

Seat No. : _____

JA-101

January-2021

B.B.A., Sem.-V

CC-304 : Operations Research & Q.T.

Time : 2 Hours]

[Max. Marks : 50

- Instructions :** (1) All Questions in Section – I carry equal marks.
(2) Attempt any **two** questions in Section – I.
(3) Question – 5 in Section II is compulsory.

SECTION – I

1. (A) What is LPP ? State its uses. 10
(B) Two types of hens are kept in a poultry farm. A type of hen costs ₹ 20 each and B type of hen costs ₹ 30 each. A type of hen lays 4 eggs per week and B type of hen lays 6 eggs per week. At the most 40 hens can be kept in the poultry. Not more than ₹ 1050 is to be spent on the hens. How many hens of each type should be purchased to get maximum eggs ? 10
2. (A) Solve the following transportation problem by NW Rule, Matrix minima method : 10

Source	A	B	C	D	Supply
X	15	18	22	16	30
Y	15	19	20	14	40
Z	13	16	23	17	30
Demand	20	20	25	35	100

- (B) Obtain basic feasible solution by Vogel's approximation method. Also obtain its optimum solution. 10

Source	A	B	C	Supply
X	6	4	14	10
Y	14	10	4	7
Z	4	10	8	8
Demand	12	8	5	

3. (A) Draw PERT diagram. Also calculate EST, EFT, LST, LFT and Float Time. State its Critical Path. 10

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6	5-7	6-7
Duration (Months)	8	7	3	6	8	6	4	12	0	6	8

- (B) Draw a PERT diagram for given details. Determine the critical path and the expected duration of completion of the entire project. 10

Activity Node	Optimistic Time	Most likely time	Pessimistic time
1-2	2	4	6
1-3	6	6	6
1-4	6	12	24
2-3	2	5	8
2-5	11	14	23
3-4	15	24	45
3-6	3	6	9
4-6	9	15	27
5-6	4	10	16

4. (A) Apply the principle of dominance in Game theory and solve the Adjoining game : 10

		Y			
		1	2	3	4
X	1	8	10	9	14
	2	10	11	8	12
	3	13	12	14	13

- (B) Solve the following assignment problem for minimization : 10

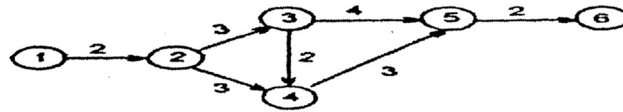
	A	B	C	D	E
P	4	10	12	18	17
Q	7	16	16	22	18
R	8	6	9	19	21
S	11	12	15	12	13
T	9	14	19	18	14

SECTION – II

5. Do as Directed : (Any **ten**)

10

- (1) Hungarian Method is used to solve
 - (a) A transportation problem
 - (b) A LP problem
 - (c) A travelling salesman problem
 - (d) Both (a) and (b)
- (2) In a zero-sum game,
 - (a) what one player wins, the other loses.
 - (b) the sum of each player's winnings if the game is played many times must be zero.
 - (c) the game is fair—each person has an equal chance of winning.
 - (d) long-run profits must be zero.
- (3) In the network shown in Fig., the critical path is



- (a) 1-2-3-4-5-6
 - (b) 1-2-4-5-6
 - (c) 1-2-3-5-6
 - (d) 1-2-4-3-5-6
- (4) Every LPP is associated with another LPP is called _____
 - (a) Primal
 - (b) Dual
 - (c) Non-linear programming
 - (d) None
 - (5) Operations Research started just before World War II in Britain with the establishment of teams of scientists to study the strategic and tactical problems involved in military operations.
 - (a) True
 - (b) False
 - (6) The main limitation of operations research is that it often ignores the human element in the production process.
 - (a) True
 - (b) False
 - (7) Which of the following is not the phase of OR methodology ?
 - (a) Formulating a problem
 - (b) Constructing a model
 - (c) Establishing controls
 - (d) Controlling the environment
 - (8) Operations research was known as an ability to win a war without really going in to _____
 - (a) Battle field
 - (b) Fighting
 - (c) The opponent
 - (d) Both (a) and (b)
 - (9) OR has a characteristics that it is done by a team of
 - (a) Scientists
 - (b) Mathematicians
 - (c) Academics
 - (d) All of the above
 - (10) What enables us to determine the earliest and latest times for each of the events and activities and thereby helps in the identification of the critical path ?
 - (a) Programme Evaluation
 - (b) Review Technique (PERT)
 - (c) Deployment of resources
 - (d) Both (a) and (b)

- (11) Graphical optimal value for Z can be obtained from
- Corner points of feasible region
 - Both (a) and (c)
 - Corner points of the solution region
 - None of the above
- (12) In game theory, the outcome or consequence of a strategy is referred to as the
- payoff
 - penalty
 - reward
 - end-game strategy.
- (13) If there were n workers & n jobs, there would be
- n! solutions
 - (n-1)! solutions
 - (n!)n solutions
 - n solutions
- (14) In a transportation problem, when the number of occupied routes is less than the number of rows plus the number of columns -1, we say that the solution is :
- Unbalanced
 - Infeasible
 - Optimal
 - Degenerate
- (15) Which of the following methods is used to verify the optimality of the current solution of the transportation problem ?
- Modified distribution method
 - Least cost method
 - Vogel's approximation method
 - All of the above
- (16) When total supply is equal to total demand in a transportation problem, the problem is said to be
- Balanced
 - Unbalanced
 - Degenerate
 - None of the above
- (17) The solution to a transportation problem with 'm' rows (supplies) & 'n' columns (destination) is feasible if number of positive allocations are
- m+n
 - m*n
 - m+n+1
 - m+n-1
- (18) _____ or _____ are used to "balance" an assignment or transportation problem.
- Destinations; sources
 - Units supplied; units demanded
 - Large cost coefficients; small cost coefficients
 - Dummy rows; dummy columns
- (19) In assignment problem of maximization, the objective is to maximize
- Profit
 - Optimization
 - Cost
 - None of the above
- (20) Total Float = _____
- LFij – EFij
 - LSij – ESij
 - Both (a) and (b)
 - None of given
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