1 *a*) Define Operations Research.
  b) List the basic steps involved in an Operations Research study.
  c) List the areas in which Operations Research Techniques can be employed. (17mrks)

2. A Company produces both interior and exterior paints from 2 raw materials m1 and m2.
  The Following table produces basic data of the problem.

Raw material	Exterior paint	Interior paint	Availability
M1	6	4	24
M2	1	2	6
Profit per ton	5	4	

A market survey indicates that daily demand for interior paint cannot exceed that for exterior paint by more than 1 ton. Also maximum daily demand for interior paint is 2 tons. Formulate LPP to determine the best product mix of interior and exterior paints that maximizes the daily total profit. (14mrks)

3. State at least three differences between the transportation model and general linear programming model.

A firm has three factories in Douala, Limbe and Kumba which make weekly dispatches to four depots located at Kumbo, Bamenda, Bafoussam and Ndop. The transport cost per cost of goods dispatch along route is shown in the table below as well as the weekly quantities available from each factory and the requirement (demand) of each depot. How should the product be allocated to the depots to minimize cost? Use the Northwest corner method for the initial allocation. Use either Least cost method or Vogel's Approximation Method also to compare results. (24mrks)

Factories	Demand Points				Supply Capacity
	Kumbo	Bamenda	Bafoussam	Ndop	
Douala	5	4	5	5	100
Limbe	3	3	6	6	200
Kumba	2	5	7	8	400
Demand	200	100	150	250	

4. Solve by simplex method.
Maximize $Z = 80x_1 + 55x_2$, subject to

$4x_1 + 2x_2 \le 40$
$2x_1 + 4x_2 \le 32$
and $x_1 \ge 0, \quad x_2 \ge 0$ (15mrks)