EXAMINATION FOR MODEL SCHOOL DIPLOMA.

MORNING, 9 TO 12.

English Composition.

SUBJECT OF ESSAY.—Any one of the following three :—

1. *The Tributaries of the River St. Lawrence.*
2. *The Dominion Pacific Railway.*
3. *The necessities of self-discipline and self-culture in a Teacher.*

Arithmetic and Mensuration.

N.B.—The work must be shown as well as the answers.

1. What is meant by *Simple Interest, Compound Interest, True and Bank Discount, Commission and Brokerage?* Find the true discount on $637.50 due in $5\frac{1}{2}$ years at 5 per cent. (15)

2. Add $\frac{1}{7}$ and $\frac{1}{5}$, multiply the sum by the difference between $\frac{1}{4}$ of $\frac{1}{3}$ of $\frac{2}{3}$ of 17, and $\frac{1}{12}$ of $\frac{1}{4}$ of 11; express the result as a decimal fraction. (15)

3. A grain dealer gains 40 per cent. by selling wheat at $1.05 per bushel, at what price did he purchase it? (15)

4. A wheel 5 feet in diameter, rolling along a level plane, makes five revolutions per second; how far has it gone after it has been in motion 6 hours? (15)

6. Find the cost of papering a room 21 ft. long, 15 ft. wide and 12 feet high, with paper $2\frac{1}{2}$ feet wide, at 15 cents a yard, allowing for a door, 7 ft. high and 3 ft. wide, 2 windows each 5 ft. high and 3 ft. wide, and a panelling 2 ft. high round the floor. (20)

6. The sides of a right-angled triangle are 3, 4 and 5; find the length of the perpendicular from the right angle on the hypothenuse. (20)

Algebra.

1. When is $a^n + x^n$ divisible by $a + x$, and when by $a - x$?
When is $a^n - x^n$ divisible by $a + x$, and when by $a - x$? (10)

2. Divide $x^3 - (y - z)^3$ by $x - y + z$. (10)

3. (1) Resolve into elementary factors: (*a*) $a^3 - 9x^2$; (*b*) $x^3 + y^2$; (*c*) $x^3 + y^3 + 3xy(x + y)$; (*d*) $3x^2 - 2x - 5$.

(2) Find the greatest common measure of
$x^2 + 2x - 120$; and $x^2 - 2x - 80$. (20)

4. Find the value of $\dfrac{x^2 + ax + a^2}{x^3 - a^3} - \dfrac{x^2 - ax + a^2}{x^3 + a^3}$ (15)

5. Solve the equations :—

(*a*) $x - 1 - \dfrac{x-2}{2} + \dfrac{x-3}{3} = 0$. (15)

(*b*) $\dfrac{4x + 17}{x + 3} + \dfrac{3x - 10}{x - 3} = 7$. (15)