AN ROINN OIDEACHAIS

AN BRAINSE GAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1950.

MATHEMATICS.

Monday, June 26th.—10 *to* 1 *p.m.*

INSTRUCTIONS.

(a) Not more than *eight* questions to be attempted.
(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 working must be shown in the answer book.

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1. (a) What fraction (in its lowest terms) is equal to ·00375 ?

(b) Convert $2\frac{5}{8}$ to a decimal form.

(c) Express in its simplest form :

$$\frac{0\cdot4\times0\cdot3}{0\cdot00012} \div \left\{ \frac{5\cdot117}{1\cdot7} + \cdot3\times1\cdot2\times9 \right\}$$

[10 marks.]

2. A certain American refrigerator cost £60 when £1 was worth 4·60 dollars. What would be the cost of the same article now, assuming £1 to be worth 2·89 dollars ?

What percentage change in cost does this mean to a purchaser in this country ?

[10 marks.]

3. A cylindrical petrol tank has a diameter of 1 ft. 6 in. and is 2 ft. 4 ins. long. Leaving the thickness and overlaps out of account, calculate (a) the area of sheet metal used in making the curved sides and (b) the capacity of the tank in gallons to the nearest gallon.

$\left(1 \text{ c.ft. holds } 6\frac{1}{4} \text{ gals. ;} \quad \pi=\frac{22}{7}\right).$

[10 marks.]

4. Find (to the nearest penny) the value of 3 tons 18 cwts. 3 qrs. 4 lbs. of metal at £65 14s. 8d. a ton.

[10 marks.]

5. The formula $V^2 = U^2 + 2aS$ occurs in mechanics. Using this formula find

(i) An expression for S in terms of the other letters and
(ii) the value of S when $V = 340$, $U = 20$ and $a = 32$.

[10 marks.]

6. Use logarithms to find the value of (a) $1 \cdot 326^5$, (b) $\sqrt{773 \cdot 7}$ and (c) $\dfrac{44 \cdot 28 \times 273 \times 740}{288 \times 760}$.

[10 marks.]

7. (i) $20(E + 19) = 30 \times 18$.

Find E from the above equation, which was obtained from the observations of an experiment in Heat.

(ii) Solve : $7x + 2y = 47$.

$5x - 4y = 1$.

[10 marks.]

8. During each year a certain machine loses 10% of its value at the beginning of that year. If the machine cost £1,000 when new, (a) find an expression for its value after 1, 2, 3, 4 and n years, where n is any number of years and (b) calculate its value in pounds and shillings after 4 years.

[14 marks.]

9. (a) Factorise the expression $x^2 + x - 56$ and solve the equation $x^2 + x = 56$.

(b) The length of a rectangular sheet of plywood is one foot longer than its breadth. If the area of the sheet is 90 sq. ft., find its length and its breadth.

[14 marks.]

10. The following figures give the electricity load in megawatts (millions of watts) for Dublin city for a typical day period of 12 hours, starting from 10 a.m.

Time ..	10 a.m.	12 Noon	12.30 p.m.	2 p.m.	3 p.m.	3 p.m.	5.30 p.m.	6 p.m.	7 p.m.	8 p.m.	10 p.m.
Load (Megawatts) ..	100	146	160	124	108	124	200	194	150	110	94

On the graph paper supplied plot a curve showing the time horizontally and the load vertically.

(a) Write down two peak times between 10 a.m. and 8 p.m.

(b) What is the load at 11 a.m. ?

(c) Between what times is the load greater than 150 megawatts ?

[14 marks.]

11. Prove that the sum of the three angles of a triangle are together equal to two right angles.

Hence show that each of the angles of a regular five-sided figure is 108° and find an expression for the magnitude of each of the angles of a regular figure on n sides.

[14 marks.]

12. Copy the following table into your answer book and then, by means of the mathematical tables supplied, or otherwise, fill in the seven blank spaces.

Angle	30°	60°	
Sine	·5		
Cosine ..		·5	
Tangent ..			1·0

From a point at a horizontal distance of 100 ft. from its base, the top of a church spire is found to make an angle of 60° with the ground. Calculate the height of the spire.

[14 marks.]