

Some examples of formulation of lpps essay



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Formulation of LPPS 1. A 24-hour supermarket has the following minimal requirements for cashiers: Period| 1| 2| 3| 4| 5| 6| Time of day(24 hr)| 3-7| 7-11| 11-15| 15-19| 19-23| 23-03| Min. # reqd. | 7| 20| 14| 20| 10| 5| Period 1 follows immediately after period 6. A Cashier works eight consecutive hours, starting at the beginning of one of the six time periods. Determine a daily employee worksheet which satisfies the requirements with the least number of personnel. Formulate the problem as a LPP. 2. An agriculturist has a 125-acre of farm.

He produces radish(Gajar), peas (Mutter) and potato (Alu). Whatever he raises is sold fully in the market. He gets Rs 5 per kg of radish. Rs 4 per kg of mutter and Rs. 5 per kg for potato. The average yield per acre is 1500kg of radish, 1800 kg of mutter and 1200 kg of potato. To produce each 100 kg of radish and mutter, and 80 kg of potato, a sum of Rs. 12. 50 has to be used for fertilizers. Labour required for each acre to raise the crop is 6 man-days for radish and potato each; and 5 man days for mutter. A total of 500 man-days of labour at a rate of Rs. 40 per man-day is available.

Formulate this as a LPP to maximize the profit of the agriculturist. 3. The Marketing department of Everest Company has collected information on the problem of advertising for its products. This relates to the advertising media available, the number families expected to be reached with each alternative, cost per advertisement, the maximum availability of each medium and the expected exposure of each one (measured as the relative value of one advertisement in each of the media): The information is given below: Media| No. of families expected to cover| Cost per ad (Rs. | Max availability (No. of times)| Expected exposure (units)| TV (30sec)| 3000| 8000| 8| 80| Radio

(15sec)| 7000| 3000| 30| 20| Sunday Ed. Of a Daily(1/4page)| 5000| 4000| 4| 50| Magazine (1page)| 2000| 3000| 2| 60| Other information and requirements: (a) The advertisement budget is Rs. 70000. (b) At least 40000 families should be covered. (The families receiving messages could be common. But a family receiving three messages, for example, would be taken to three) (c) At least 2 insertions be given in Sunday edition of daily but not more than 4 ads should be given on the TV.

Draft this as LP. The company's objective is to maximize the expected exposure. 4. A firm produces three products A, B and C. It uses two types of raw materials X and Y of which 5000 and 7500 units, respectively, are available. The raw material requirements per unit of the products are given below: Raw Material| Requirement per unit of product| | A| B| C| I| 3| 4| 5| II| 5| 3| 5| The labor time for each unit of product A is twice as that of product B and three times that of product C. The entire labor force of the firm can produce the equivalent of 3000 units.

The minimum demand of the three products is 600, 650 and 500 units respectively. Also, the ratio of the number of units produced must be equal to 2: 3: 4. Assuming the profits per unit of A, B and C are 50, 50 and 80, respectively; formulate the problem as a linear programming problem in order to determine the number units of each product that will maximize the profit. 5. A financial analyst is attempting to determine a " best" investment portfolio and is considering six alternative investment proposals.

The following table indicates point estimates for the price per share, the annual growth rate in the price per share, the annual dividend per share and

a measure of the risk associated with each investment. Portfolio Data |
 Status under considerations| | A| B| C| D| E| F| Current price per share (Rs)|
 80| 100| 160| 120| 150| 200| Projected Annual growth | 0. 08| 0. 07| 0. 10| 0.
 12| 0. 09| 0. 15| Projected Anual Div. per share (Rs)| 4. 00| 4. 50| 7. 50| 5.
 50| 5. 75| 0. 00| Projected risk in return| 0. 05| 0. 03| 0. 10| 0. 20| 0. 6| 0. 08|

The total amount available for investment is Rs. 25 lakhs and the following conditions are required to be satisfied. (i) The maximum rupee amount to be invested in alternative F is Rs 250000. (ii) No more than Rs 500000 should be invested in alternatives A and B combined. (iii) Total weighted risk should not be greater than 0. 10 where (Amt. Invested in alternative j)(Risk of Alternative j) Total Weighted Risk =

$$\frac{\sum (\text{Amt. Invested in alternative } j) \times (\text{Risk of Alternative } j)}{\text{Total amount invested in all the alternatives}}$$
 IV) For the sake diversity, at least 100 shares of each stock should be purchased. (V) At least 10% of total investment should be in alternatives A and B (VI) Dividends for the year should be at least Rs 10000. Rupee return per share of stock is defined as price per share one year hence less current price per share plus dividend per share. If the objective is to maximize total rupee return, formulate the LP model for determining the optimal number shares to be purchased in each of the shares under considerations. The time horizon is one year.