8. A linear programming problem is formulated as follows

Maximise $P = 6x + 5y$

Subject to $y \leqslant 3x + 10$

$x + 4y \leqslant 162$

$5x + 2y \leqslant 200$

$y \geqslant 15$

$x \geqslant 0$

(a) Complete the graph in the answer book to show these inequalities, shading those regions which are **not** included in the feasible region. Label the feasible region R

(3)

(b) Use the vertex method to determine the exact coordinates of the optimal vertex.

(4)

(c) The practical solution to this problem requires integer solutions. Determine the optimal solution and state the value of the objective function.

(3)

The objective function is now changed to

$$P = kx + y$$

where k is a constant.

(d) Determine the range of values for k for which the optimal vertex is unchanged.

(2)

(Total for Question 8 is 12 marks)

TOTAL FOR PAPER IS 75 MARKS