + 10_{three} + 10_{four}$ is equal to

(a) 30_{nine} (b) 10_{nine} (c) 10_{four} (d) 39_{ten}

3. $3{\cdot}6 \times 10^3 + 1{\cdot}9 \times 10^4$ equals

(a) $5{\cdot}5 \times 10^7$ (b) $2{\cdot}26 \times 10^4$ (c) $5{\cdot}5 \times 10^4$ (d) 5·5

4. $16\frac{1}{2}\%$ of £400 is

(a) £4 (b) £16·50 (c) £1,650 (d) £66

5. The mean of three numbers is 4. Two of the numbers are 1 and 2. Then the third is

(a) 3 (b) 4 (c) 9 (d) 12

6. The nth term of a sequence is $\frac{1}{2^n}$. Then $\frac{1}{32}$ is the

(a) 5th term (b) 6th term (c) 16th term (d) 30th term

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

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

OVER →

8. $5 - (4 - 3) - \Big((5 - 4) - 3\Big)$ is

☐ (a) 0 (b) 2 (c) 8 (d) 6

9. The value of $(12{\cdot}6)^2 - (12{\cdot}4)^2$ is

☐ (a) 25 (b) 0·2 (c) 0·04 (d) 5

10. Which one of the following functions has $\{0, 1\}$ as domain and range ?

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

11. A piece of wire $6x$ cm in length is bent to form a square. The area of the square is

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

12. $\frac{x}{x+1} + \frac{1}{x}$ is equal to

☐ (a) $\frac{1}{x+1}$ (b) $\frac{x^2 + x + 1}{x^2 + x}$ (c) $\frac{x+1}{2x+1}$ (d) $\frac{2x+1}{x+1}$

13. $(2x - 6)(2x + 6)$ is

☐ (a) $4x^2 - 24x + 36$ (b) $4x^2 - 36$ (c) $4x^2 + 36$ (d) $4x$

14. $\{-\frac{1}{3}, \frac{1}{3}\}$ is the solution set of

☐ (a) $9x^2 - 1 = 0$ (b) $x^2 - x = 0$ (c) $x = \frac{1}{3}$ (d) $3x^2 - 1 = 0$

15. Which one of the following numbers does <u>not</u> satisfy $5x - 7 < 17$?

☐ (a) $\frac{24}{5}$ (b) $\frac{23}{5}$ (c) 0 (d) 2 .

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SECTION B (105 marks)

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

1. (a) A person earns £5,500 per year. £1,000 of this is tax free. The rates of tax are

20% on the first £500 of taxable earnings
25% on the next £1,000 of taxable earnings
35% on the next £3,000 of taxable earnings.

Calculate how much tax the person had to pay.

(b) Find the compound interest on £2,000 for 3 years at 5% per annum.

(25 marks)

2. (a) Solve the simultaneous equations

$$4y = 7 - 3x$$

$$2y = 7 + 2x$$

and verify your answer.

(b) If a girl's present age is added to her age 5 years hence, the answer is the same as her age 17 years hence. Find her present age.

(20 marks)

3. (a) Simplify

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

(b) Factorise

(i) $pr - qs + qr - ps$

(ii) $3x^2 - 17x - 28$.

(20 marks)

OVER →

4. Draw a graph of the function

$$f : x \to (x + 1)(x - 3)$$

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

Use your graph to find

(i) the values of x for which $f(x) = -1$

(ii) the range of x for which $f(x) < -1$.

(25 marks)

5. (a) Solve the inequality

$$2x - 5 \leqslant 1 - x \qquad \text{for } x \geqslant 1,\ x \in \mathbf{R}$$

and graph the solution set on the number line.

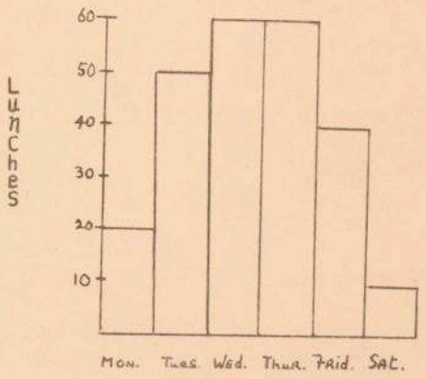
(b) In a survey of 120 people, 72 bought newspaper A and 54 bought newspaper B. The number who bought both papers is not known.

(i) If x people bought neither A nor B, find the greatest value x could have.

(ii) If 30 people bought neither A nor B how many bought B only ?

(25 marks)

6. The bar chart shows the number of lunches eaten per day in a restaurant during a particular 6 day week.



(i) How many lunches were eaten in the restaurant during the week ?

(ii) On what days was the number of lunches between 35 and 65 ?

(iii) How many extra lunches on Monday would give rise to a mean of 44 lunches per day for the first three days ?

(iv) To show a profit, 40 lunches per day must be served. Say, giving a reason, whether or not the restaurant made a profit this particular week.

(25 marks)

7. A cyclist completed a journey of 30 km travelling at an average speed of x km per hour.

If the average speed had been $(x - 5)$ km per hour, the journey would have taken an hour longer to complete. Find x.

(30 marks)