# FINAL TERM PAPER



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**SOLUTION 1:**

1. Application of Network Techniques are as Follows;
2. **Construction Industry:**

This critical path method, otherwise known as critical path scheduling, is one of the most frequently used construction planning techniques. CPM for project management uses a network diagram to graphically illustrate the major activities of a construction project and to show the links between activities.

1. Identify the Activities
2. Determine the Activities' Sequence
3. Create the Network
4. Estimate Activity Completion Time
5. Identify the Critical Path
6. Update the CPM Diagram as Needed
7. **Marketing:**

Business networking, whether it is online and/or in-person, is a very powerful way to increase your brand awareness and credibility especially if you are in the business of selling and marketing to other businesses. Besides knowing your business and your competitive advantages, it is important to set goals of what you want to achieve through business networking.

When thinking about how business networking fits within your overall marketing plans, below are questions.

1. How many people do you want to meet?
2. How many leads do you want to generate?
3. How much of my sales plan to you want to achieve via business networking?
4. Network in a Target Rich Environment & Stand Out from the Crowd
5. Givers Gain – Help Others and You Will Be Helping Yourself
6. Be Prepared – Elevator Pitch and Good Open-Ended Question
7. Good Follow Up after Meeting Someone
8. Don’t Sell at Networking Events
9. **Advantages of Network Techniques;**
10. Identifies the critical activities and focus them to provide greater managerial atten­tion.
11. Network technique enables to forecast project duration more accurately.
12. It is a powerful tool for optimization of resources by using the concept of slack.
13. It provides a scientific basis for monitoring, review and control, to evaluate effect of slippages.
14. It helps in taking decision;
    1. To over-come delays,
    2. To crashing program,
    3. Optimizing resources, and
    4. On other corrective actions.
15. It helps in getting better co-ordination amongst related fields.

**SOLUTION 2:**

Letting

Gloves = X1

Jackets = X2

Bags = X3

**Operation Function: -**

Maximize Z = f(X) = 30 X1 + 40 X2 + 80 X3

Xi > 0

**Optimality Ranges: -**

1. The optimality ranges suggest that 1 unit increase in production of X1 will reduce the value of Z by $6.00.
2. For X2  (jackets), the optimality ranges suggest that 1 unit increase in the production of X2  will reduce the value of Z by $ 5.00. So, it shows no effect on the profit is Z.
3. For X3  (bags), the optimality ranges suggest that q unit increase in the production of X3  (cars) will reduce the value of Z by $0.00. So, it means that there will be no effect on Z. i.e. Profit.

It is suggested that presently X1 is un profitable. This could be made profitable either in two case.

Case I: Increase the revenue by 32.

Case II: Reduction of Cost.

* Case I is not applicable and valid in real life because unit price of output is determined by the market.
* Case II may be implemented through adopting efficient way of production.

**Feasibility Ranges: -**

1. The feasibility ranges suggest that the dual prices for each operation are given. The dual prices suggest that 1 minute increase in the production if operation 1 will increase Z by $12.00.
2. 1 minute increase in production of operation 2 will increase Z by $15.00.
3. 1 minute increase in production of operation 3 will increase Z by $18.00. It means no effect on Z.

So, being the operation manager, it is better to give priority to operation 2, by increasing the time.

**SOLUTION 3: -**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Destination** | | | |
| **Origin** | **Denver** | **Portland** | **Miami** | **Baltimore** |
| **San Francis** | 4 | 1 | 2 | 6 |
| **Washington** | 3 | 6 | 7 | 9 |
| **Austin** | 1 | 2 | 3 | 9 |

* Three Cases / Assumption

1. **S = D**
2. **S > D**
3. **S < D**

Supply (origin) Demand (Destination)

**Supply / Origin Demand**

8000 10000

**Denver**

**San Francis**

6000 6000

**Portland**

**Washington**

5000 4000

**Miami**

**Austin**

**Baltimore**

5000

1. **San Francis: -**

Denver: 8000 x 4 = 32000 ----------- 3rd

Portland: 8000 x 1 = 8000 ----------- 1st (8000 – 6000 = 2000)

Miami: 8000 x 2 = 16000 ------------ 2nd (2000 – 4000 = -2000)

Baltimore: 8000 x 6 = 48000 ------- 4th

1. **Washington: -**

Denver: 6000 x 3 = 18000 ----------- 1st (6000-10000= -4000)

Portland: 6000 x 6 = 36000 --------- 2nd

Miami: 6000 x 7 = 42000 ------------ 3rd

Baltimore: 6000 x 9 = 54000 ------- 4th

1. **Austin: -**

Denver: 5000 x 1 = 5000 ------------ 1st (5000-4000= 1000)

Portland: 5000 x 2 = 10000 -------- 2nd (1000-2000= -1000)

Miami: 5000 x 3 = 15000 ----------- 3rd

Baltimore: 5000 x 9 = 45000 ------ 4th

**Demand Remaining:**

Denver: 4000 left

Portland: 1000 Left

Miami: 2000 Left

Baltimore: 5000 Left

1. The assumption of the transportation model is S<D satisfied. Since Supply is zero and demand is =. Therefore S<D.

**SOLUTION 4: -**

5 3

Start

4

Stop

10

2 4 15 8

1. 6
2. A + D (5+3) = 8 -------------------------------------------------------------- 1ST
3. A + C + E + F (5+10+4+15) = 34 ------------------------------------------ 4TH
4. A + C + E + G + H + I (5+10+4+12+6+8) = 45 --------------------------- 8TH
5. A + C + E + F + G + H + I (5+10+4+15+12+6+8) = 60 ----------------- 9TH
6. B + C + E + G + H + I (2+10+4+12+6+8) = 42 --------------------------- 6TH
7. B + G + H + I (2+12+6+8) = 28 -------------------------------------------- 2ND
8. B + C + G +H + I (2+10+12+6+8) = 38 ---------------------------------- 5TH
9. B + E + G + H + I (2+4+12+6+8) = 32 ------------------------------------- 3RD
10. B + C + E + F + G + H + I (2+10+4+12+6+8) = 42 ---------------------- 7TH

The shortest route to be followed by time are as follows;

1. A – D
2. B – G – H – I
3. B – E – G – H – I
4. A – C – E – F
5. B – C – G – H – I
6. B – C – E – F – G – H – I
7. A – C – E – G – H – I
8. A – C – E – F – G – H – I
9. A – C – E – F – G – H – I

**SOLUTION 5: -**

1. **Activity:**

Any individual operation, which utilizes resources and has a beginning and an end is called an activity. An arrow is used to depict an activity with its head indicating the direction of progress in the project.

1. **Burst Event:**

When more than one activity leaves an event is known as burst event

1. **Merge Event:**

When two or more activities come from an event it is known as merge event.

1. **Linear Assumption:**
2. *Proportionality:* The basic assumption underlying the linear programming is that any change in the constraint inequalities will have the proportional change in the objective function. This means, if product contributes Rs 20 towards the profit, then the total contribution would be equal to 20x1, where x1 is the number of units of the product.

For example, if there are 5 units of the product, then the contribution would be Rs 100 and in the case of 10 units, it would be Rs 200. Thus, if the output (sales) is doubled, the profit would also be doubled.

1. *Additivity:* The assumption of additivity asserts that the total profit of the objective function is determined by the sum of profit contributed by each product separately. Similarly, the total amount of resources used is determined by the sum of resources used by each product separately. This implies, there is no interaction between the decision variables.
2. *Continuity:* Another assumption of linear programming is that the decision variables are continuous. This means a combination of outputs can be used with the fractional values along with the integer values.

For example, If 52/3 units of product A and 101/3 units of product B to be produced in a week. In this case, the fractional amount of production will be taken as a work-in-progress and the remaining production part is taken in the following week. Therefore, a production of 17 units of product A and 31 units of product B over a three-week period implies 52/3 units of product A and 101/3 units of product B per week.

1. *Certainty*: Another underlying assumption of linear programming is a certainty, i.e. the parameters of objective function coefficients and the coefficients of constraint inequalities is known with certainty. Such as profit per unit of product, availability of material and labor per unit, requirement of material and labor per unit are known and is given in the linear programming problem.