Problem 1:

One kind of cake requires 200 g of flour and 25 g of fat, another kind of cake requires 100 g of flour and 50 g of fat. Find the maximum number of cakes which can be made from 5 kg of flour and 1 kg of fat, assuming that there is no shortage of the other ingredients used in making the cakes. Make it an LPP and solve it graphically.

Solution:

7.   Let x be the number of cakes of I kind and y be the number of cakes of II kind.

	Flour	Fat
Cake I	200 g	25 g
Cake II	100 g	50 g
Availability	5 kg	1 kg

The required LPP is
Maximise $Z = x + y$ subject to constraints
$200x + 100y \le 5,000 \Rightarrow 2x + y \le 50$
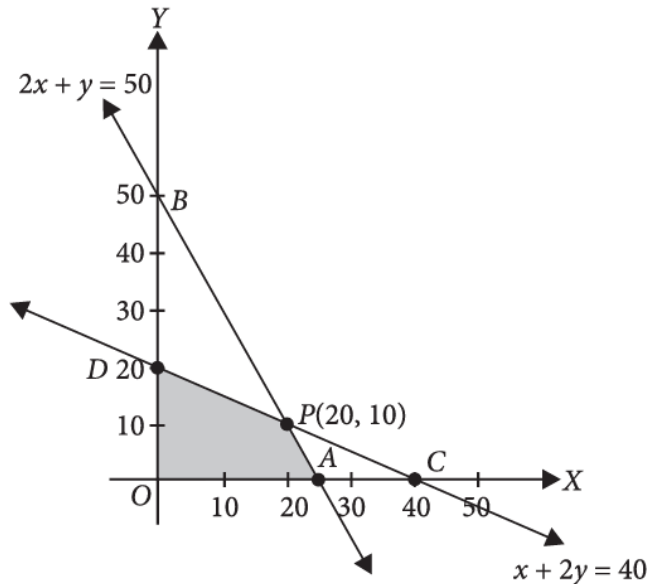$25x + 50y \le 1,000 \Rightarrow x + 2y \le 40$
$x \ge 0, y \ge 0$

To solve LPP graphically, we convert inequations into equations.
$2x + y = 50$ ...(i), $x + 2y = 40$ ...(ii)
Lines (i) and (ii) intersect at $P(20, 10)$.

Shaded region is the feasible region *i.e.* $\acute{O}APD$. The corner points of the feasible region are $O(0, 0)$, $A(25, 0)$, $P(20, 10)$, $D(0, 20)$.

Corner Points	Value of $Z = x + y$
$O(0, 0)$	0
$A(25, 0)$	25
$P(20, 10)$	30 (Maximum)
$D(0, 20)$	20

Clearly, the number of cakes is maximum at $P(20, 10)$ *i.e.*, when 20 cakes of I kind and 10 cakes of II kind are made.