AN ROINN OIDEACHAIS.

AN BRAINSE GAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1957.

MATHEMATICS.

Thursday, 13th June—10 *to* 1 *p.m.*

INSTRUCTIONS.

(*a*) Attempt Question 1 and six others.

(*b*) The marks allotted to each question are shown in brackets under.

(*c*) Mathematical Tables are supplied.

(*d*) Special credit will be given to candidates who display neatness and order in answering.

(*e*) All the work must be shown in the answer book.

1. (*a*) Simplify $\dfrac{5\frac{1}{2}-2\frac{1}{3}}{5\frac{1}{5}+2\frac{1}{3}} \div \dfrac{70}{113}$.

(*b*) Evaluate $\sqrt{(0{\cdot}85)^2-(0{\cdot}75)^2}$.

(*c*) If $a=\dfrac{b-1}{b+1}$ find b in terms of a and find its value when $a=\frac{1}{2}$.

(*d*) Multiply £53 13s. 7½d. by $4\frac{1}{7}$. If the resulting sum is divided equally amongst 29 people, how much will each receive?

(*e*) A casting weighs 4 cwt. 1 qr. 24 lb. and is composed of 92% copper and 8% tin. How many lb. of tin does it contain?

[20 marks.]

[P.T.O.

2. Show that the area of an equilateral triangle of side S is $\frac{S^2\sqrt{3}}{4}$. Hence find the weight of a regular hexagoanl prism of side 8 cms. and length 50 metres, given that 1 cubic metre of the material of the prism weighs 25 lb.

[10 marks.]

3. Factorize

(i) ax^2-ay^2.

(ii) $6x^2-11x-10$.

(iii) $(3x-4)^2-3x^2+4x$.

[10 marks.]

4. The atmospheric pressure is given as 14·74 lb. per square inch. Express this pressure in grams per square centimetre, given 1 cm.=0·4 in. and 1 Kg.=2·2 lbs.

[10 marks.]

5. Using the table-book, write down the value of the following :—

(*a*) log4·323 ; log0·0024 ;
antilog$\bar{2}$·1749 ; antilog0·8371.

(*b*) Solve, using logs :—

$$\sqrt[3]{\frac{0\cdot736}{28\cdot1\times7\cdot63}}.$$

[12 marks.]

6. Solve the equations :—

(i) $1-\frac{x-3}{4}=x$.

(ii) $3x+y=9$.
$4x-\frac{1}{3}y=5$.

(iii) $4x^2-7x-15=0$.

[12 marks.]

7. Explain clearly how to construct geometrically a tangent to a circle from an external point.

A is a point outside the circle whose centre is O. If OA is 10 cms. and the length of the tangent from A to the circle is 8 cms., calculate the radius of the circle.

[14 marks.]

8. If $\sin\theta=\frac{3}{5}$, find $\cos\theta$ and $\tan\theta$.

ABC is a triangle with a right angle at C. CB is 30 ft. long and the angle BAC is 20 degrees. If CB is produced to a point P such that the angle PAC is 55 degrees, find the length of CP to the nearest foot.

[14 marks.]

9. A swimming-pool, 30 ft. long and 15 ft. wide, is surrounded by a concrete paving to a width of 3 ft. 6 in. What is the area of the paving in sq. ft. ? The depth of the water in the pool increases uniformly from 3 ft. at one end to 6 ft. 6 in. at the other. How many gallons does the pool contain ? (1 cubic foot$=6\frac{1}{4}$ gallons.)

[14 marks.]

10. The following table gives a series of values of x and y which are dependent one upon the other :

x ..	1·3	1·6	2·0	2·4	2·8
y ..	8·2	9·4	11	12·6	14·2

Draw a graph showing the relationship between x and y and determine

(a) the value of y when $x=0$;

(b) the slope of the graph ;

(c) the equation giving the relationship between x and y.

[14 marks.]