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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May, 2018

Program/course: BBA/LM	**Semester – IV**
Subject: Decision Modeling using spreadsheet	**Max. Marks : 100**
Code: BBDL 122	**Duration : 3 Hrs**
No. of page/s: 3	

Section A

Maximum Marks: 20

Note: Attempt all questions.

1. Mark True/False (T/F) for the following

a) Optimization seeks to render its supply chain efficient, flexible and responsive as possible (T/F)

b) In mechanical systems the physical analog of arcs is wires (T/F)

c) Decision variables are not under the control of the decision maker (T/F)

d) The output generated from linear programming models provides useful "what if" analysis (T/F)

e) Standard form is attained by adding slack variables to "greater than or equal to" constraints (T/F)

2. Fill in the blanks

i. ______________ algorithm is used to solve the assignment problem

ii. _____________ models describe how all or parts of company's supply chain will operate over time

iii. The formula for slope in regression is given as m=________________

iv. _______________ cost is the cost of the resource not included in the calculation of the objective function coefficient.

v. A maximization assignment problem can be converted to a minimization problem by creating a _________________

Section B

Note: Attempt any 4 questions. Each question carries 5 marks.

3. What do you understand by range of optimality and range of feasibility?

4. What do you understand by Trans-shipment problem? Explain

5. What do you understand by Capacitated plant location problem? Formulate

6. What are the three types of models without unique optimal solution?

7. Formulate the assignment problem? What are the assumptions?

Section C

Note: Attempt all questions. Each question carries 10 marks.

8. Use graphical model to solve the following LP problem

Minimize $Z = 600x_1 + 400x_2$

Subject to the constraints

i) $3x_1 + 3x_2 >= 40$

ii) $3x_1 + x_2 >= 40$

iii) $2x_1 + 5x_2 >= 44$

and $x_1, x_2 >= 0$

9. Use Simplex method to solve the following LP problem

Max $Z = 3x_1 + 2x_2$

Subject to the constraints

i) $x_1 + x_2 <= 4$

ii) $x_1 - x_2 <= 2$

and $x_1, x_2 >= 0$

10. Determine the initial basic feasible solution to the following transportation problem by using a) NWCR, b) LCM and c) VAM. Which method gives best results?

	D1	**D2**	**D3**	**D4**	**Supply**
S1	21	16	15	3	**11**
S2	17	18	14	23	**13**
S3	32	27	18	41	**19**
Demand	**6**	**10**	**12**	**15**	

Section D **Maximum Marks: 30**

Note: Attempt any two questions. Each question carries 15 marks.

11. The table below gives the solution procedure of a transportation problem:

	W1	**W2**	**W3**	**Supply**
F1	16 180	20 20	12	**200**
F2	14	8 100	18 60	**160**
F3	26	24	16 90	**90**
Demand	**180**	**120**	**150**	

Answer the following questions:

a) Is the solution feasible?

b) Is the solution degenerate?

c) Is the solution optimum? If not, find the optimum solution using Modi method.

12. Consider a firm having two factories. The firm is to ship its products from the factories to three retail stores. The number of units available at factories X and Y are 200 and 300, while those demanded at retail stores A, B and C are 100, 150 and 250, respectively. Rather than shipping the products directly from factories to retail stores, it is asked to investigate the possibility of trans-shipment. The transportation cost(in rupees) per unit is given the table below.

		Source		Destination		
		S1	S2	D1	D2	D3
Source	S1	0	80	10	20	30
	S2	10	0	20	50	40
Destination	D1	20	30	0	4	10
	D2	40	20	10	0	20
	D3	60	70	80	20	0

Find the initial feasible solution using Least Cost Method.

13. A department of a company has five employees with five jobs to be performed. The time in hours that each man takes to perform each job is given in the effectiveness matrix.

Jobs/Employees	I	II	III	IV	V
A	60	50	100	85	95
B	65	45	100	75	90
C	70	60	110	97	85
D	70	55	105	90	93
E	60	40	120	85	97

How should the jobs be allocated, one per employee, so as to minimize the total man hours?