VPM's
DR VN BRIMS, Thane
Programme: MMS (2016-18) (Operations)
Third Semester Examination October 2017

Subject	**Operations Analytics**		
Roll No.		**Marks**	**60 Marks**
Total No. of Questions	**7**	**Duration**	**3 Hours**
Total No. of printed pages	**2**	**Date**	**24.10.2017**

Note: **This examination is computer based and students are to use computers and Excel software. State any assumptions if only required and state clearly.**

Write answers and rough work in the answer-sheet provided.

Q 1 is compulsory and carries 20 marks

Answer any FOUR from remaining SIX questions each carrying 10 marks.

Q.1 A company produces 2 products P1 and P2 in a factory operating for 8 hrs a day, and 25 days a month.

Past demand for last 12 quarters for both the products is as given.

quarter	1	2	3	4	5	6	7	8	9	10	11	12
P1	465	558	620	496	589	682	527	651	713	589	682	806
P2	682	775	868	713	806	899	775	868	930	868	930	992

One unit of Product P1 requires1 unit of component A, 2 of B , 0.5 of C, 1 of D, 6 of E and 1 of F.

One unit of Product P2 requires 7 units of component A, 2 of B, 2 of C, 0.5 of D, 5 of E and 1 of F.

Components A ,Band C are purchased at unit prices 100/-,250 /- and 300/- per unit. Ordering cost is 1000/ per order for A , B and C . Lead time is 0 for each component.

Components D ,E and F are produced within with cost of production 50/- , 75/- and 90/- per unit.The production rate in units per day is 2 times, 3 times and 4 times demand rate(units per day) for components D, E and F respectively. Set up cost for each component D, E and F is 1500/per setup.

Lead time of production is 0 for each component.

Inventory carrying cost for all components is 3 % per month.

Estimate demand for both the products and for all components for next 1 year using regression adjusted for seasonality.

Q.2. Answer any 2 from below:

Calculate Economic Batch Quantity EBQ for

(a) Component D (b) Component E(c) Component F

Q 3. Answer any 2 from below:

Prepare Material Requirement Planning (MRP) along with total cost for

(a) Component D (b) Component E(c) Component F

Q.4. One unit of P1 requires 10 hrs and one unit of P2 requires 15 hrs to produce.

Opening stock for both products is 0 and opening workers are also 0 for month 25.

Hiring cost is 1500 per worker and Layoff cost is 2000 per worker.

Normal time wages are 100 per hr and overtime wages are 150 per hr.

Inventory carrying cost for both products is 20 per unit per month.

Prepare aggregate planning for the following product and method specified.

Answer any 2 from below:

(a) P1 and Level strategy (b) P1 and Chase strategy.(c) P2 and Level strategy.

Q 5. Write short notes on any 2 :

(a) Market Basket Analysis (b) Catchment Area Analysis(C) SKU Rationalization

Q 6. The demand at the retailers outlet is found to follow following probability distribution

Demand	60	80	100	120	140
Probability	0.1	0.2	0.4	0.2	0.1

Simulate the event with following random no.s for demand.

20 2 4 45 56 68 81 10 29 34 35 37 87 61 19 3 9 12 67 98

Calculate probability of stock-out with assumed stock level.

Answer any 2 from below:

(a) Stock is 115 (b) Stock is 120 (c) Stock is 125

Q 7 . Consider a Bank where customers come to receive some kind of service. The inter arrival time of 2 successive customers has following probability distribution.

Interarrival time (minutes)	3	4	5	6	7	8
Probability	0.1	0.15	0.2	0.25	0.2	0.1

Service time probability distribution is also given below for single server :

Service time (minutes)	3	4	5	6
Probability	0.2	0.3	0.3	0.2

Simulate the event of customer arrivals and service using random no.s as given. Use same random no.s for both inter arrival and service time .

9 2 4 25 56 8 18 10 29 34 35 37 87 61 19 3 9 12 67 98

Calculate any 2 of the below: Average waiting time per customer (b) Idle time for service provider(c) % of customers waiting.