Queen's University, Kingston.

SESSION 1863–64.

FACULTY OF ARTS.

CANDIDATES FOR B.A.

MATHEMATICS.

EXAMINER: PROFESSOR WILLIAMSON.

1. The angle in a semi-circle is a right angle; the angle in a segment greater than a semi-circle is less than a right angle, and the angle in a segment less than a semi-circle is greater than a right angle.
2. If two straight lines be parallel and one of them is at right angles to a plane, the other shall also be at right angles to the plane.
3. A cistern is filled in 24 minutes by 3 pipes, one of which conveys 8 gallons more, and another 7 gallons less than the third, every 3 minutes. The cistern holds 1050 gallons. How much flows through each pipe in a minute?
4. A and B distribute £60 each among a certain number of persons; A relieves 40 persons more than B does, and B gives to each 5s. more than A. How many persons did A and B respectively relieve.
5. State the various cases in finding the angles and sides of plane triangles, and their modes of solution. The same with regard to the area of plane triangles.
6. In spherical triangles prove that

$$\text{Cos. } A = \frac{\text{Cos. } a - \text{Cos. } b \text{ Cos. } c}{\text{Sin. } b \text{ Sin. } c}$$

7. Prove and explain the use of logarithms in computation.
8. In the parabola prove that $y^2 = p\,x$.
9. In the ellipse prove that $y^2 = \frac{b^2}{a^2}(a^2 - x^2.)$
10. In the ellipse the Latus rectum $= \frac{2\,b^2}{a}$
11. Differentiate $3x^{\frac{7}{3}}$, $(1-x^2)\,(1-x)^3$, $\frac{a}{x}$, a^x, Sin. x, Tan. x.
12. What are the differentials of a subtangent, of an area, of a surface, of a solid of revolution.