BE - sem - VII - old - Mech - MP&C 25/05/16

QP Code : 29817

Time: 3 hrs TOTAL MARKS 100

1. Question 1 is compulsory
2. Attempt any four questions out of remaining six questions.
3. Assume suitable data wherever necessary

Q1 Write short notes on **any four** of the following 20

a) Material Requirements Planning MRP-I
b) Bill of Materials (BOM)
c) Rough Cut Capacity Planning
d) Production Activity Control (PAC)
e) Master Production Scheduling (MPS

Q2 A) Solve the following LP problem using Simplex method 10

Maximize $Z = 2x + 2y + 4z$

Subject to

$2x + 3y + z \leq 300$

$x + y + 3z \leq 300$

$x + 3y + z \leq 240$

and $x, y, z \geq 0$

B) Explain the role of Demand Forecasting in MPC. Explain any two qualitative methods of Demand Forecasting. 10

Q3 A) Seven jobs are to be processed through three machines M1, M2 and M3 in the order M1, M2, M3. The processing times are given in hours to process each one of the three jobs through the entire machines. Find the optimal sequence of the jobs. Also, find the minimum total elapsed times and idle times on M2 and M3. 10

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

B) Five different jobs can be done on five different machines. The matrix below gives the cost (in Rs.) of producing each job J1, J2, J3, J4 and J5 on the machines M1, M2, M3, M4 and M5. How the jobs should be assigned so that the total cost is minimum. 10

	M1	M2	M3	M4	M5
J1	10	12	15	12	8
J2	7	16	14	14	11
J3	13	14	7	9	9
J4	12	10	11	13	10
J5	8	13	15	11	15

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Q4 A) Construct the network diagram for the activities given in the table below. The three time estimates for each activity are given in the table and are provided in weeks. 10

i. Draw the network diagram
ii. Determine the critical path and expected project duration
iii. Compute the variance on the critical path
iv. What is the probability of completing the project in twenty weeks?

Activity	Duration (weeks)		
	optimistic	Most likely	pessimistic
1-2	5	6	13
2-3	2	2	2
2-4	2	5	8
2-5	6	8	10
3-5	3	5	7
4-5	1	3	5
5-6	2	3	10

B) Company manufacturing washing machines establishes a fact that there is a relationship between the washing machine and population of the city. The market research carried out reveals about the following information. 10

Population (million)	5	7	15	22	27	36
No. of washing machines demanded (*1000)	28	40	65	80	96	130

Fit a linear regression equation and estimate the demand of washing machine for a city with a population of 45 million

Q5 A) An Engineering component manufacturer has the plan of buying a Press tool machine which can be manufactured as 1, 70,000 products per year. The press tool machine is a part of a product line. The system efficiency of the product line is 85%. 10

a) What is the required systems capacity?
b) Assume that it takes 100 seconds to mould each part and the plant operates 2000 hours per year. If the press tool machines are used only 60% of the time and are 90% efficient, what is the actual output of the press tool machine per hour?
c) How many press tool machines would be required?

B) What are the different modules in three levels of manufacturing resource planning and explain Aggregate Planning module briefly. 10

Q6 A) Complete the MRP plan for item X shown below. This item has an independent demand and needs a safety stock of 40 units to be maintained. 10

Order Quantity = 70 Lead Time = 4 weeks Safety Stock = 40	Week											
	1	2	3	4	5	6	7	8	9	10	11	12
Project Requirements	20	20	25	20	20	25	20	20	30	25	25	25
Scheduled Receipts		70										
On hand at the end of period 65												
Planned Order Released												

B) Explain the concepts of project planning, monitoring and control as a part of project management. 10

Q7 A) Explain Sensitivity analysis in the context of linear programming model with change of characters, new constraint and new variable 10

B) Explain JIT philosophy. Explain the seven wastes of JIT. 10