Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2172011 **Date:30/01/2021**

Subject Name:Production Optimization Techniques

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	What do you understand by LPP?	**03**
	(b)	Explain various steps involved in V.A.M.	**04**
	(c)	Differentiate assignment problem with transportation problem.	**07**
Q.2	**(a)**	State and discuss the methods of solving an assignment problem.	**03**
	(b)	Explain tick marking procedure in assignment problem.	**04**
	(c)	Explain application of linear programming.	**07**
Q.3	**(a)**	Explain the given terms related to Queuing system: (1). Traffic intensity, (2). Length of system and (3). Queue.	**03**
	(b)	Explain kendal's notation for queuing system.	**04**
	(c)	Solve the following LPP by simplex method: Maximize $Z = 100x_1 + 50x_2 + 50x_3$ Subject to $4x_1+3x_2+2x_3 \leq 1000$ $3x_1+8x_2+x_3 \leq 800$ $4x_1+2x_2+x_3 \leq 600$ and $x_1, x_2, x_3 \geq 0$	**07**
Q.4	**(a)**	Find the dual of the following LPP: Maximize $Z = x_1 - x_2 + 3x_3$ Subject to $x_1 + x_2 + x_3 \leq 10$ $2x_1 - x_3 \leq 2$ $2x_1 - 2x_2 - 3x_3 \leq 6$ and $x_1, x_2, x_3 \geq 0$	**03**
	(b)	What are the conditions which leads the IBFS to degenerated problem?	**04**
	(c)	At barber's shop, The customers arrive at the average interval of 6 minutes, and the barber takes on an average 5 minutes for serving the person. Calculate: 1). Counter utilization level; 2). Average no. of customers in the including as the service system. 3). Average no. of customers in queue; 4). Average waiting time of the customers in the system; 5). Expected average waiting time in queue; 6). Probability that the barber is idle; 7).Probability of finding the barber is busy.	**07**
Q.5	**(a)**	Explain merge and burst event.	**03**
	(b)	With the help of quantity cost curve, explain the significance of EOQ. What are the limitations of using the formula for an EOQ?	**04**

(c) A firm is considering replacement of a machine, whose cost price is Rs. 12,200 and the scrape value Rs. 200. The running costs are found from experience to be as follows. **07**

Year (n)	1	2	3	4	5	6	7	8
Maintenance cost f(t)	200	500	800	1200	1800	2500	3200	4000

Q.6 **(a)** Discuss in brief individual replacement versus group replacement. **03**

(b) Discuss different types of floats in network analysis **04**

(c) Explain the Johnson rule of sequencing for n jobs 3 machine problem. Justify the rule with a proof. **07**

Q.7 **(a)** Describe the steps involved in process of decision making. What are pay off and regret functions? How can entries in regret table be derived from pay off table? **03**

(b) Discuss the types of inventories with suitable example. **04**

(c) The time estimates and precedence relationship of different activities constituting a small construction project: **07**

Activity	A	B	C	D	E	F	G	H	I
Predecessor	-	-	B	B	A	A	F	C,E,G	F
Duration (days)	3	8	6	5	13	4	2	6	2

1). Draw the project network assuming all activities pending are ending at single end point.
2). Determine the project completion time.
3). What is critical path?

Q.8 **(a)** What is the need of Decision tree analysis? **03**

(b) Evaluate "PERT is used for recurring type of projects whereas CPM is used for nonrecurring type". **04**

(c) Find an optimal solution to an assignment problem with following cost matrix: **07**

	J_1	J_2	J_3	J_4
M_1	10	9	7	8
M_2	5	8	7	7
M_3	5	4	6	5
M_4	2	3	4	5

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