

# ALGEBRA

1966

100 Marks. Time—One hour and a half.

*All questions to be answered.*

1. Simplify :

$$(a) \quad \frac{1+x}{1-x} - \frac{1+x^2}{1-x^2} + \frac{1-x}{1+x}$$

(b) Divide the product of  $3x^2 - 14xy + 15y^2$  and  $x^2 - y^2$  by  $3x^2 - 8xy + 5y^2$ .

[16 marks.]

2. Factorize :

(i)  $20x^2 + x - 12$  ;

(ii)  $a^2 + 2a - x^2 + 1$  ;

(iii)  $y^3 - 2y^2 - y + 2$  ;

(iv)  $x^2y^2 + xy - 110$ .

[16 marks.]

3. (i) How many pence will  $x$  ounces cost at  $y$  shillings per pound ?

(ii)  $x$  eggs cost 9 pence. How many shillings will 16 eggs cost ?

(iii) A rectangular block is  $3y$  inches long,  $2y$  inches high, and  $y$  inches wide. Find the total area of its surface.

[17 marks.]

4. Solve :

$$\frac{2x+4}{9} - \frac{1}{3} \left( \frac{x}{4} - 5 \right) = 1.$$

Prove your answer.

[17 marks.]

5. A man bought a certain number of oranges at 6 shillings per dozen and twice that number at 11 shillings per score. He sold them all at 8 shillings per dozen, making a profit of £3. What was the total number of oranges he bought?

[17 marks.]

6. (i) If  $a = 1$ ,  $b = 4$ , and  $c = -5$ , find the value of  $a^3 + b^3 - c^3 - 3abc$ .

(ii) The difference between the squares of two consecutive numbers is 35. Find both numbers.

[17 marks.]