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LEAVING CERTIFICATE EXAMINATION, 1932.

HONOURS.

MATHEMATICS (I).

MONDAY, 6th JUNE.—AFTERNOON, 3.30 TO 6 P.M.

Six questions may be answered. All questions carry equal marks. Mathematical Tables may be obtained from the Superintendent.

1. (i) x is an integer such that x^2 is greater than $15x-36$ and less than $18x-56$: find x.

(ii) By using the equation $(t-x)(t-y)(t-z)=0$ or otherwise, find the values of x, y, z which satisfy the equations $x+y+z=2$, $yz+zx+xy=-1$, $xyz=-2$.

2. (i) Factorize $6x^2-5xy-6y^2-8x-y+2$.

(ii) Given that $a+b-c$ is one factor of $a^4+b^4+c^4-2b^2c^2-2c^2a^2-2a^2b^2$, find all the factors.

3. Show that the function $\frac{(x+1)^2}{x+2}$ cannot lie between 0 and -4 when x is real and draw a rough graph of the function.

4. The nth term of the series $1+7+19+\ldots$ is in the form an^2+bn+c : find a, b, c and find the sum of the n terms.

5. Write out the first four terms and the general term in the expansion of $(1-x)^{-\frac{1}{2}}$ by the Binomial Theorem.

Express $\frac{1}{3}\sqrt{10}$ in the form $(1-x)^{-\frac{1}{2}}$ and then use the expansion to find the value of $\sqrt{10}$ to three decimal places.

6. Find one root of the equation $x^4-7x+1=0$ to two decimal places.

7. In how many ways can 4 Irish books, 3 English books and 2 Mathematical books be arranged on a shelf so that all the books in each subject are together (i) when all the books are different, (ii) when the 4 Irish books are the same (so that their order is immaterial) and all the other books are different ?

8. Find the condition that the straight lines $ax+by+c=0$ and $a^1x+b^1y+c^1=0$ may be perpendicular.

Find the co-ordinates of the orthocentre of the triangle formed by the three straight lines $x+2y+1=0$, $x-y+1=0$, $2x+y-1=0$.

9. Prove that the straight lines $x+y=0$, $x-2y=0$, $3x+y-1=0$, $3x-4y+1=0$ intersect so as to form a cyclic quadrilateral, and find the equation of the circumscribing circle.

10. Prove that the equation $x^2-4xy-5y+4y^2=0$ represents a parabola. Find the equations of the axis and tangent at the vertex and draw a rough sketch of the curve.