U.G. 6th Semester Examination - 2020

BBA

Course Code : BBBACCHT601

Course Title : Operation Research

Full Marks : 40 Time : 2 Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **ten** questions of the following: 1×10=10

a) What is the use of operational research?

b) Who is the father of operational research?

c) What is Research Operation?

d) If no feasible solutions is found in linear programming, what can we do?

e) Define stock variable.

f) What we do with objective functions in linear programming problem?

g) Define VAM.

h) Can we get optimal in the least-cost method?

i) When will a transportation problem be balanced?

j) What is Network?

k) What do you know by forward pass?

l) Explain the concept of float.

m) Define two person zero-sum game.

n) Use Dominance Property to solve the game problem:

	B_1	B_2	B_3
A_1	6	8	6
A_2	4	12	2

o) When a game has saddle-point solution?

2. Answer any **five** from the following: 2×5=10

a) Find out that whether the game is determinable or not where pay-off matrix is as follows:

$$\begin{array}{c} \\ \text{Player X} \end{array} \begin{array}{c} \text{Player Y} \\ \begin{bmatrix} 3 & -1 & 4 & 2 \\ -1 & -3 & -7 & 0 \\ 4 & -6 & 2 & -9 \end{bmatrix} \end{array}$$

b) What do you know by Mixed Strategies?

c) State the rules of constructing a "project network".

d) Compare the PERT model and CPM model.

e) What is the basic theorem of linear programming?

f) The problem has been formulated as follows:

Minimise $Z=6x_1+7x_2$

Subject to $2x_1+3x_2 \leq 12$

$2x_1+x_2 \leq 8$

Plot it graphically (solution is not needed).

g) Why is operation research important?

h) What are the steps involved in operation research?

3. Answer any **two** questions from the following: 5×2=10

a) What is Operation Research Model? Explain their different types. 2+3

b) What is meant by North-West Corner Rule? Explain this method (by taking an illustration) to obtain the initial feasible solution to a transportation problem. 1+4

c) Two players A and B match coins. If the coins match, then A wins one unit of value. If the coins do not match, then B wins one unit of value. Determine the optimum strategies for the players and the value of the game.

4. Answer any **one** question from the following: 10×1=10

a) The owner of a chain of fast-food restaurants is corresponding a new computer system for accounting the inventory control. A computer company sent the following information about the system installation:

Activity Identification	Activity Description	Immediate Predecessor	Time		
			Most Optimistic	Most Likely	Most Pessimistic
A	Select the computer model	-	4	6	8
B	Design input/output system	A	5	7	15
C	Design monitoring system	A	4	8	12
D	Assemble Computer Hardware	B	15	20	25
E	Develop the main programs	B	10	18	26
F	Develop Input/Output routines	C	8	9	16
G	Create Database	E	4	8	12
H	() the system	D.F	1	2	3
I	Test and implement	G.H	6	7	8

Construct an arrow diagram for this problem, determine the critical path and state the expected project completron time. 4+3+3

b) A solicitor's firm employs typists on hourly piece-rate basis for their daily work. There are five typists and their charges and speed are different. According to an earlier understanding, only one job is given to one typist and the typist is paid for a full hour even when he works for a fraction of an hour. Find the least cost allocation for the following data:

Typist	Rate/hour(Rs.)	Number of Pages Types/hr	Job	No. of pages
A	5	12	P	199
B	6	14	Q	175
C	3	8	R	145
D	4	10	S	298
E	4	11	T	178

What do you know by Hungarian Assignment Method?

c) Old hens can be bought at Rs.2 each and young hens at Rs.5 each. The old hens lay 4 eggs per week and the young ones lay 6 eggs per week; each egg being worth 50 paise. If there are only Rs.70 available to spend on purchasing the hens and if it is not possible to house more than 20 hens at a time, how many of each kind of hens should be bought in order to have a maximum profit per week? Formulate the above problem as a linear programming problem and solve it by simplex method. 3+7

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