July 2014

Bachelor of Business Administration (BBA) Examination

IV Semester

Operations Research

Time : 3 Hours] [Max. Marks : 80

Note : Attempt any three questions from Section A. Each question in this section carries 16 marks. Attempt any two questions from Section B. Each question in this section carries 16 marks.

Section A

1. Discuss the following :
   (a) OR as an interdisciplinary approach.
   (b) Scientific Method in OR.
2. (a) What is meant by a feasible solution of an LPP ?
   (b) In relation to LPP, explain the implication of the following assumptions of the model :
      (i) Linearity of the objective function and constraints,
      (ii) Certainty,
      (iii) Continuous Variables.
3. Compare and contrast CPM and PERT. Under what conditions would you recommend the scheduling by PERT ? Justify your answer with reasons.
4. What is an unbalanced assignment problem ? How is the Hungarian method applied for obtaining a solution if the matrix is rectangular ?
5. (a) What is replacement ? Describe some important replacement situations ?
   (b) Give Johnson's procedure for determining an optimal sequence for processing *'n'* items on two machines. Give justification of the rule used in the procedure.

Section B

6. A firm is engaged in producing two products, A and B. Each unit of product A requires 2 kg of raw material and 4 labour hours for processing, whereas each unit of product B requires 3 kg of raw material and 3 hours of labour of the same type. Every week, the firm has an availability of 60 kg of raw material and 96 labour hours. One unit of product A sold yields Rs. 40 and one unit of product B sold gives Rs. 35 as profit. Formulate and solve an LPP to determine as to how many units of each of the products should be

produced per week so that the firm can earn maximum profit. Assume that whatever is produced can be sold.

7. (a) A company plans to assign 5 salesmen to 5 districts in which it operates. Estimates of sales revenue in thousands of rupees for each salesmen in different districts are given in the following table. In your opinion, what should be the placement of the salesmen if the objective is to maximize the expected sales revenue?

	District				
Salesman	D_1	D_2	D_3	D_4	D_5
S_1	40	46	48	36	48
S_2	48	32	36	29	44
S_3	49	35	41	38	45
S_4	30	46	49	44	44
S_5	37	41	48	43	47

(b) The Simple Engg. Co. has a machine whose purchase price is Rs. 80,000. The expected maintenance costs and resale price in different years are given below :

Year	1	2	3	4	5	6	7
Maintenance Cost (Rs.)	1000	1200	1600	2400	3000	3900	5000
Resale Value (Rs.) ('000)	75	72	70	65	58	50	45

After what time interval, should the machine be replaced ?

8. There are five jobs, each of which is to be processed through 3 machine A, B, C in order ABC. Processing times in hours are :

Job	**A**	**B**	**C**
1	3	4	7
2	8	5	9
3	7	1	5
4	5	2	6
5	4	3	10

Determine optimal sequence and minimum elapsed time. Also find idle times and waiting times of 3 machines.

9. Consider the following network with activities and duration in weeks :

Activity	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration	15	15	3	5	8	12	1	14	3	14

Determine : ES, EF, CS, LF and Critical Path.

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