Code No: MA1901 R14

MBA I Semester Supplementary Examinations, May 2015

QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS
(Master of Business Administration)

Time: 3 Hours **Max. Marks: 60**

Note: Answer All Sections of Questions.

   All Questions from Section- A are to be answered at one place.

SECTION–A

$6 \times 2 = 12M$

1. What is Decision tree Analysis? What are its advantages?

2. State the mathematical formulation of LPP.

3. What are the managerial applications of assignment problem?

4. Explain two person Zero-Sum game.

5. Define different time estimates in PERT.

6. What is meant by Critical Path?

SECTION–B

$3 \times 12 = 36M$

1. a) Solve the following LP problem using Simplex Method.

   Maximize $Z = 10X1 + 6X2$

   Subject to constraints

   $X1 + X2 \leq 2$

   $2X1 + X2 \leq 4$

   $3X1 + 8X2 \leq 12$

   $X1, X2 \geq 0$

(OR)

   b) Solve the assignment problem using Hungarian Method.

<table>
<tr><td></td><td></td><td colspan="4">Persons</td></tr>
<tr><td></td><td></td><td>A</td><td>B</td><td>C</td><td>D</td></tr>
<tr><td></td><td>J1</td><td>13</td><td>5</td><td>8</td><td>10</td></tr>
<tr><td>Jobs</td><td>J2</td><td>9</td><td>15</td><td>18</td><td>10</td></tr>
<tr><td></td><td>J3</td><td>12</td><td>14</td><td>10</td><td>10</td></tr>
<tr><td></td><td>J4</td><td>10</td><td>14</td><td>9</td><td>12</td></tr>
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2. a) Find the IBFS by NWCM and Optimal solution by MODI's Method.

Plants	Warehouses					Supply
	W1	W2	W3	W4	W5	
P1	20	28	30	26	62	90
P2	42	35	32	44	26	100
P3	33	52	41	56	29	120
Demand	100	75	50	45	40	

(OR)

b) Egg containing 6 units of vitamin per gram and 7units of vitamin-B per gram, and costs 12 paise per gram. Milk contains 8 units of vitamin-A per gram and 12units of vitamin-B per gram and costs 20 paise per gram. The daily minimum requirement of vitamin-A and vitamin-B are 100 units &120 units respectively. Formulate it as LPP and solve it by graphical method.

3. a) Explain – certainity, Risk and Uncertainity that influence business decision making

(OR)

b)

Activity	Estimated Duration (in weeks)		
	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

i) Draw the project network.

ii) Find the expected duration and variance for each activity. What is the expected project length?

iii) Calculate the variance and standard deviation of the project length.
    What is the probability that the project will be completed
        a) At least 4 weeks earlier than expected?
        b) No more than 4 weeks later than expected?
    If the project is 19 due in weeks, what is the probability of meeting the due date?

CASE STUDY

Annabelle Invests in the Market

Annabelle Sizemore has cashed in some treasury bonds and life insurance policy that her parents had accumulated over the years for her. She has also saved some money in certificates of deposit and savings bonds during the 10 years since she graduated from college. As a result, she has $120,000 available to invest. Given the recent rise in the stock market, she feels that she should invest all of this amount there. She has researched the market and has decided that she wants to invest in an index fund tied to S&P stocks and in an Internet stock fund. However, she is very concerned about the volatility of Internet stocks. Therefore, she wants to balance her risk to some degree.

She has decided to select an index fund from Shield Securities and an Internet stock fund from Madis on Funds, Inc. She has also decided that the proportion of the dollar amount she invests in the index fund relative to the Internet fund should be at least one-third but that she should not invest more than twice the amount in the Internet fund that she invests in the index fund. The price per share of the index fund is $175, where as the price per share of the internet fund is $208. The average annual return during the last 3 years for the index fund has been 17%, and for the internet stock funds it has been 28%. She anticipates that both mutual funds will realize the same average returns for the coming year that they have in the recent past; however, at the end of the year she is likely to re evaluate her investment strategy anyway. Thus, she wants to develop an investment strategy that will maximize her return for the coming year.

Question:

Formulate a linear programming model for Annabelle that will indicate how much money she should invest in each fund and solve this model by using the graphical method.

Suppose Annabelle decides to change her risk-balancing formula by eliminating the restriction that the proportion of the amount she invests in the index fund to the amount that she invests in the Internet fund must be at least one-third. What will the effect be on her solution? Suppose instead that she eliminates the restriction that the proportion of money she invests in the Internet fund relative to the stock fund not exceeds a ratio of 2 to 1. How will this affect her solution?

If Annabelle can get $1more to invest, how will that affect her solution? $2 more? $3 more? What can you say about her return on her investment strategy, given the successive changes?

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