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If you want to learn computer programming then contact with me

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MTH601 FINAL TERM PAPER SHARED BY STUDENT

ON SEPTEMBER 2, 2018 AT 8:23PM

Current paper MTH601
1-Find cumulative cost each year
2-find the optimality condition ,use UV multiplier
3-Find
U1+v1
U1+V2
4-Calculate present worth(P(r))
5-Initial basic feasible solution minimize the cost
6-Discount cost in each year
7-linear problem in standard form
or eak dual function ka question tha...
BEST OF LUCK...

MTH601 FINAL TERM PAPER SHARED BY STUDENT

ON SEPTEMBER 5, 2018 AT 1:24PM

My todays paper



Today's Paper

Total Question = 52

MCQs = 40

Subjective = 12

Aik Question Graph ka tha

Aik Question Dual our primal ka tha jaisa assignment main tha (5 M)

Annual Cummulative cost Wala Question tha

UV Multiplier Wala Sawal tha

Least cost wala question tha lakin ajeeb tha solve hi nhi ho rha tha halankeh mujhy least cost method aata bhi tha

Baqi question past sy thy yeh waly

A company cost Rs. 500 operations and maintenance costs are zero for the first year and increased by Rs. 100 every year. If money is worth 5% every year, calculate present worth (**P(r)**) for each year. The resale value of the machine is negligibly small.

Answer

for each year increase in money = 5%

means to say that company significes 105 ruppes every year the company capital must be increaing as 105 * 500

0 1

2 6

5 1

1 5

2 7



5 2

3

2 4 7

7

5 5 10

To find optimality condition we use UV multiplier process

Find

1. U_2+V_2
2. U_3+V_3

The cost of a new machine is Rs. 5000. The maintenance cost during the nth year is given by M_n = Rs.500 (n-1), where n=1, 2, 3… If the discount rate per year is 0.05, determine discount factor (v^{n-1}) for each year.

Solution:

M = 5000

M_n = 500 (n-1)

V = 0.05

(v^{n-1}) = ?

Nth year	M_n	(v^{n-1})
1	0	1.00
2	500	0.05
3	1000	0.0025
4	1500	0.000125

Or



Nth year	(v^{n-1})
1	1.00
2	0.05
3	0.0025
4	0.000125

Determine whether the following Transportation model has initial feasible solution?

	D_1	D_2	D_3	D_4	Supple
Q_1	x_{11}	x_{12}	x_{13}	x_{14}	6
Q_2	X_{21}	X_{22}	X_{23}	X_{24}	8
Q_3	X_{31}	X_{32}	X_{33}	X_{34}	10
Demand	4	6	8	6	

Solution:

The transportation problems can berepresented mathematically as a linear programming model. The

Objective function in this problem is to minimize the total transportation cost given by

$Z = c_{11}x_{11} + c_{12}x_{12} + \ldots + c_{mn}x_{mn}$

Subject to the restrictions:

Row restrictions:

$x_{11} + x_{12} + x_{13} + x_{14} = 6$

$x_{21} + x_{22} + x_{23} + x_{24} = 8$

$x_{31} + x_{32} + x_{33} + x_{34} = 10$

Column restrictions:

$x_{11} + x_{21} + x_{31} + x_{41} = 4$

$x_{12} + x_{22} + x_{32} + x_{42} = 6$



$x_{13} + x_{23} + x_{33} + x_{43} = 8$

$x_{14} + x_{24} + x_{34} + x_{44} = 6$

And

$x_{11} + x_{12} + x_{13} + x_{14} \geq 0$

It should be noted that the model has feasible solutions only if

$a_1 + a_2 + a_3 + a_4 = 4+6+8+6$

Or

=

Baqi Yad nhi

MTH601 FINAL TERM PAPER SHARED BY STUDENT

ON SEPTEMBER 10, 2018 AT 12:05PM

***Mine* MTH601 CURRENT PAPER:**

TOTAL QUESTION: ***52***

MCQS: ***40***

SUBJECTIVE: ***12***

MCQS WERE FROM ***past paper and handouts.***

1. A TABLE WAS GIVEN WE HAVE TO FIND OUT UITH+VJTH=?

2. HOW TO BREAK A TIE IN LEAST COST?

3. A TABLE WAS GIVEN WE HAVE TO FIND OUT AT LEAST THREE DIFFERENTIATE BETWEEN MINIMIZATION AND MAXIMIZATION.

4. A DIFFERENTIATE TABLE WAS GIVEN OF PRIMAL AND DUAL. PRIMAL SIGNIFICANT WAS GIVEN WE JUST WRITE DUAL.

5. WHEN THE TWO PHASE METHOD IS USED?

6. A TABLE WAS GIVEN WE HAVE TO GIVE ASSIGNMENT.

7. ONE QUESTION IN TABLE FORM FIND U1+V1 AND U1+V3.

8. THE COST OF A NEW MACHINE IS RS. 5000. THE MAINTENANCE COST DURING THE NTH YEAR IS GIVEN BY M_N = RS.500 (N-1), WHERE N=1, 2, 3… IF THE DISCOUNT RATE PER YEAR IS 0.05, DETERMINE DISCOUNT FACTOR (V^{N-1}) FOR EACH YEAR. (FROM PAST)

9. CHECK WHETHER THE GIVEN INITIAL BASIC FEASIBLE SOLUTION IS OPTIMAL OR NOT. (FROM PAST)



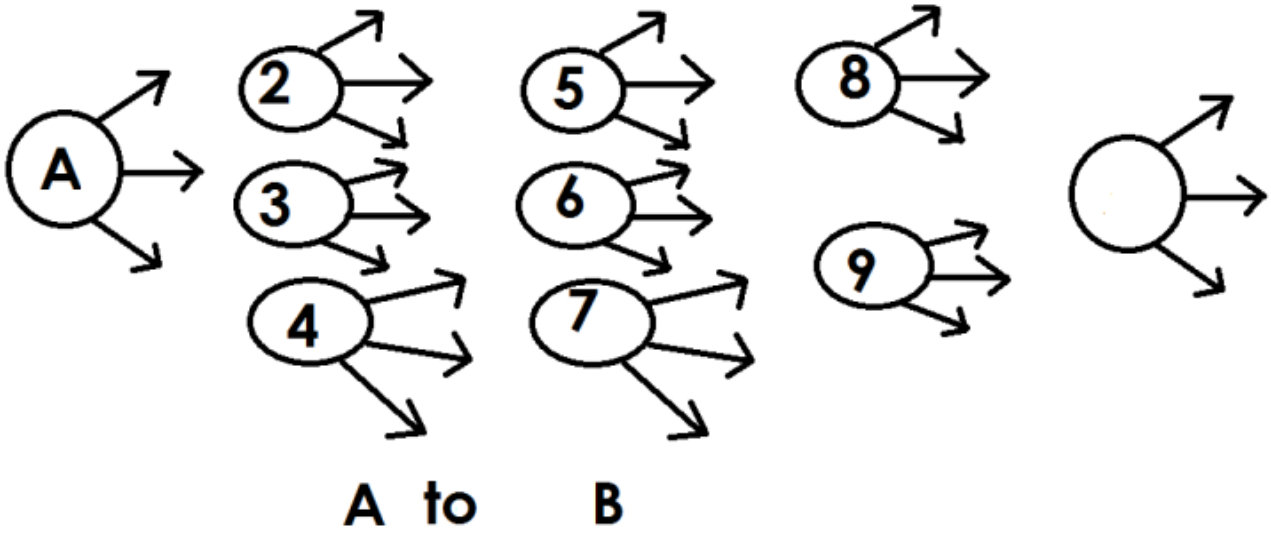
1	2	6	**7**
		7	
0	4	2	**12**
10		**2**	
	1	5	
3			**11**
	10	1	
10	10	10	

10. A COMPANY COST RS. 500 OPERATIONS AND MAINTENANCE COSTS ARE ZERO FOR THE FIRST YEAR AND INCREASED BY RS. 100 EVERY YEAR. IF MONEY IS WORTH 5% EVERY YEAR, CALCULATE PRESENT WORTH (***P(r)***) FOR EACH YEAR. THE RESALE VALUE OF THE MACHINE IS NEGLIGIBLY SMALL. (FROM PAST)

11. A SHAPE WAS GIVEN OF OR WE HAVE TO FIND MINIMIZE THE WAY FROM A TO B.

ONLY WRITE ONE STAGE AND TWO STAGE.





12. ONE QUESTION IS NOT REMEMBER.

MTH601 FINAL TERM PAPER SHARED BY STUDENT

Q: A firm has normally distributed forecast of usage with MAD=50 units. It desires a service level, which limits the stock, out to one order cycle per year. Determine Standard Deviation (SD), if the order quantity is normally a week`s supply.

Solution:

$$SD = \sqrt{\frac{\pi}{2}}(50)$$

$$SD = \sqrt{\frac{3.14}{2}}(50)$$

$$SD = \sqrt{1.57}\,(50)$$

$$SD = (1.25)(50)$$

$$SD = 62.64$$



Q: A company centre has got four experts programmers. The centre needs four application programmers to be developed. The head of the computer centre, after studying carefully the programmer's to be developed, estimate the computer time in minutes required by the respective experts to develop the application programmers as follows.

Programmers	A	B	C	D
1	120	100	80	90
2	80	90	110	70
3	110	140	120	100
4	90	90	80	90

Solution:

Programmers	A	B	C	D
1	30	10	0	10
2	0	10	40	0
3	0	30	20	0
4	0	0	0	10

Programmers	A	B	C	D
1	30	10	**0**	10
2	**0**	10	40	**0**
3	0x	30	20	0x
4	0x	**0**	0x	10

Q: the cost of a new machine is Rs. 5000. The maintenance cost during the nth year is given by M_n = Rs.500 (n-1), where n=1, 2, 3… If the discount rate per year is 0.05, determine discount factor (v^{n-1}) for each year.

Solution:

M = 5000

M_n = 500 (n-1)

V = 0.05

(v^{n-1}) = ?



Nth year	M_n	(v^{n-1})
1	0	1.00
2	500	0.05
3	1000	0.0025
4	1500	0.000125

Or

Nth year	(v^{n-1})
1	1.00
2	0.05
3	0.0025
4	0.000125

Q: Determine whether the following Transportation model has initial feasible solution?

	D_1	D_2	D_3	D_4	Supple
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Demand	4	6	8	6	

Solution:

The transportation problems can be represented mathematically as a linear programming model. The

Objective function in this problem is to minimize the total transportation cost given by

$Z = c_{11}x_{11} + c_{12}x_{12} + \ldots + c_{mn}x_{mn}$

Subject to the restrictions:

Row restrictions:

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Column restrictions:

$x_{11} + x_{21} + x_{31} + x_{41} = 4$

$x_{12} + x_{22} + x_{32} + x_{42} = 6$

$x_{13} + x_{23} + x_{33} + x_{43} = 8$

$x_{14} + x_{24} + x_{34} + x_{44} = 6$

And

$x_{11} + x_{12} + x_{13} + x_{14} \geq 0$

It should be noted that the model has feasible solutions only if

$a_1 + a_2 + a_3 + a_4 = 4+6+8+6$

Or

$$\sum_{i=0}^{m} a_i = \sum_{j=1}^{n} b_j$$

Q:

Salesman	Region					
	1	2	3	4	5	6
A	5	0	25	0	15	0
B	**0**	50	0	25	30	45
C	35	15	55	**0**	40	75
D	10	30	5	30	15	**0**
E	25	**0**	30	55	20	30
F	35	35	20	10	**0**	55

Do next step by applying Hungarian method?

Solution:

Salesman	Region					
	1	2	3	4	5	6



A	5	0x	25	0x	15	0x
B	**0**	50	0x	25	30	45
C	35	15	55	**0**	40	75
D	10	30	5	30	15	**0**
E	25	**0**	30	55	20	30
F	35	35	20	10	**0**	55

Here we have only three assignments. But we must have four assignments. With this maximal assignment we have to draw the minimum number of lines to cover all the zeros.

Q: An oil company has 8 unit of money available for exploration of three sites. If oil is present at a site, the probability of finding it depends upon the amount allocated for exploiting the site as given below.

	0	1	2	3	4	5	6	7	8
Site I	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.0
Site II	**0.0**	0.1	0.2	0.3	0.4	0.6	0.7	0.8	1.0
Site III	0.0	0.1	0.1	**0.2**	0.3	0.5	0.8	0.9	1.0

The probability that the oil exits at sites I, II and III is 0.4, 0.3 and 0.2 respectively; we have to find the optimal allocating of money. Stage I is given below, only do stage it.

Stage I

Max. $Z=0.4P_1(x_1) + 0.3P_2(x_2)$

Subject to: $x_1+x_1+x_1\leq 8$

No. of boxes x_1	0	1	2	3	4	5	6	7	8
$f_1(x_1)$	0	0	4	8	12	20	28	36	40

Q. a person wants to decide the constituents of a diet which will fulfill his daily requirements of protein, fats and carbohydrates at the minimum cost. The choice is to be made from four different types of foods. The yields per unit of these foods are given in the table below:

	Yield per unit	



Food type	Proteins	Fats	carbohydrates	3 Cost per unit (Rs.)
1 **2** **3** **4**	**3** **4** **8** **6**	**2** **2** **7** **5**	**6** **4** **7** **4**	**45** **40** **85** **65**
Min Requirement	**800**	**200**	**700**	

Solution:

Let x1, x2, x3 and x4 denote the number of units of food of type 1, 2, 3 & 4 respectively. Objective is to minimize the cost i.e.

Minimize Z = 45x1+40x2+85x3+65x4

Constraints are on the fulfillment of the daily requirements of various constituents i.e.

Proteins - 3x1 + 4x2 + 8x3 + 6x4 ≥ 800

Fats - 2x1 + 2x2 + 7x3 + 5x4 ≥ 200,

Carbohydrates - 6x1 + 4x2 + 7x3 + 4x4 ≥ 700.

Where x1, x2, x3, x4 each ≥ 0

Fall 2012

Question No: 41 (Marks: 2)



A branch of Punjab National Bank has only one typist. Since the typing work varies in length (number of pages to be typed), the typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8 – hour worki9ng day. If the typewriter is valued at Rs. 1.50 per hour, Determine Average system time.

Answer:

W_s= 1/μ-λ = 1/8-5 =1/3hr=1/3*60=20 min

Question No: 42 (Marks: 2)

An oil company has 8 unit of money available for exploration of three sites. If oil is present at a site, the probability of finding it depends upon the amount allocated for exploiting the site as given below:

	0	1	2	3	4	5	6	7	8
Site I	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.0
Site II	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.8	1.0
Site III	0.0	0.1	0.1	0.2	0.3	0.5	0.8	0.9	1.0

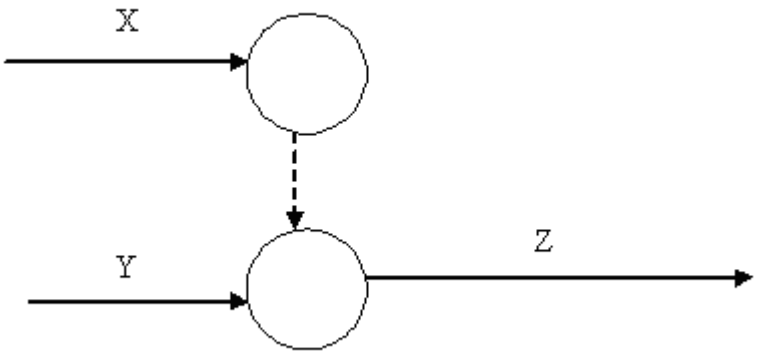
The probability that the oil exits at sites I, II and III is 0.4, 0.3 and 0.2 respectively; we have to find the optimal allocating of money.

Do stage I only.

Answer

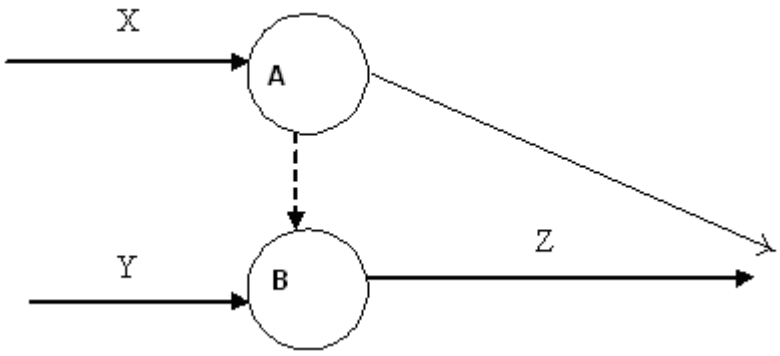
Not Attempted

Question No: 43 (Marks: 2)



Write the relationship between the activities.

Answer



X approches to Y

X also approches to Z

Y approches to Z

Whether A and b might have the values between the centre points



Question No: 44 (Marks: 2)

$$\min z = \sum_{i=1}^{i=m} \sum_{j=1}^{j=n} c_{ij} x_{ij} \text{ ------(1)}$$

For the mathematical form of a Transportation problem (T.P)

subject to

$$\sum_{j=1}^{j=n} x_{ij} = a_i \text{ ------(2)} \ , i = 1, 2, \ldots, m \text{(Sources)}$$

$$\sum_{i=1}^{i=m} x_{ij} = b_j \text{ ------(3)} \ , i = 1, 2, \ldots, n \text{(Destinations)}$$

Describe the practical significance of all the above equations(1), (2) and (3).

Answer :

The above is a mathematical formulation of a transportation problem and we can adopt the linear programming technique with equality constraints. Here the algebraic procedure of the simple method may not be the best method to solve the problem and hence more efficient and simpler streamlined procedures have been developed to solve transportation problems.

Question No: 45 (Marks: 3)

The milk plant at a city distributes its products by trucks, located at the loading dock. It has its own fleet of trucks plus trucks of a private transport company. This transport company has complained that sometimes its trucks have to wait in line and thus the company loses money paid for a truck and driver that is only waiting. The company has asked the milk plant management either to go in for a second loading dock or discount prices equivalent to the waiting time, the following data available



$$\lambda = Average\ arrival\ rate = 3\ per\ hour$$
$$\mu = Average\ service\ rate = 4\ per\ hour$$

The transport company has provided 40%of the total number of trucks. Assuming that these rates are random according to Poisson distribution, determine

a) The probability that a truck has to wait.

b) The waiting time of a truck that waits.

Answer

The probability that a truck has to wait.

$$\frac{\mu}{\mu-\lambda} = \frac{4}{4-3} = \frac{4}{1} = 4$$

The waiting time of a truck that waits.

round about 40 minutes of each truck.

Question No: 46 (Marks: 3)

A company has a machine whose cost is Rs. 30,000. Its maintenance cost and resale value at the end of different years are as given below:



Years.	1	2	3	4	5	6
Maintenance Cost.	4500	4700	5000	5500	6500	7500
Resale Value	27000	25300	24000	21000	18000	13000

Determine capital cost for each year.

Answer

Question No: 47 (Marks: 3)

A firm produced three products. These products are processed on three different machines. The time required to manufacturer one unit of each of the three products and the daily capacities of the three machines are given in the table:

Machines	Time per unit (minutes)			Machine Capacity (minutes / day)
	Product 1	Product 2	Product 3	
M1	2	3	2	440
M2	4	---	3	470
M3	2	3	---	430

It is required to determine the daily number of units to be manufactured for each product.



The profit per unit for product 1, 2 and 3 is Rs. 4, Rs. 3 and Rs. 6 respectively. It is assumed that all the amounts produced are consumed in the market. Write the constraints of above Linear Programming Problem.

Answer

Step 1

Find the key decision to be made. The key decision is to decide the extent of product 1,2&3 to be produced as this can vary.

Step 2

Assume symbols for the extent of production. Let the extent of Product 1,2&3 be X1, X2 & X3.

Step 3

Express the feasible alternatives mathematically in terms of variables. Feasible alternatives are those which are physically, economically and financially possible. In this example, feasible alternatives are sets of values of x1, x2 & x3, where x1,x2 &x3 ≥ 0 since negative production has no meaning and is not feasible.

Step 4

Mention the object quantitatively and express it as a linear function of variables. IN the present example, objective is to maximize the profit.

i.e. Maximize Z = 4x1+3x2+6x3

Step 5

Express the constraints as linear equations/inequalities in terms of variables.

Here, constraints are o the machine capacities and can be mathematically expressed as

$2x1 + 3x2 + 2x3 \leq 440,$

$4x1 + 0x2 + 3x3 \leq 470,$

$2x1 + 5x2 + 0x3 \leq 430.$



Question No: 48 (Marks: 3)

Express the following Transportation problem (T.P) table into algebraic form with proper objective function and non-negative constraints

Answer

	D_1	D_2	D_3	Supply
O_1	c_{11}	c_{12}	c_{13}	5
O_2	c_{21}	c_{22}	c_{23}	3
O_3	c_{31}	c_{32}	c_{33}	10
Demand	4	6	8	

$4x + S_2 + D_1 \leq 5$

$S_1 + 6y + D_1 \geq 3$

$S_1 + S_2 + 8z \leq 10$

Question No: 49 (Marks: 5)

	1	**2**	**3**	**Supply**
1	1	2	6 **7**	**7**



2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Complete the above transportation Model by Vogel Approximation Method.

And also find the starting basic feasible solution.

Answer

	1	**2**	**3**	**Supply**
1	1	2	6 **7**	**7**
2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	



Cost = 1 + 2 + 7(6) + 2 + 5(1) = 52

This is the initial basic solution consider u1 = 1 and v1 = 2 and v2 = 3

Question No: 50 (Marks: 5)

Check whether the given initial basic feasible solution is optimal or not.

1	2	6 **7**	**7**
0 **10**	4	2 **2**	**12**
3	1 **10**	5 **1**	**11**
10	**10**	**10**	

Answer

	1	**2**	**3**	**Supply**



1	1	2	6 **7**	**7**
2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Cost = 1 + 2 + 7(6) + 2 + 5(1) = 52

This is the initial basic solution consider u1 = 1 and v1 = 2 and v2 = 3

it is a n optimal solution according to if we put formula

Question No: 51 (Marks: 5)

A company cost Rs. 500 operations and maintenance costs are zero for the first year and increased by Rs. 100 every year. If money is worth 5% every year, calculate present worth (**P(r)**) for each year. The resale value of the machine is negligibly small.



Answer

---

for each year increase in money = 5%

means to say that company significes 105 ruppes every year the company capital must be increaing as 105 * 500

Question No: 52 (Marks: 5)

Express the following linear programming problem in standard form and also construct its initial simplex table.

Max $Z = 3x+2y$

Subject to constraints:

$x + y \leq 4$

$x - y \leq 2$

$x,y \geq 0$

Answer

Blank Data



Mth601 30 July 2013 final term paper:

2 marks qs

Q: ek bohat sari activities wali diagram di hui thi or qs ye tha

Find EFT for each activity?

Q:

0 5	2	1 1	6
2	1 5	5 2	7
2	4	3 7	7
5	5	10	

To find optimality condition we use UV multiplier process

Find

a) U_2+V_2
b) U_3+V_3

Q: 3 ya 5 mark ka tha ye qs

Contractor side wali values yad nai…

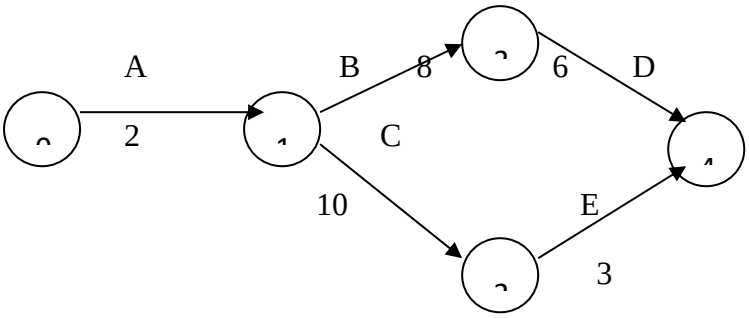
Building:	Contractor:
A	
B	
C	
D	

Operate first step by optimizing row wise the above assignment model.

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Q: state principal of optimality (optimal policy) for dynamic programming?

Q: fin EST and EFT for each activity.



Q: 5 marks

0 5	2	1 1	6
2	1 5	5 2	7
2	4	3 7	7
5	5	10	

Find

a) P_{31}
b) P_{32}

Using $P_{ij} = U_i + V_j - C_{ij}$ suppose $U_1 = 0$ and $U_2 = 5$

Q: ek statement thi us me se Average Queuing length find krna thi.

Q: Minimizing setup times, which are given? (5 marks)

Job ki values yad nai

	Job 1	**Job2**	**Job3**	**Job4**



Machine 1	14	5	7	
Machine 2				
Machine 3				
Machine 4				

Q: ek 5 mark ka qs itna long tha k word pe paste krne se ek se zyada page ki just statement thi….

Replacement Of Items with change in value and time

It is assumed that the maintenance cost increases with time and each cost is to be paid just in the start of the period. Let the money carry a rate of interest r per year. Thus a rupee invested now will be worth (1 + r) after a year, $(1+r)^2$after two years and so on.

Do first

Answer

Diff b/w CPM??

Answer

PERT

No. of stores	1	2	3
No. of boxes			
0	0	0	0
1	4	2	6
2	6	4	8
3	7	6	8
4	7	8	8
5	7	8	8
6	7	10	8
4	0	1	1
5	0	2	1
7	0	3	1

step?

pert n

(Programme Evaluation & Review Technique) is event oriented whereas CPM

(Critical Path Method) is activity oriented.



In CPM based network analysis no allowance is made for the uncertainties in the

duration of time involved.

In CPM, times are related to costs

Q:…Make two steps, of rows and columns of the following table…

Answer:

Least ko sab me se Minus krna hay pehlay rows, then columns, to have atleast one zero in all….

Markets / salesmen	I	II	III	IV
A	44	80	52	60
B	60	56	40	72
C	36	60	48	48
D	52	76	36	40

Markets / salesmen	I	II	III	IV
A	8	24	16	20



B	24	0	4	32
C	0	4	12	8
D	16	20	0	0

Complete the table By VOgha ‘s method:

Sol:

Red is solved one

	1	**2**	**3**	**Supply**
1	0 **5**	2	1 **1**	**6**
2	2	1 **5**	5 **2**	**7**
3	2	4	3 **7**	**7**
Demand	**5**	**5**	**10**	

21 july 2013

1. a branch of bank has only one typist. typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8/hour . Letter arrive rate is 5/hour during the entire 8 hour working day if writer is value 1.50 per hour determine the equipment utilization? 2marks and same this question is appeared as 5 marks question

2. Scenario was given and we have to tell the objective function of linear programming.... 2 marks



3. Table was given n determine that transportation model has initial feasible solution..... 2 marks

4. State principle of optimality for dynamic programming ..... 2 marks

5. Transportation model was given and one block has x we have to find the value of x..... 3 marks

6. Values were given and we need to tell the capital cost for each year ..... 3 marks

7. In the context of pert and CPM summarize the project planning techniques

8. One stage problem is given find the two stage problem

s	Fi*(s)	Xi
8	25	10
9	35	10

9. Table was given and asked that check initial solution is feasible or not..... 5 marks

10. Question no 1 was again appeared as 5 marks question

11. The cost of the new machine is 5000. Maintenance during the nth year is given by Mn = 500 rps (n-1) when n = 1, 2, 3 ....if discount rate per year is 0.05 calculate the present worth ..... 5 marks

12. Graph was given and question was construct the table relation show between events and activities. 5 mark s

MTH601 FINAL TERM PAPER SHARED BY STUDENT

ON AUGUST 21, 2017 AT 11:36AM

aoa all mcqs were new.
subjective was easy
1) Comulative cost find karni thi.
2) total cost and average cost find karni thi.
3) 3 question minimization and maximization se related they.
4) activities ka relationship batana tha

MTH601 FINAL TERM PAPER SHARED BY STUDENT

ON MARCH 1, 2016 AT 10:39AM

MTH 601
50 MCQ from past and midterm
subjective 3,4 questions past main sy thay

1- minimization or maximization k questions thay 2,3 marks k
2- assignment problem thi row col operations krny thay
3- find U2+V2 , U3+V3 Table diya howa tha
4- optimum manufacturing quantity find krni thi (EQ model 3)
5-network diya howa tha Critical path btana tha



6- given basic feasible solition is optimal or not
7- ek koi machine related question b tha values given thin
8- write down dual of fowling linear programing problem.

baqi yad nhi :p
past papers achy sy kr lena or samjhe lena :p
or apna paper b share kr diya kro ta k baqi bachon ki b help ho jay bs aty ho Ning py or papers dekh kr chaly jaty ho banda khud b Share kr deta hai

MTH601 FINAL TERM PAPER SHARED BY STUDENT

on March 1, 2016 at 3:08pm

paper was soo easy 60% qiuzz past papers

1)Q: the cost of a new machine is Rs. 5000. The maintenance cost during the nth year is given by Mn = Rs.500 (n-1), where n=1, 2, 3… If the discount rate per year is 0.05, determine discount factor (vn-1) for each year.
Solution:
M = 5000
Mn = 500 (n-1)
V = 0.05
(vn-1) = ?
Nth year Mn (vn-1)
1 0 1.00
2 500 0.05
3 1000 0.0025
4 1500 0.000125

Or
Nth year (vn-1)
1 1.00
2 0.05
3 0.0025
4 0.000125
Q2)A company has a machine whose cost is Rs. 30,000. Its maintenance cost and resale value at the end of different years are as given below:



Years. 1 2 3 4 5 6
Maintenance Cost. 4500 4700 5000 5500 6500 7500
Resale Value 27000 25300 24000 21000 18000 13000
Q #3Express the following linear programming problem in standard form and also construct its initial simplex table.
Max Z = 3x+2y
Subject to constraints:
$x + y \leq 4$
$x - y \leq 2$
$x,y \geq 0$
Q4 critical path and show relation in table?
Q5 Table was given and asked that check initial solution is feasible or not..... 5 marks
Q6 The cost of the new machine is 5000. Maintenance during the nth year is given by Mn = 500 rps (n-1) when n = 1, 2, 3 ....if discount rate per year is 0.05 calculate the present worth ..... 5 marks
Q 7 Graph was given and question was construct the table relation show between events and activities. 5 mark s

MTH601 FINAL TERM PAPER SHARED BY STUDENT

ON JULY 21, 2013 AT 11:32AM

mcqs were randomly from all over course

1. a branch of bank has only one typist. typing rate is randomly distributed approximating a poission distribution with mean service rate of 8/hour . letter arrive rate is 5/hour during the entire 8 hour working day if writer is value 1.50 per hour determine the equipment utilization?.... 2marks and samethis question is appeared as 5 marks question

2. scenario was given and we have to tell the objective function of linear programming .... 2 marks

3. table was given n determine that transportation model has initial feasible solution..... 2 marks

4. state principle of optimility for dynamic programming ..... 2 marks

5. transportation model was given and one block has x we have to find the value of x ..... 3 marks

6. values were given and we need to tell the capital cost for each year ..... 3 marks

7. in the context of pert and cpm summerize the project planning techniques

8. one stage problem is given find the two stage problem



s	Fi*(s)	Xi
8	25	10
9	35	10

9. table was given and asked that check initial solution is feasible or not ..... 5 marks

10. question no 1 was again appeared as 5 marks question

11. the cost of the new machine is 5000. maintainance during the nth year is given by Mn = 500 rps (n-1) when n = 1,2,3 ....if discount rate per year is 0.05 calculate the present worth ..... 5 marks

12. graph was given and question was construct the table relation show between events and activities . 5 mark s

MTH601 FINAL TERM PAPER SHARED BY STUDENT

Q: A firm has normally distributed forecast of usage with MAD=50 units. It desires a service level, which limits the stock, out to one order cycle per year. Determine Standard Deviation (SD), if the order quantity is normally a week`s supply.

Solution:

$$SD = \sqrt{\frac{\pi}{2}}(50)$$

$$SD = \sqrt{\frac{3.14}{2}}(50)$$

$$SD = \sqrt{1.57}\,(50)$$

$$SD = (1.25)(50)$$

$$SD = 62.64$$

Q: A company centre has got four experts programmers. The centre needs four application programmers to be developed. The head of the computer centre, after studying carefully the programmer's to be developed, estimate the computer time in minutes required by the respective experts to develop the application programmers as follows.

Programmers	A	B	C	D



1	120	100	80	90
2	80	90	110	70
3	110	140	120	100
4	90	90	80	90

Solution:

Programmers	A	B	C	D
1	30	10	0	10
2	0	10	40	0
3	0	30	20	0
4	0	0	0	10

Programmers	A	B	C	D
1	30	10	**0**	10
2	**0**	10	40	**0**
3	0x	30	20	0x
4	0x	**0**	0x	10

Q: the cost of a new machine is Rs. 5000. The maintenance cost during the nth year is given by M_n = Rs.500 (n-1), where n=1, 2, 3… If the discount rate per year is 0.05, determine discount factor (v^{n-1}) for each year.

Solution:

M = 5000

M_n = 500 (n-1)

V = 0.05

(v^{n-1}) = ?

Nth year	M_n	(v^{n-1})
1	0	1.00
2	500	0.05
3	1000	0.0025
4	1500	0.000125



Or

Nth year	(v^{n-1})
1	1.00
2	0.05
3	0.0025
4	0.000125

Q: Determine whether the following Transportation model has initial feasible solution?

	D_1	D_2	D_3	D_4	Supple
Q_1	x_{11}	x_{12}	x_{13}	x_{14}	6
Q_2	X_{21}	X_{22}	X_{23}	X_{24}	8
Q_3	X_{31}	X_{32}	X_{33}	X_{34}	10
Demand	4	6	8	6	

Solution:

The transportation problems can be represented mathematically as a linear programming model. The

Objective function in this problem is to minimize the total transportation cost given by

$Z = c_{11}x_{11} + c_{12}x_{12} + \ldots + c_{mn}x_{mn}$

Subject to the restrictions:

Row restrictions:

$x_{11} + x_{12} + x_{13} + x_{14} = 6$

$x_{21} + x_{22} + x_{23} + x_{24} = 8$

$x_{31} + x_{32} + x_{33} + x_{34} = 10$

Column restrictions:

$x_{11} + x_{21} + x_{31} + x_{41} = 4$

$x_{12} + x_{22} + x_{32} + x_{42} = 6$

$x_{13} + x_{23} + x_{33} + x_{43} = 8$



$x_{14} + x_{24} + x_{34} + x_{44} = 6$

And

$x_{11} + x_{12} + x_{13} + x_{14} \geq 0$

It should be noted that the model has feasible solutions only if

$a_1 + a_2 + a_3 + a_4 = 4+6+8+6$

Or

$$\sum_{i=0}^{m} a_i = \sum_{j=1}^{n} b_j$$

Q:

Salesman	Region					
	1	2	3	4	5	6
A	5	0	25	0	15	0
B	**0**	50	0	25	30	45
C	35	15	55	**0**	40	75
D	10	30	5	30	15	**0**
E	25	**0**	30	55	20	30
F	35	35	20	10	**0**	55

Do next step by applying Hungarian method?

Solution:

Salesman	Region					
	1	2	3	4	5	6
A	5	0x	25	0x	15	0x
B	**0**	50	0x	25	30	45
C	35	15	55	**0**	40	75
D	10	30	5	30	15	**0**
E	25	**0**	30	55	20	30
F	35	35	20	10	**0**	55



Here we have only three assignments. But we must have four assignments. With this maximal assignment we have to draw the minimum number of lines to cover all the zeros.

Q: An oil company has 8 unit of money available for exploration of three sites. If oil is present at a site, the probability of finding it depends upon the amount allocated for exploiting the site as given below.

	0	1	2	3	4	5	6	7	8
Site I	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.0
Site II	**0.0**	0.1	0.2	0.3	0.4	0.6	0.7	0.8	1.0
Site III	0.0	0.1	0.1	**0.2**	0.3	0.5	0.8	0.9	1.0

The probability that the oil exits at sites I, II and III is 0.4, 0.3 and 0.2 respectively; we have to find the optimal allocating of money. Stage I is given below, only do stage it.

Stage I

Max. $Z=0.4P_1(x_1) + 0.3P_2(x_2)$

Subject to: $x_1+x_1+x_1\leq 8$

No. of boxes x_1	0	1	2	3	4	5	6	7	8
$f_1(x_1)$	0	0	4	8	12	20	28	36	40

Q. a person wants to decide the constituents of a diet which will fulfill his daily requirements of protein, fats and carbohydrates at the minimum cost. The choice is to be made from four different types of foods. The yields per unit of these foods are given in the table below:

Food type	Yield per unit			3 Cost per unit (Rs.)
	Proteins	Fats	carbohydrates	
1	**3**	**2**	**6**	**45**
2	**4**	**2**	**4**	**40**
3	**8**	**7**	**7**	**85**



4	**6**	**5**	**4**	**65**
Min Requirement	**800**	**200**	**700**	

Solution:

Let x1, x2, x3 and x4 denote the number of units of food of type 1, 2, 3 & 4 respectively. Objective is to minimize the cost i.e.

Minimize Z = 45x1+40x2+85x3+65x4

Constraints are on the fulfillment of the daily requirements of various constituents i.e.

Proteins - 3x1 + 4x2 + 8x3 + 6x4 ≥ 800

Fats - 2x1 + 2x2 + 7x3 + 5x4 ≥ 200,

Carbohydrates - 6x1 + 4x2 + 7x3 + 4x4 ≥ 700.

Where x1, x2, x3, x4 each ≥ 0

Fall 2012

Question No: 41 (Marks: 2)

A branch of Punjab National Bank has only one typist. Since the typing work varies in length (number of pages to be typed), the typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8 – hour worki9ng day. If the typewriter is valued at Rs. 1.50 per hour, Determine Average system time.

Answer:

W_s= 1/μ-λ = 1/8-5 =1/3hr=1/3*60=20 min



Question No: 42 (Marks: 2)

An oil company has 8 unit of money available for exploration of three sites. If oil is present at a site, the probability of finding it depends upon the amount allocated for exploiting the site as given below:

	0	1	2	3	4	5	6	7	8
Site I	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.0
Site II	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.8	1.0
Site III	0.0	0.1	0.1	0.2	0.3	0.5	0.8	0.9	1.0

The probability that the oil exits at sites I, II and III is 0.4, 0.3 and 0.2 respectively; we have to find the optimal allocating of money.

Do stage I only.

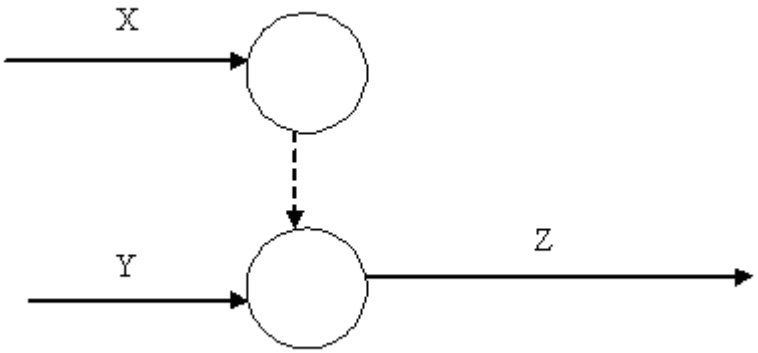
Answer

Not Attempted

Question No: 43 (Marks: 2)

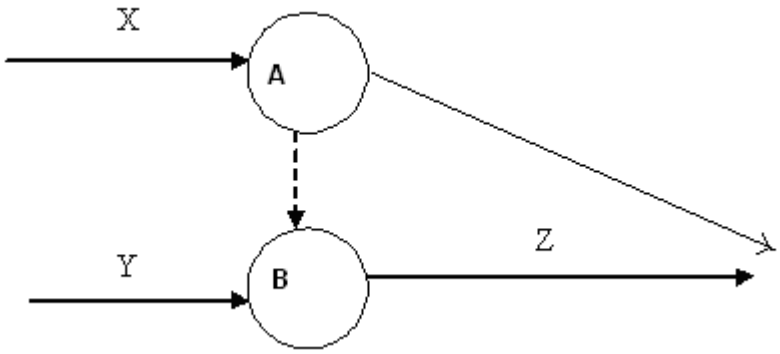
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www.ranapk.com



Write the relationship between the activities.

Answer



X approches to Y

X also approches to Z

Y approches to Z

Whether A and b might have the values between the centre points

Question No: 44 (Marks: 2)



$$\min z = \sum_{i=1}^{i=m} \sum_{j=1}^{j=n} c_{ij} x_{ij} \text{ -----(1)}$$

For the mathematical form of a Transportation problem (T.P)

subject to

$$\sum_{j=1}^{j=n} x_{ij} = a_i \text{ -----(2)} \ , i = 1, 2, \ldots, m \text{(Sources)}$$

$$\sum_{i=1}^{i=m} x_{ij} = b_j \text{ -----(3)} \ , i = 1, 2, \ldots, n \text{(Destinations)}$$

Describe the practical significance of all the above equations(1), (2) and (3).

Answer :

The above is a mathematical formulation of a transportation problem and we can adopt the linear programming technique with equality constraints. Here the algebraic procedure of the simple method may not be the best method to solve the problem and hence more efficient and simpler streamlined procedures have been developed to solve transportation problems.

Question No: 45 (Marks: 3)

The milk plant at a city distributes its products by trucks, located at the loading dock. It has its own fleet of trucks plus trucks of a private transport company. This transport company has complained that sometimes its trucks have to wait in line and thus the company loses money paid for a truck and driver that is only waiting. The company has asked the milk plant management either to go in for a second loading dock or discount prices equivalent to the waiting time, the following data available

$$\lambda = Average\, arrival\, rate = 3\ per\ hour$$
$$\mu = Average\, service\, rate = 4\ per\ hour$$



The transport company has provided 40%of the total number of trucks. Assuming that these rates are random according to Poisson distribution, determine

c) The probability that a truck has to wait.

d) The waiting time of a truck that waits.

Answer

The probability that a truck has to wait.

$$\frac{\mu}{\mu-\lambda}=\frac{4}{4-3}=\frac{4}{1}=4$$

The waiting time of a truck that waits.

round about 40 minutes of each truck.

Question No: 46 (Marks: 3)

A company has a machine whose cost is Rs. 30,000. Its maintenance cost and resale value at the end of different years are as given below:

Years.	1	2	3	4	5	6



Maintenance Cost.	4500	4700	5000	5500	6500	7500
Resale Value	27000	25300	24000	21000	18000	13000

Determine capital cost for each year.

Answer

Question No: 47 (Marks: 3)

A firm produced three products. These products are processed on three different machines. The time required to manufacturer one unit of each of the three products and the daily capacities of the three machines are given in the table:

Machines	**Time per unit (minutes)**			**Machine Capacity (minutes / day)**
	Product 1	**Product 2**	**Product 3**	
M1	2	3	2	440
M2	4	---	3	470
M3	2	3	---	430

It is required to determine the daily number of units to be manufactured for each product.

The profit per unit for product 1, 2 and 3 is Rs. 4, Rs. 3 and Rs. 6 respectively. It is assumed that all the amounts produced are consumed in the market. Write the constraints of above Linear Programming Problem.



Answer

Step 1

Find the key decision to be made. The key decision is to decide the extent of product 1,2&3 to be produced as this can vary.

Step 2

Assume symbols for the extent of production. Let the extent of Product 1,2&3 be X1, X2 & X3.

Step 3

Express the feasible alternatives mathematically in terms of variables. Feasible alternatives are those which are physically, economically and financially possible. In this example, feasible alternatives are sets of values of x1, x2 & x3, where x1,x2 &x3 ≥ 0 since negative production has no meaning and is not feasible.

Step 4

Mention the object quantitatively and express it as a linear function of variables. IN the present example, objective is to maximize the profit.

i.e. Maximize Z = 4x1+3x2+6x3

Step 5

Express the constraints as linear equations/inequalities in terms of variables.

Here, constraints are o the machine capacities and can be mathematically expressed as

$2x1 + 3x2 + 2x3 \leq 440,$

$4x1 + 0x2 + 3x3 \leq 470,$

$2x1 + 5x2 + 0x3 \leq 430.$

Question No: 48 (Marks: 3)



Express the following Transportation problem (T.P) table into algebraic form with proper objective function and non-negative constraints

Answer

	D_1	D_2	D_3	Supply
O_1	c_{11}	c_{12}	c_{13}	5
O_2	c_{21}	c_{22}	c_{23}	3
O_3	c_{31}	c_{32}	c_{33}	10
Demand	4	6	8	

$4x + S_2 + D_1 \leq 5$

$S_1 + 6y + D_1 \geq 3$

$S_1 + S_2 + 8z \leq 10$

Question No: 49 (Marks: 5)

	1	2	3	Supply
1	1	2	6 **7**	**7**
2	0	4	2	**12**



	10			
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Complete the above transportation Model by Vogel Approximation Method.

And also find the starting basic feasible solution.

Answer

	1	**2**	**3**	**Supply**
1	1	2	6 **7**	**7**
2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Cost = 1 + 2 + 7(6) + 2 + 5(1) = 52



This is the initial basic solution consider u1 = 1 and v1 = 2 and v2 = 3

Question No: 50 (Marks: 5)

Check whether the given initial basic feasible solution is optimal or not.

1	2	6 **7**	**7**
0 **10**	4	2 **2**	**12**
3	1 **10**	5 **1**	**11**
10	**10**	**10**	

Answer

	1	**2**	**3**	**Supply**
1	1	2	6	**7**



			7	
2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Cost = 1 + 2 + 7(6) + 2 + 5(1) = 52

This is the initial basic solution consider u1 = 1 and v1 = 2 and v2 = 3

it is a n optimal solution according to if we put formula

Question No: 51 (Marks: 5)

A company cost Rs. 500 operations and maintenance costs are zero for the first year and increased by Rs. 100 every year. If money is worth 5% every year, calculate present worth (**P(r)**) for each year. The resale value of the machine is negligibly small.



Answer

---

for each year increase in money = 5%

means to say that company significes 105 ruppes every year the company capital must be increaing as 105 * 500

Question No: 52 (Marks: 5)

Express the following linear programming problem in standard form and also construct its initial simplex table.

Max $Z = 3x+2y$

Subject to constraints:

$x + y \leq 4$

$x - y \leq 2$

$x,y \geq 0$

Answer

Blank Data

Mth601 30 July 2013 final term paper:



2 marks qs

Q: ek bohat sari activities wali diagram di hui thi or qs ye tha

Find EFT for each activity?

Q:

0 5	2	1 1	6
2	1 5	5 2	7
2	4	3 7	7
5	5	10	

To find optimality condition we use UV multiplier process

Find

c) U_2+V_2
d) U_3+V_3

Q: 3 ya 5 mark ka tha ye qs

Contractor side wali values yad nai…

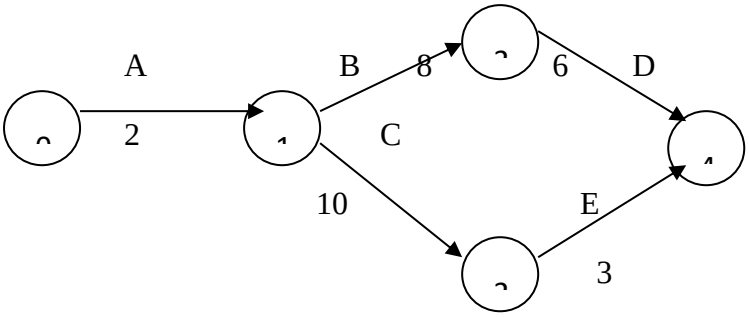
Building:	Contractor:
A	
B	
C	
D	

Operate first step by optimizing row wise the above assignment model.

Q: state principal of optimality (optimal policy) for dynamic programming?



Q: fin EST and EFT for each activity.



Q: 5 marks

0 5	2	1 1	6
2	1 5	5 2	7
2	4	3 7	7
5	5	10	

Find

c) P_{31}
d) P_{32}

Using $P_{ij}= U_i + V_j – C_{ij}$ suppose $U_1 = 0$ and $U_2 = 5$

Q: ek statement thi us me se Average Queuing length find krna thi.

Q: Minimizing setup times, which are given? (5 marks)

Job ki values yad nai

	Job 1	**Job2**	**Job3**	**Job4**
Machine 1	14	5	7	



Machine 2				
Machine 3				
Machine 4				

Q: ek 5 mark ka qs itna long tha k word pe paste krne se ek se zyada page ki just statement thi….

Replacement Of Items with change in value and time

It is assumed that the maintenance cost increases with time and each cost is to be paid just in the start of the period. Let the money carry a rate of interest r per year. Thus a rupee invested now will be worth (1 + r) after a year, $(1+r)^2$after two years and so on.

Do first

Answer

Diff b/w CPM??

Answer

PERT

No. of stores	1	2	3
No. of boxes			
0	0	0	0
1	4	2	6
2	6	4	8
3	7	6	9
4	7	6	8
5	7	9	8
7	7	10	8
4	0	1	1
5	0	2	1
7	0	3	1

step?

pert n

(Programme Evaluation & Review Technique) is event oriented whereas CPM

(Critical Path Method) is activity oriented.

In CPM based network analysis no allowance is made for the uncertainties in the



duration of time involved.

In CPM, times are related to costs

Q:…Make two steps, of rows and columns of the following table…

Answer:

Least ko sab me se Minus krna hay pehlay rows, then columns, to have atleast one zero in all….

Markets / salesmen	I	II	III	IV
A	44	80	52	60
B	60	56	40	72
C	36	60	48	48
D	52	76	36	40

Markets / salesmen	I	II	III	IV
A	8	24	16	20
B	24	0	4	32



C	0	4	12	8
D	16	20	0	0

Complete the table By VOgha ‘s method:

Sol:

Red is solved one

	1	**2**	**3**	**Supply**
1	0 **5**	2	1 **1**	**6**
2	2	1 **5**	5 **2**	**7**
3	2	4	3 **7**	**7**
Demand	**5**	**5**	**10**	

21 july 2013

1. a branch of bank has only one typist. typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8/hour . Letter arrive rate is 5/hour during the entire 8 hour working day if writer is value 1.50 per hour determine the equipment utilization? 2marks and same this question is appeared as 5 marks question

2. Scenario was given and we have to tell the objective function of linear programming.... 2 marks

3. Table was given n determine that transportation model has initial feasible solution..... 2 marks

4. State principle of optimality for dynamic programming ..... 2 marks



5. Transportation model was given and one block has x we have to find the value of x..... 3 marks

6. Values were given and we need to tell the capital cost for each year ..... 3 marks

7. In the context of pert and CPM summarize the project planning techniques

8. One stage problem is given find the two stage problem

s	Fi*(s)	Xi
8	25	10
9	35	10

9. Table was given and asked that check initial solution is feasible or not..... 5 marks

10. Question no 1 was again appeared as 5 marks question

11. The cost of the new machine is 5000. Maintenance during the nth year is given by Mn = 500 rps (n-1) when n = 1, 2, 3 ....if discount rate per year is 0.05 calculate the present worth ..... 5 marks

12. Graph was given and question was construct the table relation show between events and activities. 5 mark s

FINALTERM EXAMINATION

Fall 2012

MTH601 - Operations Research

Ref No: 3886822

Time: 120 min

Question No: 1 (Marks: 1) - Please choose one

Which of the following is a characteristic of critical path scheduling techniques?

▶The jobs or tasks are dependent on each other

▶Interruptions may be permitted if they are documented

Selected answer The jobs or tasks must be well defined, and their completion marks the end of the project

▶The jobs or tasks do not necessarily have to be in a predetermined sequence



Question No: 2 (Marks: 1) - Please choose one

During a replacement if the value of money decreases at the rate of **3**% then the present worth factor of unit amount to be spent after one year is given by

▶0.25

▶0.333

Selected answer 0.9708

▶4

Question No: 3 (Marks: 1) - Please choose one

If the money carries a rate of interest of **12**% per year, the present worth factor of one rupee due in one year is

Selected answer 0.08333

▶0.89285

▶0.0769

▶13

Question No: 4 (Marks: 1) - Please choose one



Search and cutting methods are used to solve following types of problems

▶Transportation

▶Assignment

Selected answer Integer Programming

▶Queuing problems

Question No: 5 (Marks: 1) - Please choose one

A feasible solution is called a _____ solution if the number of non negative allocation is equal to “m + n – 1” (Here m is the number of rows, n is the number of columns in transportation problem)

Selected answer basic feasible

▶non basic feasible

▶basic infeasible

▶optimal

Question No: 6 (Marks: 1) - Please choose one

If a basic feasible solution contains less than “m + n – 1” (Here m is the number of rows, n is the number of columns in transportation problem) non negative allocation, then it is said to be

▶Degenerate



►Multiple Solutions

►Non degenerate

Selected answer Alternative Optima

Question No: 7 (Marks: 1) - Please choose one

Consider the following cost table

	Destinations				
Source		**D1**	**D2**	**D3**	**Supply**
	S1	5	1	2	**25**
	S2	7	2	4	**10**
	S3	3	3	5	**15**
	Demand	**10**	**20**	**20**	

Using Vogel's Approximation Method, which one is the starting cell?

Selected answer S1 à D1

► S3 à D1

► S2 à D2



► S2 à D1

Question No: 8 (Marks: 1) - Please choose one

		Destinations			
		D1	D2	D3	Supply
Source	S1	5	1	2	25
	S2	7	2	4	10
	S3	3 10	3	5	15
	Demand	10	20	20	

Using Vogel's Approximation Method:
These below are the three cells which can be next cell:

I. S3 → D2
II. S2 → D2
III. S1 → D3

Which one is the correct option?

►I, II and III

►I only

►II only



Selected answer III only

▶I and II only

Question No: 9 (Marks: 1) - Please choose one

	D1	D2	D3	Supply
S1	5 10	1 15	2	25
S2	7	2 5	4 5	10
S3	3	3	5 15	15
Demand	10	20	20	

Cost = 10 (5) + 15 (1) + 5 (2) + 5 (4) + 15 (5) = 170

This is the initial basic feasible solution of a question by North – West Corner Method.

Finding optimal basic feasible solution: Consider U1 = 0 and V1 = 5, what is the value of V2?

▶

▶

▶

Selected answer

Question No: 10 (Marks: 1) - Please choose one



Transportation problem is a special class of linear programming problem in which transport a commodity from the source to a destination in such a way that the total transportation cost is

▶Zero

▶Maximum

Selected answer Minimum

▶Average

Question No: 11 (Marks: 1) - Please choose one

We solve a assignment problem by subtracting least number in each row and we get the table below:

Cost Table	Dist Center D	Dist Center E
Plant A	0	135
Plant B	0	8
Plant C	34	0

After doing next step, which table should be next?



Cost Table	Dist Center D	Dist Center E
Plant A	0	135
Plant B	0	8
Plant C	34	0

▶

Cost Table	Dist Center D	Dist Center E
Plant A	0	127
Plant B	0	0
Plant C	0	0

▶



Cost Table	Dist Center D	Dist Center E
Plant A	135	0
Plant B	8	0
Plant C	0	34

▶

Cost Table	Dist Center D	Dist Center E
Plant A	0	0
Plant B	34	8
Plant C	0	135

Selected answer

Question No: 12 (Marks: 1) - Please choose one

The cost matrix in assignment problem is always

Selected answer identity matrix



▶zero matrix

▶diagonal matrix

▶square matrix

Question No: 13 (Marks: 1) - Please choose one

If the arrival rate is 5 per hour and the service rate is 10 per hour, then the average system time is:

▶1/5

Selected answer 5

▶1

▶2

Question No: 14 (Marks: 1) - Please choose one

If the arrival rate is 5 per hour and the service rate is 10 per hour, then ρ (traffic intensity or system utilization) =?

▶???

Selected answer ???

▶???

▶???



Question No: 15 (Marks: 1) - Please choose one

Formula for the expected number in the system L is:

$$L=\frac{\lambda}{\mu-\lambda}$$

▶

$$L=\frac{\lambda}{\mu+\lambda}$$

▶

$$L=\frac{\lambda}{\lambda-\mu}$$

▶

$$L=\frac{\mu}{\mu-\lambda}$$

Selected answer

Question No: 16 (Marks: 1) - Please choose one

If the arrival rate is 5 per hour and the service rate is 10 per hour, then the expected number in the queue or average queue length is:

▶

Selected answer



▶

▶

Question No: 17 (Marks: 1) - Please choose one

Total cost per period = Item cost + Order cost + Holding cost + _____.

Selected answer Shortage cost

▶Optimum Shortage (S*)

▶Economic Oreder Quantity. (Q*)

▶Maximum Inventory. ($I_{max.}$)

Question No: 18 (Marks: 1) - Please choose one

In Manufacturing Model with no shortage, the replacement rate is finite and _____ the demand rate.

▶greater than

Selected answer less than

▶equal to

Question No: 19 (Marks: 1) - Please choose one



If "N*i*" be the Number of replacement made at the end of the i^{th} week and "P*j*" be the probability of failure during the i^{th} week, then N_1 = ----------.

▶N_0P_1

Selected answer N_1P_1

▶N_0P_0

▶N_1P_2

Question No: 20 (Marks: 1) - Please choose one

If "N*i*" be the Number of replacement made at the end of the i^{th} week and "P*j*" be the probability of failure during the i^{th} week, then N_2 = ----------.

▶$N_1P_2 + N_1P_1$

▶$N_0P_2 + N_1P_1$

▶$N_0P_1 + N_1P_2$

▶$N_0P_2 + N_1P_2$

Question No: 21 (Marks: 1) - Please choose one



The present worth of a rupee to be spent after a year is denoted by *v* and given by

- ▶*v* = (1 + *r*)
- ▶*v* = (1 / *r*)
- ▶*v* = (1 + *r*) / 10

Selected answer *v* = 1/ (1 + *r*)

Question No: 22 (Marks: 1) - Please choose one

Formula for a geometric series "$x + vx + v^2x + ... + v^{n-1}x$" is

$$P(n) = \frac{1-v^n}{1-v}$$

Selected answer

- ▶ $P(n) = x\frac{1-v}{1-v^n}$
- ▶ $P(n) = \frac{1-v}{1-v^n}$
- ▶ $P(n) = x\ \frac{1-v^n}{1-v}$

Question No: 23 (Marks: 1) - Please choose one



In replacement Models, Capital Cost = (Item / Machine Cots) – (----------).

▶Resale Cost

▶Running Cost

Selected answer Maintenance Cost

▶Operating Cost

Question No: 24 (Marks: 1) - Please choose one

Formula of EOQ in manufacturing model with shortages is

▶ $Q^* = \sqrt{2C_2D/C_3(1-D/R)}.\sqrt{C_3+C_4/C_4}$

$Q^* = \sqrt{2C_2D/C_3}.\sqrt{R/R-D}$

Selected answer

▶ $Q^* = \sqrt{2C_2D/C_3}$

▶Non of them

Question No: 25 (Marks: 1) - Please choose one



To identify and maintain the proper precedence relationship between activities those are not connected by event, we introduce

▶Parallel Activity

Selected answer Dummy Activity

▶Sequential Activity

▶None of these

Question No: 26 (Marks: 1) - Please choose one

PERT is based on

▶Deterministic times

Selected answer Probabilistic Times

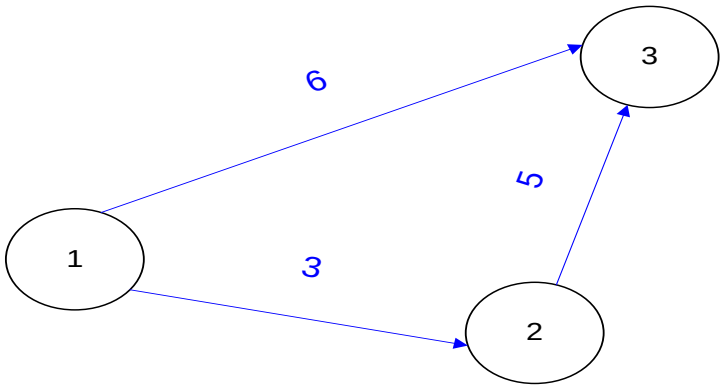
▶Dummy Times

▶Estimated times

Question No: 27 (Marks: 1) - Please choose one

Non-critical activities in the following network are -------

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▶Activity (1,2)

▶Activity (2,3)

Selected answer Dummy Actvity

▶Activity (1,3)

Question No: 28 (Marks: 1) - Please choose one

If $t_0 = 10$, $t_m = 10$ and $t_p = 16$, then *S.D* = _____.

▶??

▶???



▶

Selected answer

Question No: 29 (Marks: 1) - Please choose one

Which of the following is an essential characteristic of a linear programming problem?

▶The relationship between variables and constraints must be linear

▶The model must have an objective function

▶The model must have structural constraints

Selected answer All are equivalent

Question No: 30 (Marks: 1) - Please choose one

In the simplex table for a linear programming problem, we select the leaving basic variable corresponds to ----------

▶Maximum non-negative ratio

▶Maximum negative ratio

Selected answer Minimum non-negative ratio



▶Minimum negative ratio

Question No: 31 (Marks: 1) - Please choose one

A technique for solving a linear programming problems in which artificial variables are included with coefficients of very large number say equal 10 times of any cost coefficient of decision variables is known as ---------

▶Big M – Method.

▶Least Cost Method

♦♏●♏♍♦♏♎ ♋■♦♦♏❒ Hungarian Method

🕓 Branch and Bound Method

Question No: 32 (Marks: 1) - Please choose one

If the _____ variables appear in the final basic set, then the LP (Linear Program) has no solution.

▶slack

▶surplus

▶non – basic

Selected answer artificial

Question No: 33 (Marks: 1) - Please choose one



If no _____ variable appears in the basis and the optimality conditions are satisfied, then the current solution will be optimal one.

▶artificial

Selected answer non basic

▶slack

▶surplus

Question No: 34 (Marks: 1) - Please choose one

Min. Z = 0 and no artificial variable appears in the basic variables. _____ solution to original problem has been found and we proceed to phase II method.

▶A basic feasible

▶An optimal

Selected answer An infeasible

Question No: 35 (Marks: 1) - Please choose one

In Two – Phase method, if all the _____ variables become zero, we stop the phase I and proceed to phase-II.



▶artificial

Selected answer basic

▶non basic

▶positive slack

▶negative slack

Question No: 36 (Marks: 1) - Please choose one

The inequality $2x+3y\leq 18$ is equivalent to

▶ $2x+3y\leq -18$

Selected answer $-2x-3y\geq 18$

▶ $-2x-3y\geq -18$

▶ $-2x-3y\leq -18$

Question No: 37 (Marks: 1) - Please choose one

Which of the following order pair would minimize the objective function of the linear programming problem; z = x + y subject to x≥3, y≥0 ?



►(3,3)

Selected answer (3,0)

►(0,3)

►(0,0)

Question No: 38 (Marks: 1) - Please choose one

In which of the following models, Simplex algorithm is not preferred to use due to laborious computations?

►Transportations models

►Degenerate Linear models

►Non-degenerate Linear models

Selected answer Dual or unbounded linear models

Question No: 39 (Marks: 1) - Please choose one



Transportations models consist of ------- like the production centers and --------- which may be the sales centers.

►(sinks, sources)

►(sources, sinks)

Selected answer (origins, sources)

►(sinks, destinations)

Question No: 40 (Marks: 1) - Please choose one

To convert the transportation problem into a maximization model we have to----------.

►write the inverse of the coefficient matrix

►multiply the feasibility condition by –1

►multiply the coefficient matrix by –1

Selected answer We can't convert the transportation problem into a maximization problem, as it is basically a minimization problem.



Question No: 41 (Marks: 2)

A branch of Punjab National Bank has only one typist. Since the typing work varies in length (number of pages to be typed), the typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8 – hour worki9ng day. If the typewriter is valued at Rs. 1.50 per hour, Determine

Average system time.

Answer

Not Attempted

Question No: 42 (Marks: 2)

An oil company has 8 unit of money available for exploration of three sites. If oil is present at a site, the probability of finding it depends upon the amount allocated for exploiting the site as given below:

	0	1	2	3	4	5	6	7	8
Site I	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.0
Site II	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.8	1.0
Site III	0.0	0.1	0.1	0.2	0.3	0.5	0.8	0.9	1.0



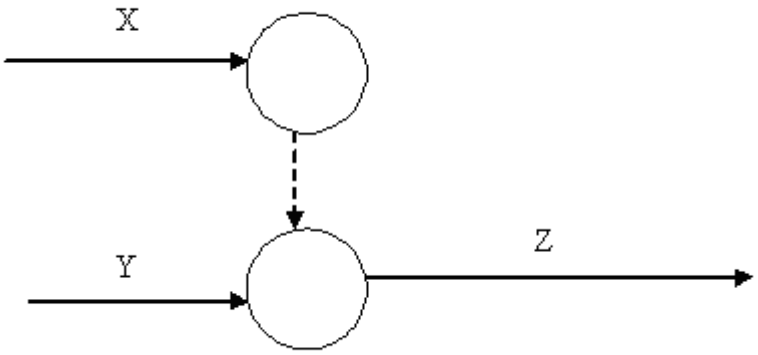
The probability that the oil exits at sites I, II and III is 0.4, 0.3 and 0.2 respectively; we have to find the optimal allocating of money.

Do stage I only.

Answer

Not Attempted

Question No: 43 (Marks: 2)

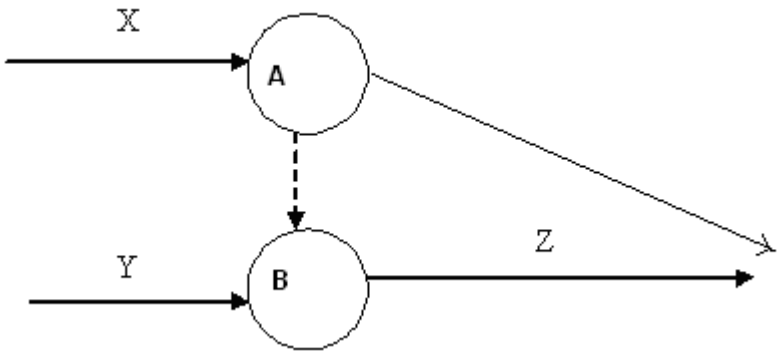


Write the relationship between the activities.

Answer

---

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X approches to Y

X also approches to Z

Y approches to Z

whether A and b might have the values between the centre points

Question No: 44 (Marks: 2)

For the mathematical form of a Transportation problem(T.P):

$$\min z = \sum_{i=1}^{i=m} \sum_{j=1}^{j=n} c_{ij} x_{ij} \text{ ------(1)}$$

subject to



$$\sum_{j=1}^{j=n} x_{ij} = a_i \text{ -----(2)} \ , i = 1,2,\ldots,m(\text{Sources})$$

$$\sum_{i=1}^{i=m} x_{ij} = b_j \text{ -----(3)} \ , i = 1,2,\ldots,n(\text{Destinations})$$

Describe the practical significance of all the above equations(1), (2) and (3).

Answer

Not Attempted

Question No: 45 (Marks: 3)

The milk plant at a city distributes its products by trucks, located at the loading dock. It has its own fleet of trucks plus trucks of a private transport company. This transport company has complained that sometimes its trucks have to wait in line and thus the company loses money paid for a truck and driver that is only waiting. The company has asked the milk plant management either to go in for a second loading dock or discount prices equivalent to the waiting time, the following data available

$$\lambda = Average\ arrival\ rate = 3\ per\ hour$$
$$\mu = Average\ service\ rate = 4\ per\ hour$$

The transport company has provided 40%of the total number of trucks. Assuming that these rates are random according to Poisson distribution, determine

a) The probability that a truck has to wait.

b) The waiting time of a truck that waits.



Answer

The probability that a truck has to wait.

$$\frac{\mu}{\mu-\lambda}=\frac{4}{4-3}=\frac{4}{1}=4$$

The waiting time of a truck that waits.

round about 40 minutes of each truck.

Question No: 46 (Marks: 3)

A company has a machine whose cost is Rs. 30,000. Its maintenance cost and resale value at the end of different years are as given below:

Years.	1	2	3	4	5	6
Maintenance Cost.	4500	4700	5000	5500	6500	7500
Resale Value	27000	25300	24000	21000	18000	13000

Determine capital cost for each year.



Answer

Item / machine cost - resale cost - maintenace cost = capital cost

30000 - 13000 - 7500 => 17000-7500 = 9500

machine capital cost for year 7 is 7500

Question No: 47 (Marks: 3)

A firm produced three products. These products are processed on three different machines. The time required to manufacturer one unit of each of the three products and the daily capacities of the three machines are given in the table:

Machines	Time per unit (minutes)			Machine Capacity (minutes / day)
	Product 1	Product 2	Product 3	
M1	2	3	2	440
M2	4	---	3	470
M3	2	3	---	430

It is required to determine the daily number of units to be manufactured for each product.



The profit per unit for product 1, 2 and 3 is Rs. 4, Rs. 3 and Rs. 6 respectively. It is assumed that all the amounts produced are consumed in the market.

Write the constraints of above Linear Programming Problem.

Answer

Transportation problem is a special class of linear programming problem in which transport a commodity from the source to a destination in such a way that the total transportation cost is maximum

Question No: 48 (Marks: 3)

Express the following Transportation problem(T.P) table into algebraic form with proper objective function and non-negative constraints



Answer

	D_1	D_2	D_3	Supply
O_1	c_{11}	c_{12}	c_{13}	5
O_2	c_{21}	c_{22}	c_{23}	3
O_3	c_{31}	c_{32}	c_{33}	10
Demand	4	6	8	

$4x + S_2 + D_1 \leq 5$

$S_1 + 6y + D_1 \geq 3$

$S_1 + S_2 + 8z \leq 10$

Question No: 49 (Marks: 5)

	1	2	3	Supply
1	1	2	6 **7**	**7**
2	0 **10**	4	2	**12**



3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Complete the above transportation Model by Vogel Approximation Method.

And also find the starting basic feasible solution.

Answer

	1	**2**	**3**	**Supply**
1	1	2	6 **7**	**7**
2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	



Cost = 1 + 2 + 7(6) + 2 + 5(1) = 52

This is the initial basic solution consider u1 = 1 and v1 = 2 and v2 = 3

Question No: 50 (Marks: 5)

Check whether the given initial basic feasible solution is optimal or not.

1	2	6 **7**	**7**
0 **10**	4	2 **2**	**12**
3	1 **10**	5 **1**	**11**
10	**10**	**10**	

Answer

	1	**2**	**3**	**Supply**



1	1	2	6 **7**	**7**
2	0 **10**	4	2	**12**
3	3	1	5 **1**	**11**
Demand	**10**	**10**	**10**	

Cost = 1 + 2 + 7(6) + 2 + 5(1) = 52

This is the initial basic solution consider u1 = 1 and v1 = 2 and v2 = 3

it is a n optimal solution according to if we put formula

Question No: 51 (Marks: 5)

A company cost Rs. 500 operations and maintenance costs are zero for the first year and increased by Rs. 100 every year. If money is worth 5% every year, calculate present worth (**P(r)**) for each year. The resale value of the machine is negligibly small.



Answer

---

for each year increase in money = 5%

means to say that company significes 105 ruppes every year the company capital must be increaing as 105 * 500

Question No: 52 (Marks: 5)

Express the following linear programming problem in standard form and also construct its initial simplex table.

Max $Z = 3x+2y$

Subject to constraints:

$x + y \leq 4$

$x - y \leq 2$

$x,y \geq 0$

Answer

Blank Data