AN ROINN OIDEACHAIS

(Department of Education.)

LEAVING CERTIFICATE EXAMINATION, 1946.

MATHEMATICS—Arithmetic.

TUESDAY, 18th JUNE—MORNING, 10 TO 12 NOON.

Six questions may be answered.

All questions carry equal marks.

Mathematical Tables may be obtained from the Superintendent.

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1. Assuming that 1 metre=39·37079 inches, find in yards, to the nearest yard, the difference between 66 kilometres and 41 miles.

Show that the difference is less than 0·03 per cent. of either.

2. Find, to the nearest penny, without using the Tables, the compound interest on £469 16s. for 5 years at $2\frac{1}{2}\%$ per annum. Then find the compound interest by using the Tables, and express the difference between the two results as a percentage of the first one.

3. To estimate the speed of a motor car its time over a $\frac{1}{4}$ of a mile of road is taken. Find its speed in miles per hour when this time is 24 seconds.

If the time and distance are liable to errors not exceeding $\frac{1}{2}$ second and 2%, respectively, find the limits, in miles per hour, within which the speed must lie.

4. A tent is in the form of a right circular cone of height 16 feet. If the radius of its base be 12 feet find the area of cloth required to make it if 10% of the material is waste, and find its cost, to the nearest shilling, if the material costs 6s. 10d. per yard of width 54 inches.

5. A shopkeeper bought articles at 16s. 8d. each, less 2% discount for cash. At what price must he sell the articles in order to make 25% profit ?

At what price, however, should he mark the articles for sale so that he can dispose of one-tenth of his stock to special customers at a discount of 20% off the marked price, the remainder being sold at the marked price without discount, and still have a profit of 25% on the whole ?

6. A man invests £7,280 in 3% stock at $93\frac{1}{3}$, and when it rises to 98 he sells and invests the proceeds in a 4% stock, thereby increasing his income by $30\frac{2}{3}\%$.

Find the price of this stock.

7. A tank is in the form of a cylinder of internal diameter d feet and height h feet, and it is closed on the top by a hemispherical cap. Expressing the volume of the tank in the form $\frac{1}{4}\pi d^2(h+\frac{1}{3}d)$ show that this is very roughly $100{,}000\pi$ when $h=157$ feet and $d=48$ feet.

If $\pi=3{\cdot}14159265\ldots$ find the volume correct to the nearest 1,000 cubic feet, keeping no more places of decimals in π than are necessary.

8. Make a rough estimate of the value of

$$(26{\cdot}67)^{-\frac{1}{3}}\times(\cdot003521)^{\frac{3}{2}}\times(9{\cdot}856)^{4},$$

and find its value using the Tables.

9. A man borrows £500 at 6% per annum, compound interest. The whole is to be repaid in three equal annual instalments, the first of these to be paid a year after the date of borrowing.

Find the value of each instalment.