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(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1927.

PASS

MATHEMATICS (I).

FRIDAY, 17*th JUNE*.—MORNING 10 A.M. TO 12.30 P.M.

Seven questions may be answered. 8 (*a*) *or* 8 (*b*) may be attempted, but not both. All questions carry equal marks.

Tables of Measures, Constants and Formulae, and Logarithm Tables may be obtained from the Superintendent.

1. Solve the equations

(*a*) $bx^2-x\,(ab+1)+a=0$.

(*b*) $3xy+6=5x+6y=7x-15y+5$.

2. Solve the equation $ax^2+bx+c=0$, and find expressions for the sum, difference, and product of the roots in terms of a, b, c.

3. A man arrives at Kingsbridge and wants to catch a train at Broadstone. A cab travelling at 8 miles per hour will make him 5 minutes late, but a taxi travelling by the same route at 12 miles per hour will give him 2 minutes to spare. How long has he for the journey from Kingsbridge to Broadstone?

4. If x, y, z are positive integers and a is not equal to 0 and

$$\left(\sqrt[x]{a^{y-z}}\right)\ \left(\sqrt[y]{a^{z-x}}\right)\ \left(\sqrt[z]{a^{x-y}}\right)=1,$$

show that at least two of the quantities x, y, z are equal.

5. Factorise: (i) $a^4+2a^2b^2+9b^4$.

(ii) $(x+y)\ (y+z)\ (z+x)+xyz$.

6. Prove the formula for the sum of n terms of an Arithmetical Progression.

Find the sum of all the positive whole numbers less than 1000 which are not divisible by 3.

7. AB is a line and C a point in it. A semicircle is described on AB as diameter and the perpendicular from C to AB meets the semicircle in P. Show that the difference between the area of the semicircle on AB and the sum of the semicircles on AC and CB is equal to the area of the circle on CP as diameter.

8. (*a*) Write down the expansion of $(1+x)^n$.

Use the expansion to find to the nearest pound the amount of £100 in 20 years at 2 per cent. compound interest.

Or

(*b*) A stone is thrown into the air. Its height is y feet above the ground when it has moved x feet horizontally from the starting point. The relation between x and y is given by the equation

$$y=20x-\frac{2x^2}{25}$$

Find the greatest height to which the stone will rise.

9. Show that

$$\log_b a \times \log_c b \times \log_a c = 1$$

and find the value of

$$\log_{64} 10 \times \log_{354} 64.$$