AN ROINN OIDEACHAIS

AN BRAINSE GAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1955.

MATHEMATICS.

Monday, June 20th—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.

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1. (*a*) Simplify : $\frac{\frac{1}{2}}{1\frac{1}{5}}+\frac{1}{3}\times\frac{7}{8}-\frac{3}{4}$

(*b*) Express 6s. 5d. as a decimal of a £, correct to three decimal places.

(*c*) Four castings have an average weight of 20 lb. A fifth casting is made weighing 23 lb. What is the average weight of all five castings ?

(*d*) When $a=-4$, $b=12$ and $c=8$ find the value of $\frac{c^2-ab}{a^2}$

(*e*) A certain metal is quoted in France at 600 francs per kilogram. Express this in shillings per lb.

(£1=960 francs ; 1 lb.=454 grams).

[20 marks.]

2. A merchant's stock is worth £2,436; if he loses 40 per cent. of it by fire and sells the remainder at a 15 per cent. loss, find the total amount lost to the nearest £.

[10 marks.]

3. Find, correct to the nearest penny, the cost of plating an ornament, whose surface area is 2,000 sq. cm., to a thickness of 0·01 mm., if the plating costs 10s. 6d. per 10 grams.
(1 cubic centimetre of the plating weighs 10·47 grams.)

[10 marks.]

4. Evaluate, using logarithms :—

$$(a)\ \sqrt[4]{(63{\cdot}74)^3}\ ;\quad (b)\ \frac{(5{\cdot}395)^2\times 0{\cdot}00871}{0{\cdot}06324}$$

[10 marks.]

5. Solve for x and y :—

$$\begin{cases} \frac{5x}{6}-y=3 \\ x-\frac{5y}{6}=8 \end{cases}$$

[12 marks.]

6. From the formula

$$\frac{1}{R}=\frac{1}{P}+\frac{1}{Q}$$

express P in terms of R and Q.
Hence, find the value of P when Q=50 and R=40.

[12 marks.]

7. Calculate the volume of a cone whose vertical height is 12 ft. and the diameter of whose base is 10 ft.
Find the slant height of this cone.

[14 marks.]

8. (*a*) What is the size of the angle between a tangent to a circle and the radius drawn to its point of contact.

(*b*) Draw a direct common tangent to two circles of radius $1\frac{1}{2}$ in. and 1 in. respectively, whose centres are 3 in. apart. Explain your method.

[14 marks.]

t in seconds	3	5	8	14	23	30
v in ft./sec.	11	17	26	44	71	92

Draw a graph showing the relationship between t and v, and from it determine the value of v when $t=20$.

If the relationship between t and v is given by the equation $v=3t+C$, show how to find the value of C from the graph.

[14 marks.]

10. An iron stair rail is to be fitted at an inclination to the horizontal of 43°. Its lower end is to be 4 feet from the ground and its upper end 10 feet from the ground. Calculate the length of the rail, to the nearest inch.

[14 marks.]