ii. Consider the following assembly network relationships of a product. The number of shifts per day is two and the number of working hours per shift is 8. The company aims to produce 80 nuts of the product per day. **7**

Operation Number	1	2	3	4	5	6	7	8	9	10
Immediate Preceding Tasks	-	1	1	1	2,3	3,4	5	5,6	4,6	7,8,9
Duration (Min)	7	2	2	5	8	3	4	7	9	8

Draw the precedence diagram, group the activities into work station clearly mention idle time, and find out the line efficiency and balance delay.

OR iii. Seven job are to be machined through 3 machines M1, M2, and M3 in the order M1, M2, M3. The processing time are given in hours to process each one of the 3 jobs through all the machines. Find the optimal sequence of the jobs. Also find the minimum total elapsed times and idle times of machine M2 and M3. **7**

Jobs	A	B	C	D	E	F	G
M1	3	8	7	4	9	8	7
M2	4	3	2	5	1	4	3
M3	6	7	5	11	5	6	12

Q.6 Attempt any two:

i. Explain six sigma methodology of quality improvement. **5**

ii. What are control charts? How can they be used in quality control? **5**

iii. What is TQM. Write its importance? **5**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Management Studies

End Sem (Odd) Examination Dec-2022

MS5CO10 Operations Management

Programme: MBA Branch/Specialisation: Management

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Which of the following activities is not a direct responsibility of operations management? **1**

(a) Developing an operations strategy for the operation
(b) Planning & controlling the operations
(c) Determining the exact mix of products and services that customers will want
(d) Designing the operations products , services & process

ii. As production systems move from projects to batch production to mass production to continuous production. **1**

(a) Processes become more flexible.
(b) Customer involvement with the process increases
(c) Products become more standardized
(d) Demand volumes decrease.

iii. When the flow of materials is variable- **1**

(a) Layout by process is most suitable
(b) Layout by product is most suitable
(c) Layout by fixed position is most suitable
(d) Line balancing is most suitable

iv. The following is the preliminary stage of production planning- **1**

(a) Capacity planning
(b) Material requirements planning
(c) Scheduling
(d) Product development and design

P.T.O.

v. A forecasting technique consistently produces a negative tracking signal. This means that- **1**
(a) The forecasting technique consistently under predicts.
(b) The forecast technique consistently over predicts.
(c) The MAD will also consistently be negative.
(d) The MSE will also consistently be negative.

vi. Aggregate planners balance- **1**
(a) Demand and costs
(b) Capacity and inventories
(c) Fixed and variable costs
(d) Capacity and demand

vii. The table give details of an assembly line: **1**

Work Station	I	II	III	IV	V	VI
Total task time at the workstations (in minutes)	7	9	7	10	9	6

The line efficiency of assembly line is-
(a) 70% (b)75% (c) 80% (d) 85%

viii. Which of the following is not a priority sequencing rule? **1**
(a) SPT (b) CPM (c) EDD (d) FCFS

ix. Kaizen is a Japanese term meaning- **1**
(a) A Fool proof mechanism (b) Just-in-time (JIT)
(c) A fishbone diagram (d) Continuous Improvement

x. Lean production relies on a specific throughput rate of the whole operation. This is known as _____. **1**
(a) Takt time (b) Throughput time
(c) Kanban time (d) Output Time

Q.2 i. Write important functions of operations manager. **2**
ii. What are the key features of MTO and MTS? **3**
iii. What is operations management? Discuss historical evolution of operations management. **5**
OR iv. What is productivity? Explain in detail factors affecting productivity. **5**

Q.3 i. Explain by the use of flow chart product design process. **4**

ii. Write about the characteristics, advantages and limitations of product layout, process layout and cellular layout with block diagram. **6**
OR iii. Why location of plant is important for any organization. **6**
Find out the plant location for the given problem: The new Health care facility is targeted to serve seven census tracts in Delhi. Customer will travel from the seven census tracts centre to the new facility when they need health care. Two locations being considered for the new facility are at (5.5,4.5) and (7,2), which are the centre of census tracts C and F. The table given below shows the coordinates for the centre of each census tracts, along with the projected populations, measured in thousands Find the target area`s centre of gravity for the Health-care medical facility.

S. No	1	2	3	4	5	6	7
Census tracts	A	B	C	D	E	F	G
x,y	2.5, 4.5	2.5, 2.5	5.5, 4.5	5,2	8,5	7,2	9,2.5
Population (I)	2	5	10	7	10	20	14

Q.4 i. What do you understand by master production schedule? How it is related to MRP? **4**
ii. What are various aggregate production planning strategies? Explain in detail. **6**
OR iii. Write about Delphi method of forecasting? Also find smoothing constant i.e. α. If the sale for a product during last four year is given below. The forecast for the 4th year was 876. Also the forecast for 5th year using exponential smoothing method is same as that the forecast obtained by three period moving average for the 5th year. **6**

Year	1st	2nd	3rd	4th
Sales	860	880	870	890

Q.5 i. Write characteristic features of job shop and batch processing. **3**

Marking Scheme
MS5CO10 Operations Management

Q.1	i)	c. Determining the exact mix of products and services that customers will want	**1**
	ii)	c. Products become more standardized	**1**
	iii)	a. layout by process is most suitable	**1**
	iv)	d. Product development and design	**1**
	v)	b. the forecast technique consistently over predicts.	**1**
	vi)	d. capacity and demand	**1**
	vii)	c. 80%	**1**
	viii)	b. CPM	**1**
	ix)	d. Continuous Improvement	**1**
	x)	a. Takt time	**1**
Q.2	i.	Write important functions of operations manager. Two functions - 1 marks each.	**2**
	ii.	What are the key features of MTO and MTS. Three features of MTO - 1.5 marks Three features of MTS - 1.5 marks	**3**
	iii.	What is operations management. Discuss historical evolution of operations management. Operation Management definition. - 2 Marks Historical Evolution of OM - 3 Marks	**5**
OR	iv.	What is productivity. Explain in detail factors effecting productivity. Definition of Productivity - 2 Marks Factors Effecting Productivity - 3 Marks	**5**
Q.3	i.	Explain by the use of flow chart product design process. Flow chart - 2 Marks Theory of product design - 2 Marks	**4**
	ii.	Write about the characterstics, advantages and limitations of product layout, process layout and cellular layout with block diagram. Product Layout - 2 Marks Process Layout - 2 Marks Cellular Layout - 2 Marks	**6**
OR	iii.	Importance of plant location - 2 Marks Numerical Draw table containing x_i , y_i , W_i , x_iW_i , y_iW_i - 2 Marks Find $C_x = \sum x_iW_i / \sum W_i = 7.82$ unit $C_y = \sum y_iW_i / \sum W_i = 3.54$ unit - 2 Marks	**6**
Q.4	i.	What do you understand by master production schedule. How it is related to MRP. Definition of MPS - 2 Marks Relationship with MRP - 2 Marks	**4**
	ii.	What are various aggregate planning strategies. Explain in detail. Three Strategies - 2 Marks Each	**6**
OR	iii.	Write about Delphi method of forecasting & Forecasting Numerical. Delphi Method - 2 Marks Smoothening constant , $\alpha = .2857$ - 4 Marks	**6**
Q.5	i.	Write characteristic features of Job shop and Batch processing. Three features of Jobshop - 1.5 Marks Three features of Batch - 1.5 Marks	**3**
	ii.	Numerical : Precedence diagram - 2 Marks Number of workstations = 5, Cycle Time = 12 min. Idle Time = 5min. - 3 Marks Line Efficiency = 91.66% - 1 Marks Balance Delay = .0833 - 1 Marks	**7**
OR	iii.	Numerical : Sequence (ADGFBCE) - 2 Marks Elapsed Time = 59 hrs - 3 Marks Idle Time : M2 = 25hrs, M3 = 7hrs - 2 Marks	**7**
Q.6		Attempt any two :	
	i.	Six Sigma Methodology (DMIAC) - 5 Marks	**5**
	ii.	What are control charts. - 2 Marks How can they be used in quality control. - 3 Marks	**5**
	iii.	What is TQM. - 2.5 Marks Write its importance. - 2.5 Marks	**5**

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