

MATHEMATICS.

ARITHMETIC.

I b.

[Time allowed—1 hour 40 minutes.]

Six questions may be answered, and the marks will be awarded on the first six answers left uncanceled.

The questions at the end of the paper carry somewhat higher marks than the others.

Tables of Measures, Constants, and Formulæ will be supplied.

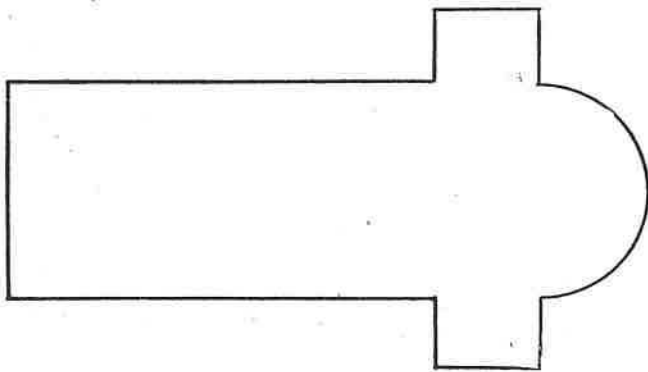
Tables of Logarithms may be obtained from the Superintendent.

1. Arrange in ascending order of magnitude:—

$$\frac{82}{31}, \frac{45}{17}, \sqrt{7},$$

and find to *three* significant figures the percentage error in taking $\frac{82}{31}$ as an approximation to $\sqrt{7}$.

2. The diagram drawn to a scale of a centimetre to 20 feet shows the plan of a building, one end terminating in a semi-circle. Find the area of the floor of the building in sq. yards. If the average height of the building were 60 feet, what would be the weight of the air in it? [Water is approximately 800 times heavier than an equal volume of air.]



3. Find H from the two equations :—

$$mH = \frac{\pi^2 I}{T^2},$$

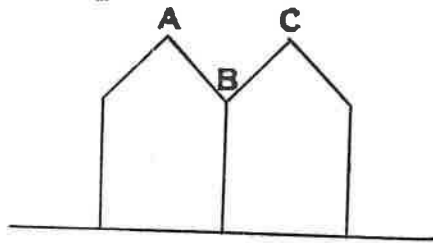
$$\frac{m}{H} = \frac{r^3}{8} \left(\frac{d}{l} \right),$$

if $I = 516.38$, $T = 6.4$, $r = 100.0$, $d = 6.07$, $l = 237.0$.

Give result correct to *three* significant figures.

4. The diagram represents the end elevation of a double house 30 feet long, AB and BC being each 14 feet 4 inches and inclined to the horizon at an angle of 45° . All the rain falling on the roof between the ridges A and C runs into a cistern of rectangular base 10 feet by $7\frac{1}{2}$ feet: find

- (a) the increase in the depth of the water in the cistern, and
 (b) the number of gallons of water entering the cistern during a rainfall of 0.127 inch.



5. A manufacturer allows a shop-keeper 15 per cent. discount on the invoice price of goods. The shop-keeper marks the goods 10 per cent. above invoice price, and allows his customers 5 per cent. discount for cash. Find his net profit on goods marked £2 17s. 8d. and sold for cash.

6. A man has three different investments yielding 4, 5, and 6 per cent. respectively, his income from all three being equal. He consolidates the three investments into a single 5 per cent. investment. Find by what percentage his total income and the average rate of interest on his capital are increased or diminished.

7. A man buys goods worth £4356 on the understanding that he is to pay for them in seven equal annual instalments, the first payment to be made on delivery. What should the annual payment be, reckoning compound interest at 5 per cent. per annum?

At the time of making the third payment what should the man pay to make a settlement in full?

8. The sides of a triangle are 3, 4, and 5 units. Find the ratios of the volumes of the solids of revolution formed by rotating the triangle round each side in succession as axis.

A2

