(i) Printed Pages: 4 Roll No. .....

(ii) Questions : 9 Sub. Code : 0 8 7 4

Exam. Code : 0 0 2 3

Bachelor of Business Administration 3rd Semester

(2122)

OPERATION RESEARCH

Paper–BBA 202

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :—(1) Attempt any **four** questions from Unit I.

(2) Attempt any **two** questions each from Unit II and Unit III.

UNIT–I

1. (a) What is degeneracy ? How it can be resolved in case of transportation problem ?

(b) Explain zero sum two person game with suitable example.

(c) Solve the following game :

		Player B	
		B1	B2
Player A	A1	8	10
	A2	12	6

(d) In a factory, there are six jobs to perform, each of which should go through two machines A and B, in the order A, B. The processing timings (in hours) for the

jobs are given here. You are required to determine the sequence for performing the jobs that would minimize the total elapsed time.

Job	J1	J2	J3	J4	J5	J6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

(e) Solve the following transportation problem using VAM :

Source	Destination			Supply
	A	B	C	
1	2	7	4	5
2	3	3	1	8
3	5	4	7	7
4	1	6	2	14
Demand	7	9	18	34

(f) A Director in a Management Institute has the problem of assigning courses to teachers with a view to maximizing educational quality in his Institute. He has available to him four professors namely A, B, C and D. Four courses must be cleared and after appropriate evaluation, the Director has arrived at the following relative ratings (100 = best rating) regarding the ability of each instructor to teach each of the four courses :

	Course 1	Course 2	Course 3	Course 4
Prof 1	60	40	60	70
Prof 2	20	60	50	70
Prof 3	20	30	40	60
Prof 4	30	10	30	40

How should he assign his staff to the courses to realize his objective ? 5 marks each

UNIT–II

2. Define Operations Research. Explain the scope and significance of operations research. Describe some methods of O.R.

3. What is linear programming problem ? What are the assumptions in formulating linear programming problem ? Explain main limitations of linear programming problem.

4. A farmer has 1,000 acres of land on which he can grow corn, wheat or soyabean. Each acre of corn costs Rs. 100 for preparation, requires 7 man-days of work and yields a profit of Rs. 30. An acre of wheat costs Rs. 120 to prepare, requires 10 man-days of work and yield a profit of Rs. 40. An acre of Soyabean costs Rs. 70 to prepare, requires 8 man days of work and yields a profit of Rs. 20. If the farmer has Rs. 1,00,000 for preparation and can count on 8,000 man-days of work, how many acres should be allocated to each crop to maximize profits ? Solve using simplex method.

5. A travelling salesman has to visit 5 cities. He wishes to start from a particular city visit each city once and then return to his starting point. Cost of going from one city to another is shown below. You need to find the least cost route.

		To City				
		A	B	C	D	E
From City	A	–	2	6	10	8
	B	12	–	5	22	4
	C	18	14	–	6	14
	D	26	4	3	–	10
	E	9	6	10	2	–

15 marks each

UNIT–III

6. It is a game between two players where A is maximizing player and B is minimizing player. Player A wins B's coin if the two coins total are equal to odd number and loses his coin if total of two coins is even. It is game of 1, 2, 5, 10 and 50 rupees coins. Determine the pay off matrix, the best strategies for each player and the value of game to A.

7. A small project consisting of eight activities has the following characteristics :

Time estimate in weeks				
Activities	Preceeding activity	Most optimistic time	Most likely time	Most pessimistic time
A	NONE	2	4	12
B	NONE	10	12	26
C	A	8	9	10
D	A	10	15	20
E	A	7	7.5	11
F	B,C	9	9	9
G	D	2	3.5	7
H	E,F,G	5	5	5

(i) Draw the PERT network for the project.

(ii) Prepare the activity schedule for the project.

(iii) Determine the critical path.

8. Differentiate between PERT and CPM. What are the applications of PERT and CPM in business ?

9. Explain in detail the sequencing problem. What are the different classification of sequencing problems ? Explain its application in business. 15 marks each