OR iii. Seven jobs are to be machined through 3 machines M1, M2, and **6** 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.

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 Examination Dec-2023
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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Which one of the following transformational processes is not **1** associated with the processing of materials?
(a) Location (b) Storage
(c) Psychological state (d) Physical properties

ii. Productivity can be measured in which of the following input **1** resources?
(a) Material input (b) Labour input
(c) Capital and Land Input (d) All of these

iii. Which of the following is the first step in making a correct location **1** choice?
(a) Develop location alternatives
(b) Decide the criteria for evaluating location alternatives
(c) Evaluate the alternatives
(d) Make a decision and select the location

iv. Which type of layout is preferred to manufacture a standard **1** product in large quantity?
(a) Product layout
(b) Process layout
(c) Fixed position layout
(d) Combination layout

v. Which one of the following forecasts is least accurate? **1**
(a) Time series (b) Delphi
(c) Naïve (d) Exponential Smoothening

vi. Which of the following is an output of materials requirements planning? **1**
(a) Work orders
(b) Bills of materials
(c) Master production schedule
(d) All of these

vii. Johnson's rule is used for- **1**
(a) N machines, N jobs   (b) 1 machines, N jobs
(c) N machines, 2 jobs   (d) 2 machines, N jobs

viii. Which one is not a method of line balancing? **1**
(a) largest candidate rule   (b) rank position weighted method
(c) Exponential smoothing   (d) None of these

ix. Control charts developed by **1**
(a) W. Edwards Deming   (b) Joseph M. Juran
(c) Walter Shewhart   (d) Armand Feigenbaum

x. Six Sigma process involves- **1**
(a) Measuring   (b) Analysis
(c) Controlling   (d) All of these

Q.2 i. Define operations management and its objectives. **2**
ii. Describe the functions of an operation manager? **3**
iii. What is productivity? Explain in detail factors affecting productivity. **5**
OR iv. Explain the characteristics, advantages and limitation of Job shop production. **5**

Q.3 i. What do you understand by facility location and facility layout? **2**
ii. Describe the factors affecting facility location. Explain dimensional analysis in detail. **8**
OR iii. 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 **8**

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? **3**
ii. Explain different methods of forecasting. **7**
OR iii. Write about Delphi method of forecasting? Also find smoothing constant i.e. α. If the sale for a product during last four years is given below. The forecast for the 4th year was 876. Also the forecast for 5thyear using exponential smoothing method is same as that the forecast obtained by three period moving average for the 5th year. **7**

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

Q.5 i. Write characteristic features of job shop and batch processing. **4**
ii. Consider the following assembly network relationships of a product. The number of shifts per day are two and the number of working hours per shift is 8. The company aims to produce 80 nuts of the product per day. **6**

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.

Scheme Marking
MS5CO10 (T)-Operations Management

Q.1   **i)**   **(c) Psychological state**   **1**

     ii)   **(d) All of these**   **1**

     iii)   **(b) Decide the criteria for evaluating location alternatives**   **1**

     iv)   **(a) Product layout**   **1**

     v)   **(c) Naïve**   **1**

     vi)   **(a) Work orders**   **1**

     vii)   **(d) 2 machines, N jobs**   **1**

     viii)   **(c) Exponential smoothing**   **1**

     ix)   **(c) Walter Shewhart**   **1**

     x)   **(d) All of these**   **1**

Q.2   i.   Define operations management and its objectives.   **2**

     Definition-   1 Marks,

     Objectives –   1 Marks

     ii.   Describe the functions of an operation manager?   **3**

     Any Six Functions of an operation manager –

         0.5 Marks each

     iii.   What is productivity? Explain in detail factors affecting productivity.   **5**

     Definition of Productivity   - 2 Marks

     Factors Effecting Productivity   - 3 Marks

OR   iv.   Explain the characteristics, advantages and limitation of Job shop production.   **5**

     Any three characteristics   -0.5 Marks each

     Three advantages   -0.5 Marks each,

     Two limitations-   1 Marks each

Q.3   i.   What do you understand by facility location and facility layout?   **2**

     facility location -   1 Marks,

     facility layout -   1 Marks

     ii.   Describe the factors affecting facility location. Explain dimensional analysis in detail.   **8**

     Any four factors affecting facility location-   4 Marks

     dimensional analysis -   4 Marks

OR   iii.   Numerical   **8**

     Draw table containing x_i , y_i , W_i , x_iW_i , y_iW_i -   4 Marks

     Find $C_x = \Sigma\ x_iW_i/\Sigma W_i = 7.82$ unit

         $C_y = \Sigma\ y_iW_i/\Sigma W_i = 3.54$ unit   - 4 Marks

Q.4   i.   What do you understand by master production schedule? How it is related to MRP?   **3**

     Definition of MPS   -1.5 Marks

     Relationship with MRP   - 1.5 Marks

     ii.   Explain different methods of forecasting.   **7**

     Methods of Forecasting

     i) Qualitative Forecasting & its Types   -3.5 Marks

     ii) Quantitative Forecasting & its Types   -3.5 Marks

OR   iii.   Write about Delphi method of forecasting & Forecasting Numerical.   **7**

     Delphi Method   - 3 Marks

     Smoothening constant , **α = .2857** -   4 Marks

Q.5   i.   Write characteristic features of Job shop and Batch processing.   **4**

     Two features of Jobshop –   1 Marks each

     Two features of Batch   -   1 Marks each

     ii.   Numerical :   **6**

     Precedence diagram   - 2 Marks

     Number of workstations = **5**   - 1 Marks

     Cycle Time = **12 min.**   - 1 Marks

     Idle Time = **5min.**   - 1 Marks

     Line Efficiency = **91.66%**   - 0.5 Marks

     Balance Delay = **.0833**   - 0.5 Marks

OR   iii.   Numerical :   **6**

     Sequence (**ADGFBCE**)   - 2 Marks

     Elapsed Time = **59 hrs**   - 2 Marks

     Idle Time : M2 = **25hrs**, M3 = **7hrs**   - 2 Marks

Q.6   **Attempt any two:**

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

     Six Sigma Methodology (DMIAC)   - 5 Marks

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

     What are control charts.   - 2 Marks

     How can they be used in quality control. -   3 Marks

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

     What is TQM?   - 2.5 Marks

     Write its importance.   - 2.5 Marks

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