Printed page: 4 **Subject Code: ACSBS0401**

Roll No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P. J Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course: B.Tech. **Branch : CSBS**

Semester IV Examination PUT Year- (2021-22)

Subject Name: Operations Research

Time: 2:00 Hrs **Max. Marks:60**

General Instructions:

1. *This Question paper consists of 4pages & 4questions. It comprises of three Sections -A, B, &C.*
2. *Section A –Q.No- 1 is Very short answer type questions carrying 1 mark each, Q. No- 2 is shortanswer type Question carrying 2 mark each. You are expected to answer them as directed.*
3. *Section B- Q.No-3 is Short answer type questions carrying 5 marks each. Attempt any four out of five questions given.*
4. *Section C - Q.No-4 is Long answer type questions carrying 6 marks each.Attempt any four out of six questions given.*

		SECTION – A		
1.	**Attempt all parts**		**[8x1=08]**	
	1-a.	Dummy Row or Dummy Column are used to "balance" an assignment or transportation problem.	**(1)**	**CO3**
	1-b.	In a transportation problem, we must make the number of Demand and Supply equal.	**(1)**	**CO3**
	1-c.	The allocation cells in the transportation table is called Occupied.	**(1)**	**CO3**
	1-d.	The longest path in the network diagram is called _____ path.	**(1)**	**CO4**
	1-e.	Floats for critical activities will be always _____	**(1)**	**CO4**
	1-f.	The two types of costs involved in project crashing are Normal and _____ cost.	**(1)**	**CO4**
	1-g.	a. Traffic intensity is given by _____.	**(1)**	**CO5**
	1-h.	a. The unit of traffic intensity is Erlang.	**(1)**	**CO5**
2.	**Attempt allparts**		**[4×2=08]**	

	2-a.	What are the rules for forming the closed loop?	(2)	CO3
	2-b.	Define holding cost and set-up cost.	(2)	CO4
	2-c.	What is meant by inventory?	(2)	CO4
	2-d.	Give some important applications of queueing theory?	(2)	CO5

SECTION – B

3. Attempt any four out of five questions- [4x5=20]

3-a. Determine an initial basic feasible solution to the following transportation problem using: matrix minima method (5) CO3

	D_1	D_2	D_3	D_4	Available
O_1	1	2	1	4	30
O_2	1	3	2	1	50
O_3	4	2	5	9	20
Required	20	40	30	10	100

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Required	20	40	30	10	100

3-c. The annual demand of an item is 3,200 units. The unit cost is Rs. 6 and inventory carrying charges are 25 per cent per annum. If the cost of one procurement is Rs. 150, determine the:i) EOQ ii) Number of orders per year iii) Time between two consecutive orders iv) The optimal cost. (5) CO4

3-d. What is Queuing Theory? Also explain Queuing System. (5) CO5

3-e. Explain the steps involved in Monte-Carlo Simulation. (5) CO5

SECTION – C

4. Attempt any four out of six questions- [4×6=24]

4-a. Determine an initial basic feasible solution to the following transportation problem using Vogel's method. (6) CO3

		A_1	B_1	C_1	D_1	E_1	Supply
	A	2	11	12	3	7	4

			Origin	B	1	4	7	2	1	8	
				C	3	9	4	8	12	9	
				Demand	3	3	4	5	6	21	
	4-b.	There are four jobs to be assigned to five machines. Only one job can be assigned to the machine. The amount of time in hours required for the jobs per machines are given in the following matrix									**(6)** **CO3**

	A	B	C	D	E
1	4	3	6	2	7
2	10	12	11	14	16
3	4	3	2	1	5
4	8	7	6	9	6

	4-c.	A project consists of a series of task labelled A,B,…,H,I with the following constraints, A<D,E;B,D<F;C<G;B<H;F,G<I;W<X,Y means X and Y cannot start until w is completed. You are required to construct a network using this notation. Also find the minimum time of completion of the project when the time of completion of each task is given as follows:									**(6)** **CO4**

Task	A	B	C	D	E	F	G	H	I
Time (days)	23	8	20	16	24	18	19	4	10

	4-d.	The details of material stocked in a company are given below with the unit cost and the annual consumption in Rs. Classify the material in to A class, B class and C class by ABC analysis.									**(6)** **CO4**

Sr. No.	Item Code No.	Annual consumption in pieces	Unit price in Paise
1	501	30,000	10
2	502	2,80,000	15
3	503	3,000	10
4	504	1,10,000	05
5	505	4,000	05
6	506	2,20,000	10

			7	507	15,000	05		
			8	508	80,000	05		
			9	509	60,000	15		
			10	510	8,000	10		
	4-e.	A T.V. mechanics finds that the time spent on his jobs has an exponential distribution with mean 30 minutes, if he repairs sets in the order in which they come in. If the arrival of sets is approximately Poisson with an average rate of 10 per eight-hour day, what is the mechanic's expected idle time each day? How many jobs are ahead of the average set just brought in?					(6)	CO5
	4-f.	Discuss in detail the use of Monte-Carlo method in problems encountered in: a) Waiting line b) Storage Giving suitable illustration and pointing out the advantages of the method.					(6)	CO5

----------THE END ---------

$\mu = 1/30 \quad \lambda = 10/8\times60 = \frac{1}{48}$

A	B	C	D	E	F	G	H	I
-	-	-	A	A	B,D	C	B	F,G