AN   ROINN   OIDEACHAIS

INTERMEDIATE   CERTIFICATE   EXAMINATION,   1988

MATHEMATICS – LOWER COURSE – PAPER II (150 marks)

FRIDAY, 10 JUNE,   9.30 a.m. to 12.00 p.m.

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 Superintendents.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1.   2 as a percentage of 40 is

(a) 50%   (b) 20%   (c) 5%   (d) 2%

2. $x_{10} = 1011_2$. x is

(a) 1011   (b) 11   (c) 9   (d) 3

3.   123 expressed in scientific notation is

(a) $1 \cdot 23 \times 10$ (b) $1 \cdot 23 \times 10^{-1}$ (c) $1 \cdot 23 \times 10^2$ (d) $1 \cdot 23 \times 10^{-2}$

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

(a) $\frac{5}{3}$ (b) $\frac{10}{3}$ (c) $\frac{4}{5}$ (d) $\frac{5}{9}$

5. $0 \cdot 287 \times 7 =$

(a) $2 \cdot 009$ (b) $2 \cdot 09$ (c) $0 \cdot 2009$ (d) $0 \cdot 209$

6.   The least number among the following is

(a) $0 \cdot 0009$ (b) $0 \cdot 005$ (c) $0 \cdot 02$ (d) $0 \cdot 1$

7.   If $A = \{1, 3, 5\}$, $B = \{3, 5, 7\}$, $C = \{1, 5, 7\}$ then $A \cap B \setminus C$ is

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

8. $(x + 4)(x - 1)$ is

(a) $x^2 - 4$ (b) $x^2 + 3x - 4$ (c) $x^2 - 3x - 4$ (d) $x^2 + 3x + 4$

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9.   The mean of four numbers is 3·1.   The sum of the four numbers is

(a) 3·1   (b) 12·4   (c) 0·775   (d) 7·1

10. $A = \{x \mid 3 < x \leqslant 6, \; x \in \mathbf{N}\}$ is the set

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

11.   The n th term of a sequence is $\dfrac{3n}{n+1}$ The 2nd term is
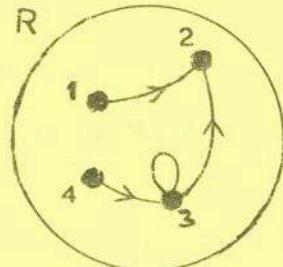
(a) 1   (b) 2   (c) 3   (d) 4
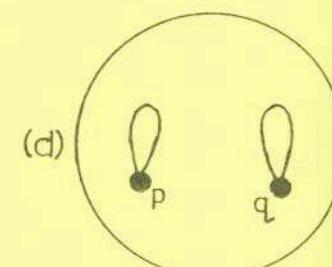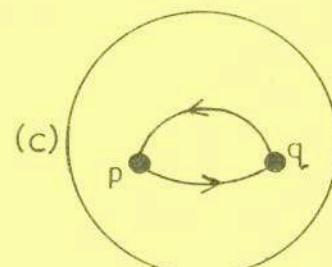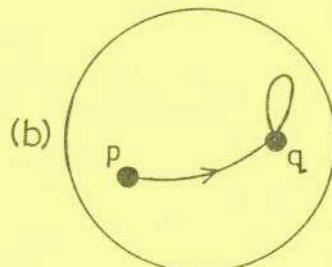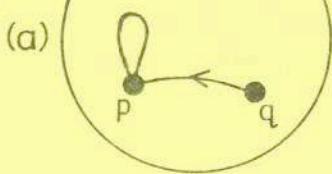
12.   The relation **R** is shown.   The range of **R** is

(a) {1, 2, 3, 4}   (b) {1, 3, 4}

(c) {3}   (d) {2, 3}

13.   The domain of a function is $\{p, q\}$.   Its range is $\{p\}$.   The function could be

(a)   (b)   (c)   (d)

14.   The ratio 40 : 90 is the same as
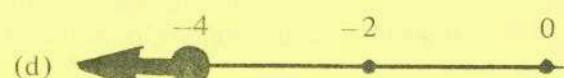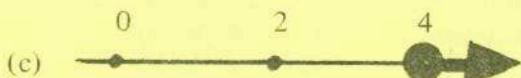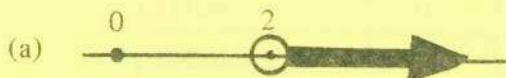
(a) $\frac{1}{4} : \frac{1}{9}$ (b) $\frac{1}{9} : \frac{1}{4}$ (c) $1 : \frac{4}{9}$ (d) 9 : 4

15.   Which one of the following diagrams illustrates the inequality $2x - 4 > 0 \Rightarrow$

(a)   (b)

(c)   (d)

M.46

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INTERMEDIATE CERTIFICATE EXAMINATION, 1988

MATHEMATICS – LOWER COURSE – PAPER II

FRIDAY, 10 JUNE – MORNING 9.30 to 12.00

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£9 000 for two years at $7\frac{1}{2}$ % .

    (b) A guest house, A, advertises: "Five nights, bed and breakfast, IR£46·40 per person
    Another guest house, B, advertises: "Three nights bed and breakfast, IR£28·50
    per person".
    Find the cost per person per night in each guesthouse.
    If A adds a $12\frac{1}{2}$% charge on the bill, find the new cost per person per night
    in A.

2. (a) If $x = 1$, $y = -2$ and $z = 3$, find the value of

    $$x(y - z)^2 + y(z - x)^2 + z(x - y)^2.$$

    (b) Solve for x

    $$9(1 - 2x) - 5(2 - 5x) = 8.$$

    (c) Solve the simultaneous equations

    $$2x - 3y = 9 \quad \text{and} \quad x = 1 - 2y.$$

3. (a) Factorise

    (i) $xy - 3ty - 2wx + 6tw$.
    (ii) $3x^2 - 10x - 8$.
    (iii) $9 - 4x^2$.

    (b) John began his holidays with IR£45 and Sheila began with IR£49.   Each
    spent the same amount of money (IR£ x).
    At the end of the holiday Sheila had twice as much money left as John had.
    Using an algebraic equation, find how much each of them spent.

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4. The Venn diagram shows the number of elements in the different subsets of the sets A, B and C.
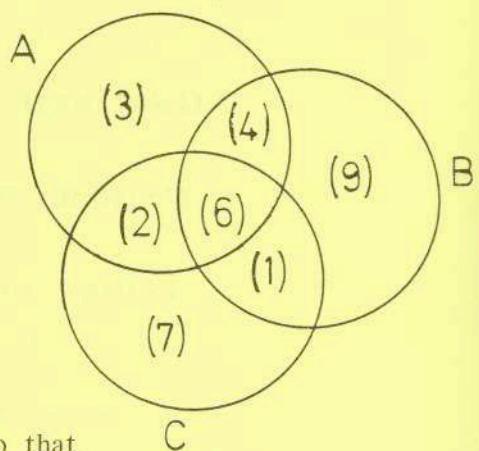
Using a separate diagram each time, shade the following.

    (i) $A \cup B \cup C$,

    (ii) $(A \cap B) \cup C$,

    (iii) $A \setminus (B \cup C)$.

State the cardinal number of each of (i), (ii), (iii).

Substitute one of $\cup$, $\cap$ or $\setminus$ for each question mark so that

    (iv) $\#\big((A \; ? \; C) \; ? \; B\big) = 2$,

    (v) $\#\big((A \; ? \; C) \; ? \; B\big) = 12$.

A (3) (4) (9) B (2) (6) (1) (7) C

5. Complete the following table in your answer book and draw the graph of the function:
$$f : x \to x^2 - 2x - 4.$$
in the domain $-2 \leqslant x \leqslant 4$, $x \in \mathbf{R}$.

x	-2	-1	0	1	2	3	4
$f(x)$	4						4

Using the graph, estimate

    (i)   the value of $f(1\cdot5)$.

    (ii)   the minimum value of $f(x)$.

Under the axial symmetry in a particular line the graph is mapped on to itself. Indicate this line on the graph paper by a dotted line.

State the range of values of $f(x)$ for which
$$0 \leqslant x \leqslant 2.$$

6. On a certain morning 20 pupils took a test. Their scores were

    2,   3,   1,   2,   1
    0,   2,   4,   5,   1
    3,   4,   5,   0,   5
    4,   2,   3,   1,   2

Copy the following table into your answer book and complete the frequency row:

Mark	0	1	2	3	4	5
Frequency		4				

    (i)   Calculate the mean mark per pupil.

    (ii)   On a pie-chart representing all 20 pupils, illustrate the number of pupils scoring more than the mean. Show clearly how you calculate the angle representing them.

7. The admission costs to a zoo for two groups of people were:

    IR£34·80 for 7 adults and 8 children and
    IR£21·60 for 1 adult and 15 children.

Find the admission cost for

    (i)   an adult
    (ii)   a child.