

M.Com. DEGREE EXAMINATION APRIL 2008
COMMERCE
SECOND SEMESTER

COURSE : MAJOR – CORE
PAPER : QUANTITATIVE ANALYSIS FOR MANAGEMENT
TIME : 3 HOURS MAX. MARKS : 100

SECTION – A

ANSWER ANY FIVE QUESTIONS: (5 x 8 = 40)

1. Solve the following assignment problem. The data given in the table refer to production in certain units.

Operators	Machine			
	A	B	C	D
1	10	5	7	8
2	11	4	9	10
3	8	4	9	7
4	7	5	6	4
5	8	9	7	5

2. Find the initial feasible solution by least cost method

	W1	W2	W3	
F1	48	60	56	140
F2	45	55	53	260
F3	50	65	60	360
F4	52	64	55	220
Demand	200	320	250	

3. X Ltd. during the festival season combines two factor A & B to form a gift pack which must weigh 5kg. Atleast 2kg of A & not more than 4kg of B should be used. The net profit contribution to the company is Rs.5 per kg for A & Rs.6 per kg for B. Formulate LP model to find the optimal factor mix.
4. Draw a network from the following activity & find a critical path & total project duration.

Activity	Duration (weeks)
1-2	3
1-4	2
1-5	2
2-3	4
3-8	2
4-6	7
4-7	4
5-6	4
6-9	6

7-8 5
8-9 3.

5. A project has the following activities and characteristics:

Activity	Estimated Duration in days		
	Optimistic	Most likely	Pessimistic
1-2	2	5	8
1-3	6	6	6
1-4	1	7	13
2-5	3	9	15
3-5	2	8	14
4-6	6	9	12
5-6	4	7	10

Required -

- Find expected duration of each activity and their variances.
 - Draw the project network and expected Duration of the project.
 - Find variances of activities on critical path and its standard deviation.
6. Enumerate the methods by which initial feasible solution can be obtained.
7. Give an account of the quantitative techniques used in decision making.
8. Write short notes on -
- Importance of business forecasting
 - Optimistic time
 - CPM
 - Unbalanced assignment problem.

SECTION – b

ANSWER ANY THREE QUESTIONS:

(3 x 20 = 60)

9. The captain of a cricket team has to allot five middle batting positions to five batsman. The average runs scored by each batsman at these positions are as follows:

Bats man	Batting position				
	1	2	3	4	5
P	40	40	35	25	50
Q	42	30	16	25	27
R	50	48	40	60	50
S	20	19	20	18	25
T	58	60	59	55	53

Find the assignment of batsmen to positions which would give the maximum number of runs.

10. A company has 4 factories situated in 4 different locations in the country and 4 sales agencies located in 4 other locations in the country. The cost of production the sale price and shipping cost in the cells of matrix, monthly capacities and monthly requirements are given below:

Factory	Sales agency				Monthly capacity (units)	Cost of production (Rs.)
	1	2	3	4		
A	7	5	6	4	10	10
B	3	5	4	2	15	15
C	4	6	4	5	20	16
D	8	7	6	5	15	15
Monthly requirements (units)	8	12	18	22		
Sales price	20	22	25	18		

Find the monthly production and distribution schedule which will maximize profits.

11. Solve the following problem using simplex method

$$\text{Maximise } z = 21x_1 + 15x_2$$

Subject to the constraints

$$-x_1 - 2x_2 \leq 6$$

$$4x_1 + 3x_2 \leq 12$$

$$x_1 \geq 0, x_2 \geq 0.$$

12. A small maintenance project consists of the following twelve jobs whose precedence relations are identified with their node numbers.

Job	1-2	1-3	1-4	2-3	2-5	2-6
Duration in days	10	4	6	5	12	9
Jobs	3-7	4-5	5-6	6-7	6-8	7-8
Duration	12	15	6	5	4	7

- Draw an arrow diagram representing the project.
 - Calculate Earliest start, earliest finish, latest start and latest finish time for all the jobs.
 - Find the critical path and project duration.
 - Tabulate total float, free float and independent float.
13. The activities involved in a PERT project are detailed below:

Job	(Duration in weeks)		
	Optimistic	Most likely	Pessimistic
1-2	3	6	15
2-3	6	12	30
3-5	5	11	17
7-8	4	19	28
5-8	1	4	7
6-7	3	9	27
4-5	3	6	15
1-6	2	5	14
2-4	2	5	8

Required -

- a) Draw a network diagram.
- b) Find the critical path after estimating the earliest and latest event times for all mode.
- c) Find the probability of completing the project before 31 weeks.
- d) What is the chance of project duration exceeding 46 weeks.
- e) What will be the effect on the current critical path if the most likely time of activity 3-5 gets revised to 14 instead of 11 weeks given above.

