

AN ROINN OIDEACHAIS.

AN BRAINSE GAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS for DAY VOCATIONAL COURSES, 1958.

MATHEMATICS.

Thursday, 19th 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) Evaluate $\frac{1.65 \times 0.36}{0.01 + 0.0098}$.

(b) Express 6 cwt. 2 qrs. 7 lb. as a decimal of 1 ton.

(c) Multiply $x^2 - 3x - 10$ by $x + 7$. Find the value of the product when $x = -6$.

(d) Find the value of $\sqrt{114.63}$ correct to the second decimal place.

(e) Given $\frac{1}{V} + \frac{1}{u} = \frac{1}{f}$, express V in terms of u and f , and find its value when $u = \frac{1}{2}$ and $f = -1$.

[20 marks.]

[P.T.O.]

2. Water flows through a pipe at the rate of 6 gallons per minute into a cylindrical tank of diameter $1\frac{1}{2}$ ft. and height 4 ft. How long, to the nearest second will it take to fill the tank ?

(1 cu. ft. of water = $6\frac{1}{4}$ gallons.)

[10 marks.]

3. Using ruler and compass only construct a right-angled triangle ABC, with the right angle at C, making AB 3 in. long and the angle CAB 60 degrees. Describe a circle to touch the sides of the triangle and measure its radius. If O is the centre of the circle, calculate the length OA.

(All construction lines must be clearly shown.)

[10 marks.]

4. An embankment of turf is constructed on level ground. Its cross-section is that of a trapezium of base 20 ft., horizontal top 15 ft., and vertical height 30 ft. If the market value of the turf is £194 5s., and the current price of turf £4 12s. 6d. per ton, calculate the length of the embankment to the nearest foot. (1 cubic foot of turf weighs 7 lb.)

[10 marks.]

5. One end A of a rod AB which is 15 in. long is fastened to a point on the circumference of a wheel, centre O and radius 9 in. The end B slides along a straight horizontal line which passes through O. Starting from the position in which O, A and B are in one straight line, calculate the distance B moves when OA is turned through a right angle.

[12 marks.]

6. Solve the equations :—

$$(i) \frac{2}{3}(x-2) - \frac{1}{5}(2x-5) = 1.$$

$$(ii) \quad x + y = 3.$$

$$5x - 3y = -1.$$

$$(iii) 7x - 2x^2 = 3.$$

[12 marks.]

7. A square sheet of cardboard has a 10 cm. side and out of each corner a small square is cut ; the flaps remaining are turned up so as to form a box of depth x cms. Show that the volume of the box is $4x(4-x)^2$ cubic cms. If the depth of the box is 3.5 cms., determine its volume in cubic mm.

[14 marks]

8. (i) Using log tables find the value of x if $3x^3 = \frac{2718}{0.8935}$.
- (ii) Given $\log N = 3\log 3 + \log 8 - \log 9$, find N without using the log tables.

[14 marks.]

9. The inner ring of a circular path measures 150 yards in circumference and the path is 2 yds. wide. Find to the nearest shilling the cost of surfacing the path at 4s. 6d. per square yard.

[14 marks.]

10. The following table gives the extensions of a spiral spring produced by the application of various loads :—

Load W (grams)	10	20	30	40	50	60
Extension E (cms.)	2.4	3.35	4.275	5.2	6.1	7.0

By means of a graph, determine :

- (a) The value of the load for 1 cm. extension.
- (v) the extension for no load.
- (c) The extension between loads 20 and 50.2 grams.
- (d) Write down the Law of the spiral spring.

[14 marks.]