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## Fifth Semester B.E. Degree Examination, July/August 2021 Operations Management

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions.*

1. a. What do you understand by the term Operations Management? Trace the historical events leading to study of operation management. (07 Marks)
- b. Explain productivity. State the factors affecting productivity. (05 Marks)
- c. A company has an order for a particular component is 100,000 units. There are two alternate methods to manufacture the product. The details of various costs are given below:

Investment details	A	B
(i) Investment on Machinery & Building	Rs.60,00,000	Rs.80,00,000
(ii) Other Fixed & production overheads	Rs.3,00,000	Rs.2,00,000
(iii) Variable production cost/unit	Rs.125	Rs.115
(iv) Variable selling expenses/unit	Rs.5	Rs.15
Selling price/unit	Rs.280	

- (i) Which alternative is economical?
- (ii) Estimate the loss of selecting wrong alternative. (08 Marks)

2. a. Explain the concept of production system with a schematic diagram. (07 Marks)
- b. Sketch and explain the BEP analysis. Explain how it helps in decision analysis. (05 Marks)
- c. A milk factory seeks advice concerning its business and production processes. The final report describes several steps to increase productivity. Accordingly following are the details:

	Existing system	Proposed system
Milk output/hour	1000 gallons	1400 gallons
Wage rate/hour	Rs.12	Rs.12
Filtration cost/hour	Rs.120	Rs.170
Workers	12	9

- (i) Calculate labor productivity for both systems.
- (ii) Find All Factor (AFP) for both systems. (08 Marks)

3. a. What Forecasting? Explain any two techniques. (07 Marks)
- b. Explain any two Forecast Errors. (05 Marks)
- c. The manager of a road transport company believes that the demand for tyres used on his trucks is closely related to the number of kilometers driven. Accordingly the following data covering past 7 months collected.

Duration	1	2	3	4	5	6	7
Kms driven in 1000	120	135	130	150	170	190	220
No. of tyres used	9.5	11.0	12.0	12.5	14.0	16.0	18.0

- (i) Compute the coefficients a and b for the regression line.
- (ii) Suppose the manager plans to drive 250000 kms, what is the expected number of tyres which will be used? (08 Marks)



- 4 a. What is coefficient of correlation? Explain tracking signal with a graph. (06 Marks)  
 b. What are the Time Series Components? Explain the processing steps in forecasting and limitations. (06 Marks)  
 c. Explain the difference between MA and EMA. Find the Weighted Moving Average of 3 and 5 months.

Months	Jan	Feb	Mar	Apr	May	Jun	Jul
Bottles	1325	1353	1305	1275	1210	1195	?

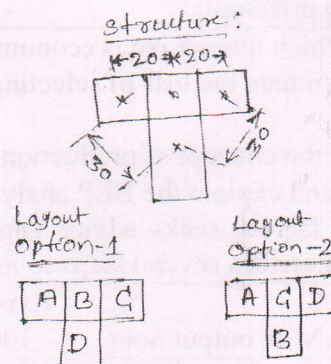
(08 Marks)

- 5 a. What are the various types of capacity? Explain the importance of capacity planning. (06 Marks)  
 b. Explain any two types of layout. (06 Marks)  
 c. A metal processing firm wishes to install enough automobile molders to produce 250000 good castings per year. The molding operations takes 1.5 minutes per casting, but output is typically about 3% defective. How many molders will be required if each one is available for 2000 hours (of capacity) per year? (08 Marks)
- 6 a. List the various factors influencing plant location. Explain. (06 Marks)  
 b. Explain the various capacity measures. What are the capacity strategies? (06 Marks)  
 c. In a small factory two alternate layouts are to handle the following work load/week. Find the suitable option and optimum cost. (08 Marks)

Work Load per week:

To \ From	A	B	C	D
A	x	30	20	x
B	10	x	20	x
C	50	5	x	40
D	x	20	10	x

(X - No load movement)



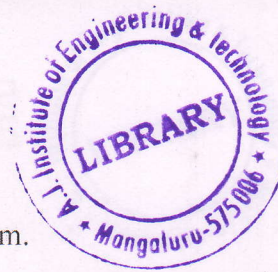
- 7 a. What is Aggregate Planning? Explain its strategies. (06 Marks)  
 b. What are the Functions of Master Production Schedule? State the difference between AP and MPS. (06 Marks)  
 c. A manufacturing plant is in the process of updating its MPS for its products. The plant produces a product on a produce-to-stock basis. Table below shows the estimates of demand for the product for the next six weeks.

Types of Demand	Week					
	1	2	3	4	5	6
Customer forecast & orders	700	1200	700	500	400	1200
Warehouses	100	100	400	500	200	100
Market Research	-	50	-	-	10	-
Production Research	10	-	-	-	-	-

The plant starts with Beginning Inventory of 1500 units, the safety stock requirement of each week is 500 units and the minimum production. Lot size is 2000 units. Prepare a six week detailed master production schedule. Also Available-To-Promise for next 7<sup>th</sup> week.

(08 Marks)





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- 8 a. Explain the Master Production Schedule with a diagram. (06 Marks)  
b. What are the objectives and strategies of MPS? (06 Marks)  
c. Given the following information, set the aggregate planning problem as a transportation problem and find the solution using least cost method.

Forecast demand and production capacity:

Period	Available capacity units			Demand Forecast units
	RT	OT	SG	
1	500	50	120	520
2	500	50	120	720
3	500	50	100	750

Initial Inventory = 100 units, Final Inventory = 100 units, Inventory Carrying Cost = Rs.1/unit/period. Back ordering is not permitted. (08 Marks)

- 9 a. What are the objectives of MRP? Explain the input and outputs of MRP package. (06 Marks)  
b. Explain the key features of MRP system. (06 Marks)  
c. A company makes Q model from components R, S and T. Component R is made from 2 units of component X and 1 unit of component Y. Component T is made from 1 unit of component Y and 3 units of component Z.  
(i) Draw the product structure tree for Q.  
(ii) Actually company plans to build 100 units of Q, and having inventory of 150 units of T and 200 units of R. Find the gross and net requirements of T, R and S. (08 Marks)
- 10 a. Define supply chain. What are the key decisions in supply chain? (06 Marks)  
b. Explain a typical supply chain system with a blank diagram. (08 Marks)  
c. Explain Bullwhip effect. What are the root causes for bullwhip effect? (06 Marks)

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