University of Petroleum & Energy Studies
College of Management & Economics Studies
Kandoli Campus, Dehradun

End Semester Examination – May, 2017

Programme Name: MBA (PM) & MBA(UID) Semester - II
Subject: Operations & Materials Management M.Marks: 100
Subject code: MBCQ 722 Duration: 3 Hrs

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Note: All sections are compulsory & this question paper carries 4 sections.

Section – A (20 Marks)

Attempt all questions in this section

1. (A) Write the full form of the following **(2*4=8 marks)**
   (a) DMAIC
   (b) DPMO
   (c) TOC
   (d) MRP

   (B) Explain the following **(3*4=12 marks)**
   (a) Throughput rate
   (b) MPS
   (c) FMS
   (d) Six sigma

Section – B (20 Marks)

Attempt any 4 question, each question carries 5 marks only (5*4=20 marks)

2. (a) Determine the reliability of the system shown below where lamp 2(backup of lamp 1), lamp 4(backup of lamp 3), lamp 5(backup of lamp 4), lamp 7(back up of lamp 6)
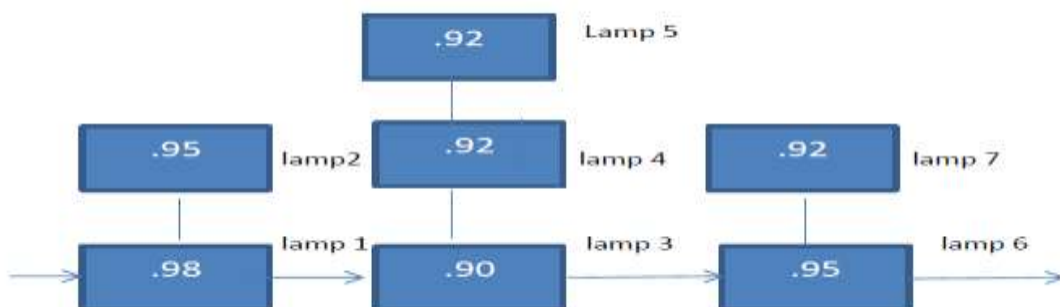
(b Discuss the design process, its importance & the various stages of design process?
(c) Define little's law? Describe an example that you have observed where little's law applies?
(d) What are the various types of process design? Explain with examples

(e) Differentiate between make to order, make to stock & assemble to order?

Section-C(30 Marks)

Attempt any 3 question, each question carries 10 marks only   (15*2=30 marks)

3(a) Smart metering is a new startup that develops and markets smart meters. The company is currently located in Delhi & employs 15 people. Due to a strong growth, the company needs additional office space. The company has the option of leasing additional space at its current location in Delhi for the next two years, but after that will need to move to a new building. Another option the company is considering is moving the entire operation to a small town in Bhiwadi immediately. A third option is for the company to lease a new building in Delhi immediately. If the company chooses the first option & leases new space at its current location, it can, at the end of two years, either lease a new building in Delhi or move to the small town Bhiwadi

The following are some additional facts about the alternatives and current situation
1. The company has a 75% chance of surviving the next two years
2. Leasing the new space for two years at the current location in Delhi would cost $750000 per year
3. Moving the entire operation to Bhiwadi towm would cost $ 1million, leasing space would run only $500000 per year
4. Moving to a new building in Delhi would cost $200000, and leasing the new building's space would cost $650000 per year
5. The company can cancel the lease at any time
6. The company will build its own building in five years, if it survives
7. Assumes all other costs and revenues are the same no matter where the company is located

What should Smart Metering do?

3(b) Anik & Co. produces electric wires for state electricity department. Quality is not quite good as it could be at this point, but the selling price is low and Anik can study the market response while spending more time on R&D. At this stage, however Anik & co. needs to develop aggregate production plan for the next six months January through June. You have been commissioned to create the plan. The following information should help:

	January	February	March	April	May	June	Total
Demand forecast	500	600	650	800	900	800	4250
Number of working days	22	19	21	21	22	20	125

Costs

Materials	$ 100/unit
Inventory holding cost	$ 10/unit/month
Marginal cost of stockout	$ 20/unit/month
Marginal cost of subcontracting	$ 100/unit
Hiring & training cost	$ 50/worker
Layoff cost	$ 100/worker
Labour hours required	4/unit
Straight time cost(first eight hours each day)	$12.5/hour

Inventory

Beginning inventory	200 units
Safety stock required	0% of moth required

What is the cost of each of the following production strategies?

(a) Level strategy   (b) subcontracting

3(c) The task shown in the following table identifies the work elements, time & immediate predecessors, management has designed an output rate of 192 units per 8 hours shift

Work element	Time(sec)	Immediate predecessors
A	40	none
B	80	A
C	30	D,E,F
D	25	B
E	20	B
F	15	B
G	120	A
H	145	G
I	130	H
J	115	

(i) What is the desired cycle time?

(ii) What is the theoretical minimum number of workstation?

(iii)   Use a trial & error to work out a solution, and show your solution on a precedence diagram

(iv)   What is the efficiency & balance delay of the solution found?

3(d) Jayant & company makes customized electric meter to order. They are analyzing the processes at their plant. The general flow of the process is shown below. There is a separate person working at each of the steps in the process
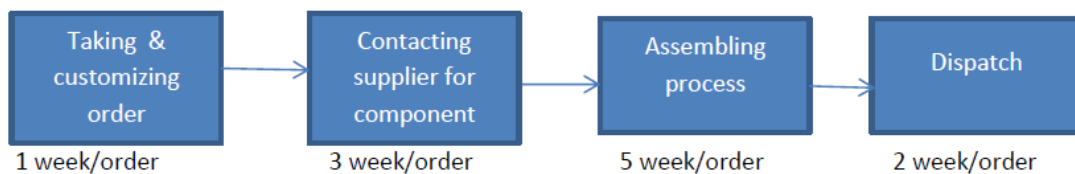

Jayant want to figure out the following for a typical 1 year(52 week)

(i) What is the current maximum output of the process?

(ii) If we add another person, where would we add him or her & what is the benefit

(iii)   If there is a benefit if we can shift 1 week from contacting supplier to customizing order? Assume we do not want make the change in part b above

(iv)   Is there a benefit if we shift 1 week from assembling process to dispatch? Assume we do not make the change in part b & c above

Section – D (30 Marks)

Attempt the situation & provide the solution for this situation
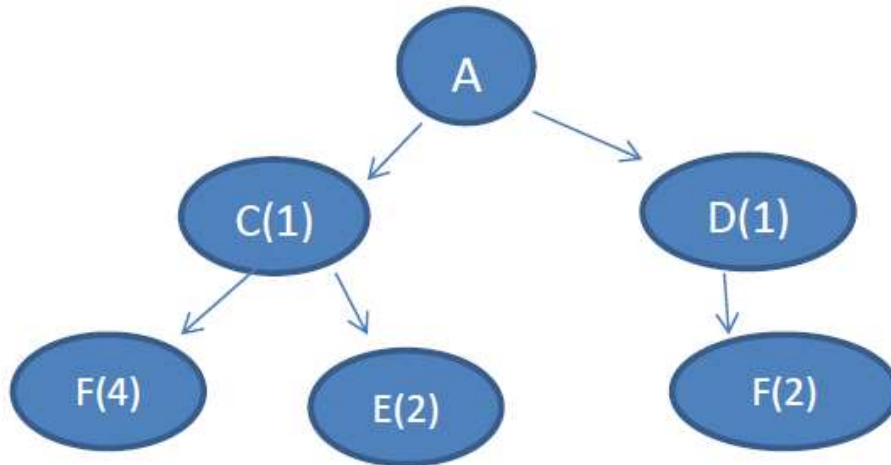
In the above figure, the bills of material and inventory records for product A is given & their components. The MPS for product A calls for completion of 100 units in period 2, 125 units in period 4 & 150 units in period 6. The manufacturing lead time for product A is 1 week. The numbers in parentheses are the number of parts needed to make the parent item. Compute a full MRP explosion & apply the appropriate lot sizing rules to determine a schedule of planned order releases

	Part C	Part D	Part E	Part F
Lot size rule	FOQ=250	LFL	FOQ=1000	POQ=2 weeks
Lead time(weeks)	2	1	1	2
Schedule receipts	300(week 1)	None	None	1000 (week 2)
Beginning inventory	0	125	750	2500
Spare parts orders	None	100 each in week 3 & 6	None	none
Source of item	Manufactured in house	Manufactured in house	Manufactured in house	Purchase items from supplier