ANIPAL INSTITUTE OF TECHNOLOGY



DEPARTMENT OF MECHATRONICS ENGINEERING **VII SEMESTER B.TECH. (MECHATRONICS)**

Reg. No.

END SEMESTER EXAMINATIONS, NOVEMBER 2021

SUBJECT: PRODUCTION AND OPERATIONS MANAGEMENT [MTE 4080]

(17.11.2022)

100 MINUTED -

NANY NANDIZO FO

	T	me: 180 MINUTES			MAX.	MA	KKS	<u>5: 50</u>		
	 Instructions to Candidates: Answer ALL the questions. Missing data if any can be suitably assumed 									
Q. No				Μ	СО	РО	LO	BL		
1A.	Draw product volume vs variety chart to represent different production systems. Cite unique characteristic and suitable example to each system.								1	3
1B.	A company is setting up an assembly line to produce 200 units per 10 hour shift. The following table identifies the work elements, time and immediate predecessors.								2	5
		Elemental	Immediate	Duration of the						
		tasks	predecessors	elements (Sec.)						
		A		30						
		В	A	60						
		С	В	55						
		D	В	80						
		Е	С	85						
		F	D	40						
		G	D	65						
		Н	G	60						
		Ι	E, F, H	35						
		Total time (Se								
	 What is the desired cycle time? What is the theoretical minimum number of stations? Use the longest work element time rule balance the assembly line. What are the resulting efficiency? 									
1C.	ABC Lto stock and	l. produces three produ d product structure as s	cts namely X, Y a hown in the below	nd Z, which have d table and the tree s	emand, safety structure:	5	4	1, 2, 3, 5	2	5

	Determine MRP for	oductSafety SX40Y40Z40 I <th>Stock 1 LT LT E(2) LT = 1 Inventory X = scheduled rec or B is 50 and quantities and</th> <th>2 3 y = 1 3) = 1 100, Y = 10 eipts are 60 D is 50. order release</th> <th>4 E $B (2)$ $LT = 2$ $00. A = 5$ units of se dates f</th> <th>5 $T = 2$ C C $C = 8$ $Z due if$ for all references</th> <th>$\frac{6}{120}$ $C(2)$ $\Gamma = 1$ $30, E = 1$ $equirem$</th> <th>7 180 80. d 4.</th> <th>8 120 200</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Stock 1 LT LT E(2) LT = 1 Inventory X = scheduled rec or B is 50 and quantities and	2 3 y = 1 3) = 1 100, Y = 10 eipts are 60 D is 50. order release	4 E $B (2)$ $LT = 2$ $00. A = 5$ units of se dates f	5 $T = 2$ C C $C = 8$ $Z due if$ for all references	$\frac{6}{120}$ $C(2)$ $\Gamma = 1$ $30, E = 1$ $equirem$	7 180 80. d 4.	8 120 200					
2A.	List out	any four qual	itative and qu	antitative fo	orecastin	g mode	ls.			2	1	1, 2, 3	1	3
2B.	 For a product line the annual fixed costs are Rs. 75000, the cost of production at present is Rs. 5/unit and the present sales price is Rs. 7/unit. The annual sales at present are 40000 units. Determine, a) BEP and state whether the company is having profit or loss and calculate the same. b) If the company desires to increase the BEP by 20% suggest the alternative for the same. 							3	2	1, 2, 3, 4, 5	3	4		
2C.	The following data is available for an item Annual demand = 2500units. Holding cost rate = 10% of purchase price Ordering cost = Rs. 100/orderPurchase price (Rs.)54.754.64.5Order quantity100-499500-24995000 and aboveDetermine the most economical order quantity							5	2	1, 2, 3, 4, 5	3	4		
3A	If the designed capacity of a logistics company is 50 vehicles/day. Consider 20% of vehicle capacity goes through planned maintenance everyday and if 3 vehicles delayed at maintenance, calculate utilization and efficiency.								2	2	1, 2, 3, 4, 5	3	4	

3B	For the following demand, calculate the total cost of the plan if the demand can be met by regular time production and subcontracting.							be	3	2	1, 2, 3, 4, 5	2	4		
	Demond Drochastion										5				
		Month Demand				on									
		Ian	800		$\frac{Da}{28}$	28									
		Feb	760		20										
		Mar	1200		29										
		Anr	900		26										
		May	1100		30										
		Widy	1100		50										
	Consider regular time cost as Rs. 15 per unit and subcontracting cost as Rs. 16 per unit.								ber						
3C	Two jobs are to be p hours and the sequen	processed once are as	on 5 macl shown.	hines A,	B,C,I) and	E. Tł	ne proce	essing tim	ie in	5	3	1, 2, 3, 4, 5	3	5
		b 1 A	D	C	Т	<u> </u>	Б						5		
		$\frac{101}{100}$ A		$\frac{c}{2}$	1	<u>ן</u>	E 5								
		$\frac{1110}{1}$ $\frac{5}{1}$	- 4 R	 	1	ו <u></u> ק	Δ								
		$\frac{102}{10}$ C	3	2	1	<u></u> 	4								
			5	2		L									
	In what order jobs b makespan?	e done on	each mac	chine to	minir	nize 1	makes	pan? W	Vhat is the	e					
4 A	Draw the time vs qu delivery without sho	antity char ortages. Re	rt to repre present a	esent ma Ill possil	anufac ble en	cturin tities	g moo of the	lel with model	i finite		2	2	1, 2, 3, 4, 5	1	3
4B	Use suitable method to find the job sequencing for the following data.								3	3	1, 2, 3, 4,	3	5		
		Job/Mac	hine		M1	M2	M3						5		
		Job1			15	14	14								
		Job2			18	16	10								
		Job3			16	12	14								
		Job4			19	18	12								
	Available time (Min.)303030														
	Also, calculate the mean flow time for the assigned sequence.														
4 C	The monthly demand in units for ABC Ltd. For the past 6 months is as shown below.								5	1	1, 2, 3	2	4		
	Month	ı Ian	Feb	Mar	Anr	M	lav	Iun	٦						
	Units	100	80	110	115	1()5	110	1						
	Cinto	-00					~~								
	Use regular straight	fit line to a	forecast f	for July.											
5A	List out the different types of inventories present in the manufacturing units.								2	4	1, 2, 3, 5	1	3		

5B	Discuss the production system cycle with suitable example.				1	3
5C	A business man decide whether to build a small capacity plant or a large capacity				3	5
	plant at a new location. Demand at the location can be either low or high with					
	probabilities estimated at 0.4 and 0.6 respectively. If a small capacity plant is built					
	and demand proves to be high the businessman may choose ether to expand or not					
	to expand with payoffs of Rs.5,40,000 and Rs. 4,46,000 respectively. In case a small					
	capacity plant is built and the demand is low there is no reason to expand and the					
	payoff is Rs. 4,00,000. If a large capacity plant is built and the demand is low the					
	choice is to do nothing with payoff of Rs. 80,000 or to stimulate demand through					
	intensive advertising. The response to advertising may be either modest or sizable					
	with their probabilities estimated to be 0.3 and 0.7 respectively. If it is modest the					
	payoff is estimated to be only Rs. 40,000 and the payoff grows to Rs. 4,40,000 if the					
	response is sizable. Finally if a large capacity plant is built and demand turns out to					
	be high the payoff is Rs.16,00,000. Draw the decision tree and determine whether					
	the businessman should build a small capacity plant or a large capacity plant?					