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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Seventh Semester, B.E. - Mechanical Engineering
Semester End Examination; Dec. - 2019
Production Management

Time: 3 hrs   *Max. Marks: 100*

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

1 a.	Describe the historical evolution of PM.	10
b.	Explain the areas of PM.	10
2 a.	Describe product life cycle.	10
b.	Explain organization structure for a product focused system.	10

UNIT - II

3 a. Describe Time Series and Delphi methods of forecasting. — 8

b. Shipments (in tons) of welded tube by an aluminum producer are given below.

Year	1	2	3	4	5	6	7	8	9	10	11
Tons	2	3	6	10	8	7	12	14	14	18	19

12

i) Graph the data and comment on the relationship

ii) Compute a 3-year moving average, plot it as a dotted line and use it to forecast shipments in year 12

4 a. Explain exponential smoothing and regression analysis. — 8

b. Use the least square method to develop a linear trend equation for the following data. State the equation complete with signature, and forecast a trend value for year 16

Year	1	2	3	4	5	6	7	8	9	10	11
Shipment (tons)	2	3	6	10	8	7	12	14	14	18	19

12

UNIT - III

5 a. Write down the factors influencing plant location. — 10

b. Potential locations in A, B and C have the cost structure given below for a product expected to sell for Rs. 130.

i) Choose the most economical location for an expected volume of 6000 units per year.

ii) What is the expected profit if the site selected in (i) used?

iii) Decide for what output range is each location best? Use graphical method.

10

Potential location	Fixed cost / year	Variable cost / unit
A	` 150000	` 75
B	` 200000	` 50
C	` 400000	` 25

6 a. State the objectives of plant layout. Explain any one of the plant layout. — 10

b. The following data pertains to different market locations to which a manufacturer of wood windows expects to ship its products. Using centre of gravity method, decide the possible warehouse location.

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Market Area	Volume	X-coordinate	Y-coordinate
R	8	2.5	10
O	20	3	5
Y	12	6.5	8
A	10	11	10
L	30	11	8
M	20	10	4
E	40	13	3.5
C	30	12	2
H	23	9	5

UNIT - IV

7 a. Compile the scheduling sequence assumptions.   8

   b. There are five jobs each of which is to be processed through three machines A, B, and C in the order ABC processing times in hours are given below. Determine the optimum sequence for the five jobs and minimum elapsed time. Also find the idle time for the three machines and waiting time for the jobs.   12

Job	A	B	C
1	3	4	7
2	8	5	9
3	7	1	5
4	5	2	6
5	4	3	10

8 a. Explain Johnson's rule 2 machines '*n*' jobs and 3 machines '*n*' jobs.   4

   b. Two major parts P_1 and P_2 for a product require processing through six machine centres. The technological sequence of the parts on six machines and manufacturing times on each machine are.   16

Part P_1	Machine sequence:	C	A	E	F	D	B
	Time (hrs):	2	3	4	5	6	1
Part P_2	Machine Sequence:	B	A	E	F	C	D
	Time (hrs)	3	2	5	3	2	3

   What would be the optimal scheduling to minimize the total processing time for these two parts? Find also the total elapsed time, for each machine specify the job that should be done first.

UNIT – V

9 a. Explain Gantt chart.   4

   b. Solve the following machine loading problem using indexing method: 16

Job	1	2	3	4	5	6	7	8	9	10
M/C A	10	18	17	16	12	16	12	15	25	18
M/C B	15	20	21	17	20	22	-	18	30	25
M/C C	14	22	25	24	17	19	18	16	27	29
M/C D	12	27	28	25	-	28	22	20	35	32

10. Explain the terms: Dispatching, Expediting, Follow up, and priority rules.   20

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