Faculty of Commerce
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Questions and Answers in Operation Research

4th Year English Section

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1- Linear Programming

A-Graph Solution

Questions 1-10: The following function (z) is revenue function where:

$$Z = 4x + 8y$$

Subject to:

$x + y \leq 20$ **(Let the line to be (a-b) from left to right).**

$2x + y \leq 32$ **(Let the line to be (c-d) from left to right).**

(Let Point (h) is the intersection of a-b and c-d)

$x \geq 0, y \geq 0$

(Let Point (h) is the intersection of a-b and c-d, and Point o (0, 0))

1- **The problem is:**
   - **A- Revenue Min. problem**
   - **B- Revenue Max. problem**
   - **C- Cost Min. problem**
   - **D- Cost Max. problem**

2- **The feasible area is:**
   - **A- oahd**
   - **B- dhb**
   - **C- ahc**
   - **D- ocd**

3- **The feasible area according the first constraint is:**
   - **A- chb**
   - **B- oahd**
   - **C- oab**
   - **D- ocd**

4- **The feasible area according the second constraint is:**
   - **A- chb**
   - **B- oahd**
   - **C- oab**
   - **D- ocd**

5- Point (h) is:
A- (8, 12)
B- (12, 8)
C- (12, -8)
D- (-12, -8)

6- The optimal solution is:
A- 112
B- 128
C- 64
D- 160

7- If the first constraint becomes $x + y \geq 20$, the feasible area becomes:
A- ahc
B- dhb
C- chb
D- oahd

8- If the second constraint becomes $2x + y \geq 32$, the feasible area Becomes:
A- ahc
B- dhb
C- chb
D- oahd

9- If z in the original problem is a cost function, the optimal solution will be:
A- 64
B- 112
C- 128
D- 0

10- If z in the original problem is a cost function and both the constrains inequalities become $\geq$, the optimal solution will be:
A- (0, 32)
B- (12, 8)
C- (20, 0)
D- (0, 20)

Questions 11-2o: Minimize T =5x + 3y

Subject to:

$x + y \geq 60$ **(Let the line to be (a-b) from left to right).**

$2x + y \leq 90$ **(Let the line to be (c-d) from left to right).**

$x \geq 0, y \geq 0$

(Let Point (h) is the intersection of a-b and c-d, and Point o (0, 0))

$x \geq 0, y \geq 0$

Solve by graph method

11- Point (h) is:

A- (30, -30)

B- (30, 30)

C- (45, 0)

D- 0, 45)

12- The feasible area is:

A- ahb

B- cah

C- ocd

D- oab

13- The feasible area according the first constraint is:

A- ocd

B- dhb

C- oab

D- ahc

14- The feasible area according the second constraint is:

A- ocd

B- dhb

C- oab

D- ahc

15- The optimal solution is:

A- d

B- h

C- b

D- o

16- If the T function of original problem was profit function, the optimal solution will be:

A- d

B- h

C- b

D- o

17- If the constraints become, $x + y \leq 60$ and $2x + y \geq 90$, the optimal solution becomes:

A- oahd

B- dhb

C- ach

D- ahb

18- If both constraints inequalities become ≥, the optimal solution becomes:

A- Oahd

B- Dhb

C- Ach

D- chb

19- If both constraints inequalities become ≤, the optimal solution becomes:

A- oahd

B- dhb

C- ach

D- chb

20- If both constraints become equalities, the optimal solution becomes:

A- a

B- h

C- d

D- b

B- Semplix

Questions 21-30: El Amal Company produces two products A and B, suppose that the size units of A are x units and the size units of B are y units the following table represents the industrial resources:

Department	Time required per unit		Available Time
	A	B	
1	4	6	3000
2	6	4	3000
3	2	2	6000
Profit per unit	40	10	

21- The solution of the above problem is:

I. To find the value of x.

II. To find the value of y.

III. To find the values of both x and y.

IV. To find the values of x and y and determine the optimal value of profit.

22- The above problem is:

A- Cost minimization.

B- Profit maximization.

C- Units x maximization.

D- Units y minimization.

23- The objective function is:

A- 40x + 10y

B- 4x + 6y

C- 6x + 4y

D- 2x +2y

24- **The first constraint is:**

A- $40x + 10y \geq 0$

B- $4x + 6y \leq 3000$

C- $6x + 4y \geq 3000$

D- $4x + 6y \geq 3000$

25- **The second constraint is:**

A- $40x + 10y \geq 0$

B- $4x + 6y \leq 3000$

C- $6x + 4y \leq 3000$

D- $4x + 6y \geq 3000$

26- **The third constrain is:**

A- $2x + 2y \geq 6000$

B- $4x + 6y \leq 3000$

C- $6x + 4y \geq 3000$

D- $2x + 2y \leq 6000$

27- **According to the initial (first) table the pivot column is:**

A- x Column,

B- y column.

C- 1, 0, 0.

D- 0, 1, 0.

28- **According to the initial (first) table the pivot row is:**

A- 4, 6, 2

B- 2, 2, 0, 0. 1.

C- 6, 4, 0, 1, 0.

D- 0, 1, 0.

29- According to the initial (first) table the pivot number is:

A- 6

B- 4

C- 1

D- 0

30- According to the second table, the value of the profit is:

A- 40

B- 0

C- 20000

D- 80/3

C-Dual Problem

Questions 31-35 El Amal Company produces two products A and B, suppose that the size units of A are x and the size units of B are y the following table represents the industrial resources:

Department	Material required per unit		Minimum row material required
	x	y	
1	4	6	30
2	6	4	60
Cost per unit	40	10	

31- The objective function of the dual problem of the above problem is:

A- Max. 30x + 60 y
B- Max. 30m + 60 n
C- Min. 30x + 60 y
D- Max. 30m + 60 n

32- The first constraint of the dual problem is:

A- $4x + 6y \geq 30$
B- $4m + 6n \leq 40$
C- $4x + 6y \leq 40$
D- $4m + 6n \geq 40$

33- The second constraint of the dual problem is:

A- $4x + 6y \geq 30$
B- $4m + 6n \leq 40$
C- $4x + 6y \leq 40$
D- $6m + 4n \leq 10$

34- The non negative variables

A- $x, y \geq 0$
B- $m, n \geq 0$
C- $x, y \leq 0$
D- $x, y, m, n \geq 0$

35- The optimal solution of the original problem and the dual will be:

A- Same values.

B- Original optimal value is > the dual optimal value.

C- Original optimal value is < the dual optimal value.

D- Deferent values.

1- Game Theory

Questions 36- 40: The following is the pay off matrix of game between player M and player N:

$$M \quad \begin{pmatrix} 9 & 12 & 15 & 4 \\ 13 & 8 & 17 & 16 \\ 15 & 11 & 14 & 18 \end{pmatrix} \quad N$$

36- The Min. Max. for player M is:

A- 4
B- 8
C- 12
D- 15

37- The Max. Min. for player N is:

A- 4
B- 8
C- 12
D- 18

38- The result of the game is:

A- M will gain 12
B- N will gain 12
C- M will lose 12
D- Both M and N will win

39- The payoff matrix represents:

A- negative numbers win for M
B- positive numbers win for M
C- positive numbers win for N
D- Positive numbers win for both M and N

40- The best strategy for N is:

A- The first strategy
B- The second strategy
C- The third strategy
D- The fourth strategy

Questions 41- 50: The following is the pay off matrix of game between player L and player S:

$$\begin{array}{cc} & S \\ L & \begin{pmatrix} 4 & 8 & 0 \\ 2 & 0 & 8 \end{pmatrix} \end{array}$$

41- The Min. Max. for player L is:

A- 4
B- 8
C- 0
D- 2

42- The Max. Min. for player S is:

A- 4
B- 8
C- 0
D- 2

43- The game is:

A- Zero game
B- Player L will play by his first strategy
C- Player L will play by his second strategy
D- Both L will play with mixed strategies.

44- Player L will play:

A- Half time by his first strategy and the second half time by his second strategy.
B- 0.4 time by his one strategy and o.6 by the other strategy.
C- All the time by his first strategy.
D- All the time by his second strategy

45- The result of the game is:

A- Player L will gain 3.2
B- Player L will gain 3.2 and Player S will lose 3.2
C- Player L will lose 3.2 and Player S will gain 3.2
D- Both Players L and S will win

2- Network and Transportation Problem

Questions 51-60 The following table represents 3 plants and 3 distribution centers, sizes of supply and demand, and the cost of transportation from every plant to every distribution center:

	B_1	B_2	B_3	Supply
A_1	120	150	40	400
A_2	100	80	50	600
A3	50	20	100	200
Demand	200	700	300	1200

51-According to North West Method (NWM) the cell A_2 B_3 occupied by:

A- 500
B- 100
C- 0
D- 200

52-According to North West Method (NWM) the cell A_3 B_3 occupied by:

A- 500
B- 100
C- 0
D- 200

53-According to Least Cost Method (LCM) the cell A_1 B_3 occupied by:

A- 300
B- 500
C- 0
D- 100

54-According to Least Cost Method (LCM) the cell A_3 B_2 occupied by:

A- 300
B- 200
C- 50
D- 100

55-According to Vogal Approximation Method (VAM) the cell A_3 B_2 occupied by:

A- 100
B- 200
C- 300
D- 500

56- According to Vogal Approximation Method (VAM) the cell A_1 B_2 occupied by:

A- 200
B- 300
C- 0
D- 500

57- The total cost of transportation according to Vogal Approximation Method (VAM) is:

A- 78000
B- 87000
C- 76800
D- 67000

58- The total cost of transportation according to Least Cost Method (LCM) is:

A- 87000
B- 67000
C- 78000
D- 76000

59- The total cost of transportation according to North West Method (NWM) is:

A- 87000
B- 78000
C- 76000
D- 119000

60- In general the total cost of transportation:

A- North West Method always is the best methods among the three methods.
B- Vogal Approximation Method always is the best methods among the three methods.
C- Least Cost Method always is the best methods among the three methods.
D- The best method depends upon the case.

3- PERT

Questions 61-74 The following is details of A project:

Activities	Path	Time (week)		
		O	M	P
A	1-2	2	6	10
B	1-3	1	3	5
C	2-4	4	7	10
D	3-4	3	4	5
E	1-5	6	8	10
F	5-6	5	8	17
G	6-7	7	9	17
H	4-7	10	16	34
I	3-7	10	12	26

61-T_e of activity C is equal:

A- 10 weeks
B- 7 weeks
C- 12 weeks
D- 21 weeks

62-T_e of activity H is equal:

A- 18 weeks
B- 17 weeks
C- 44 weeks
D- 10 weeks

63-CP is:

A-B I
B- B D H
C- A C H
D- A C I

64-ES of Event 4 isequal:

A- 13
B- 7
C- 17
D- 8

65-ES of Event 5 is equal:

A- 21
B- 8
C- 17
D- 0

66-LS of Event 3 is equal:

A- 6

B- 9

C- 31

D- 21

67-LS of Event 4 is equal:

A- 12

B- 11

C- 13

D- 14

68-The time to finish the project is equal:

A- 31

B- 30

C- 17

D- 6

69-The standard deviation of the project is equal:

A- 18.78

B- 2.78

C- 16

D- 4.33

70-The standard deviation of the activity C is equal:

A- 1.78

B- $\sqrt{1.78}$

C- 1

D- 16

71-$Z_{calculated}$ (The Radom variable on standard normal distribution) using to calculate the probability of finishing the project within 34 weeks equal:

A- $Z = (O + 4M + P)/6$

B- $Z = \{(P - O)/6)\}^2$

C- Z = {(required time – CP_{time})/(variance of the activities on the CP)}

D- Z = {(required time – CP_{time})/(Standard deviation of the activities on the CP)}

72- $Z_{calculated}$ (The Radom variable on standard normal distribution) using to calculate the probability of finishing the project within 34 weeks equal:

A- 0.50
B- 0.16
C- 0.70
D- 0.8

73- The probability of finishing the project within 34 weeks equal:

A- 0.5
B- > 0.5
C- < 0.5
D- 1

74- The probability of finishing the project within 28 weeks equal:

A- 0.5
B- > 0.5
C- < 0.5
D- 1

Questions 75-80 the following table represents information about a project:

Activity	Path	Time (week)		Cost ($)	
		Normal	Crash	Normal	Crash
A	1 – 2	5	3	10000	14000
B	1 - 3	10	7	18000	24000
C	2 – 5	11	8	15000	18000
D	3 – 4	6	5	5000	6500
E	3 – 5	8	4	3000	7000
F	4 – 6	9	8	12000	15000
G	5 - 6	12	8	6000	9000
Total				69000	93500

75- How many weeks can be minimized?

A- 12 weeks
B- 10 weeks
C- 8 weeks
D- 6 weeks

76- The normal CP is:

A- A C G
B- B E G
C- B D F
D- A B G

77- The crashed CP is equal:

A- 28 weeks
B- 30 weeks
C- 26 weeks
D- 20 weeks

78- The first time minimization equal:

A- 4 weeks
B- 6 weeks
C- 8 weeks
D- 10 weeks

79- The additional cost according to the first time minimization is:

A- $ 69750
B- $ 70500
C- $ 71250
D- $72000

80- $\Delta_{cost} / \Delta_{time}$ of activity D is equal:

A- 3000
B- 2000
C- 1500
D- 1000