Seat No. : _____

ND-101

November-2021

B.B.A., Sem.-V

CC-304 : Operation Research and Quantitative Techniques

Time : 2 Hours] **[Max. Marks : 50**

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

Section – I

1. (A) Define Operation Research. Explain application and scope of Operation Research. **10**

(B) Jannet has an accounts question paper. It is divided in two parts. Each question of first part carries 10 marks and requires 15 minutes to solve it and each question paper contains the instruction that at least two questions from each section are to be attempted and maximum 8 questions are to be answered. Time duration of solving the paper is two and half hours. How many questions from each section should be answered to get maximum marks. **10**

2. (A) Johaana Ltd. is producing raw material for the machinery. It has 3 godowns and 4 sales centers. From it find the Optimal Solution for the following transportation problem. **10**

–		Sales Center				Supply
		T	**V**	**J**	**R**	
Godowns	**P**	8	9	6	3	**19**
	N	6	11	5	10	**12**
	C	3	8	7	9	**14**
Demand		**15**	**6**	**11**	**13**	**45**

(B) Find the feasible solution of Transportation Problem by Vogel's Approximation Method. **10**

	A	**B**	**C**	**D**	**Supply**
A	24	16	18	22	**30**
B	12	14	20	14	**14**
C	10	18	14	12	**16**
Demand	**12**	**8**	**22**	**10**	

3. (A) Joyaan Ltd. has prepared a project. The number of days of completing different jobs of a project are given below. Prepare a network of the project and determine critical path. Also find EST, EFT, LST and LFT. **10**

Job	Time
1 – 2	4
2 – 3	6
2 – 4	10
3 – 5	8
3 – 6	2
4 – 6	12
4 – 7	4
5 – 8	16
6 – 8	14
7 – 8	8

(B) Kakkad Ltd. has a project which is carried out through activities A to H. The time estimates of different activities are as follows. Determine the critical path. **10**

Activity	Sequence	Time (In Hours)
A	1 – 2	6
B	2 – 3	8
C	3 – 4	12
D	2 – 5	16
E	5 – 6	20
F	4 – 7	14
G	6 – 7	22
H	7 – 8	10

4. (A) The payoff matrix of two players is given below. Decide the best strategy for both and also find the value of the game. **10**

Players	B				
A	–3	–1	–1	4	2
	2	1	0	1	1
	–5	–4	–1	–3	5
	4	2	–5	1	–7

(B) 3J Car Service has a surplus of one car in each of the cities A, B, C, D, E, F and a requirement of one car in each of the cities P, Q, R, S, T and U. The distance (in miles) between cities with a surplus and cities with a requirement are given in the matrix below. How should the cars be dispatched so as minimize the total distance travelled ? **10**

	P	**Q**	**R**	**S**	**T**	**U**
A	41	62	39	52	25	51
B	22	29	49	65	81	50
C	27	29	60	51	32	32
D	45	50	48	52	37	43
E	29	40	39	26	30	33
F	82	40	40	60	51	30

Section – II

5. Give the following answer : (Attempt any **10**) **10**

(1) Which problem is studied in the first phase of operation research ?

(A) Environment (B) Social

(C) Mental (D) None

(2) "Operation Research is the art of giving bad answers to problems to which otherwise worse answers are given." – This definition is given by whom ?

(A) Churchman (B) T. K.

(C) V. T. (D) 3J

(3) Linear Programming was first introduced in which year ?

(A) 1947 (B) 1950

(C) 1991 (D) 2020

(4) Linear Programming was first introduced by whom ?

(A) George R. Dantjing (B) V.T. Kakkad

(C) Marshall Wood (D) None

(5) From the following what is the full form of VAM ?

(A) Vogel's Approximation Method

(B) Void Algorithm Mean

(C) Valid Arithmetic Mean

(D) None

(6) Matrix Minima is also known as _____.

(A) North-West (B) Least Cost

(C) Both (D) None

(7) If total demand and total supply are not equal in transportation problem then it is called _____.

(A) Balanced (B) Unbalanced

(C) Both (D) None

(8) What is the full form of MODI method ?

(A) Minimum Optimum Demo Insurance

(B) Modified Distribution Method

(C) (A) or (B)

(D) None

(9) From the following what is the formula of Total Float in Pert & CPM ?

(A) EFT-LST (B) LFT-EFT

(C) LST-EST (D) None

(10) In PERT, the completion of an activity is called _____.

(A) Node (B) Event

(C) Both (D) None

(11) In CPM, the completion of an activity is called _____.

(A) Event (B) Virtual

(C) Node (D) None

(12) The dominance property is used to reduce _____ of the payoff matrix.

(A) Column (B) Row

(C) The Size (D) None

(13) From the following, in which situation the saddle point exist ?

(A) Minmin = Maxmax (B) Maxmax = Minmin

(C) Maximin = Minimax (D) None

(14) From the following what is the name of method to solve assignment problem ?

(A) Fisher (B) Passche

(C) Hungarian Method (D) None

(15) The optimum solution is obtained by which method in Assignment Problem ?

(A) Laspayere (B) TK

(C) Hungarian Method (D) None