

DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1973

MATHEMATICS - PAPER II

WEDNESDAY, 13th JUNE - 9.30 - 11.30 a.m.

INSTRUCTIONS

- (a) Answer any *five* questions.
- (b) All working must be clearly set out in your answer book.
- (c) Mathematical Tables and squared paper are available from the Superintendent.
- (d) All questions carry equal marks.

1. I need a number of tools for my gardening. The price list in the hardware shop shows that the prices of the tools I need are as follows:

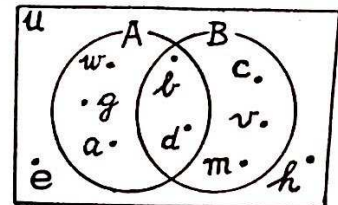
a spade £1.70; a fork £1.95; a hoe £0.75; a rake £0.70; a hedge shears £2.10; a lawn-mower £8.25; a watering can £0.80; a wheel-barrow £7.00; a pruning knife £1.50; a water-hose £1.30, and a hand-sprayer £0.95.

What is the total cost of all the things I need?
If 10% tax is then added what is my total bill?

2. (a) Use logarithms or a slide rule to evaluate $\frac{19.5 \times 9.55}{30.9}$.
- (b) Write out, in correct order, the first ten natural numbers in the base four (fours system).

[NOTE: The set of natural numbers is {0, 1, 2, 3,}]

3. (a) The diagram shows the elements of the sets A and B in the universe, U. List the elements of each of the following sets:



- (i) U, (ii) B, (iii) $A \cap B$, (iv) $A \cup B$, (v) B/A , (vi) A' .

- (b) In a survey of a class of 24 boys 14 of the boys said that they play basketball, 6 boys said they play tennis and 12 boys said they play volleyball. Of the boys who play tennis 3 also play volleyball and 2 play basketball. Seven of those who play basketball also play volleyball. Only one boy plays all three of the games.

Represent the results of the survey on a single Venn diagram and find out how many of the boys in the class play none of the three games mentioned.

4. There are 540 boys in a school. A survey on a Wednesday afternoon showed that 150 were playing Gaelic Football, 120 were taking part in a Soccer tournament, 60 boys were playing Hurling and 90 boys were playing in a Volleyball competition. All the remaining boys were rehearsing for the Music and Drama Society productions. Illustrate the information given above as accurately as you can on a pie-chart.

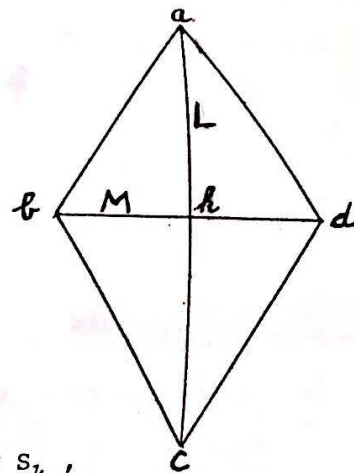
(You are advised to use a reasonably large circle.)

5. Find the solution set of each of the following:

(1) $3(2x + 5) - 4(3x + 2) = 18 - 7(2x - 3)$.

(1i) $\left. \begin{array}{l} x + 4y = 17 \\ 3x + y = 18 \end{array} \right\}$.

6. The figure $abcd$ represents a rhombus (i.e. a parallelogram with all sides of equal length). The diagonals of the rhombus intersect at the point k . The measure of each of the angles abc and adc is 120° . L is the line ac and M is the line bd . S_L denotes the axial (line) symmetry with axis L , S_M denotes the axial (line) symmetry with axis M , and S_k denotes the central (point) symmetry of centre k .



- (a) What is the image of the point d (i) by S_L , (ii) by S_M , (iii) by S_k , (iv) by the translation \vec{ab} ?
- (b) What is the image of the line segment $[ab]$ (i) by S_L , (ii) by S_M , (iii) by S_k , (iv) by the translation \vec{bc} ?
- (c) What is the measure of (i) the angle abd , (ii) the angle acd ?

7. (a) Graph the elements of each of the following sets on a separate number line:

(i) $A = \{x | x \in \mathbb{N}, 0 < x \leq 5\}$

(ii) $B = \{x | x \in \mathbb{Z}, -4 < x < 2\}$

[NOTE: $\mathbb{N} = \{0, 1, 2, 3, \dots\}$ and $\mathbb{Z} = \{\dots, -2, -1, 0, 1, 2, \dots\}$]

(b) Draw up a table of the ordered pairs (x, y) such that $y = 2x + 5$ where x and y are integers and $-3 \leq x \leq 1$. Graph this set of ordered pairs (couples) on the squared paper provided.

8. (a) In testing the petrol consumption of my car I found that I could travel 1500 kilometres on £10 worth of petrol. The petrol costs 8p per litre. How many kilometres per litre do I get from my car?

(b) I work a 44-hour week and my pay rate is 60p per hour. I get $1\frac{1}{2}$ times normal rate for overtime. What will my wages be for a week in which I worked a total of 48 hours?