

**VPM's**  
**DR VN BRIMS, Thane**  
**Programme: MMS (2017-19) (Operations)**  
**Third Semester Examination October 2018**

<b>Subject</b>	<b>Operations Analytics</b>		
<b>Roll No.</b>		<b>Marks</b>	<b>60 Marks</b>
<b>Total No. of Questions</b>		<b>Duration</b>	<b>3 Hours</b>
<b>Total No. of printed pages</b>	<b>2</b>	<b>Date</b>	<b>3.11.2018</b>

**Note: State clearly any assumptions if only required. Students can use EXCEL software.**

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

**Q 1 is compulsory and carries 20 marks**

**Q 1** The following data gives past demand of last 8 quarter.

Quarter	1	2	3	4	5	6	7	8
	465	558	620	496	589	682	527	651

- Estimate demand for quarter 9 using Regression adjusted with seasonality.
- Estimate demand using exponential smoothing with optimum value of smoothing constant which will minimize MAPE. Calculate MAPE for optimum value of smoothing constant.

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

**Q 2. Answer any 2 from below:**

Consider demand of a product for last 8 quarters.

Quarter	1	2	3	4	5	6	7	8
	682	775	868	713	806	899	775	868

One unit of Product P1 requires 1 unit of component A, 2 of B, 0.5 of C, 1 of D. Components A, B and 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. Forecast demand for next year using regression adjusted with seasonality. Use this demand forecast and Calculate EOQ and Total cost for Component (a) A (b) B (c) C

**Q 3. Answer any 2 from below:**

Explain following strategies of Aggregate Planning

- Level
- Chase
- Modified level

**Q 4. Answer any 2 from below:**

Prepare MRP based on data in Q2 for component (a) A (b) B (c) C

**Q 5.** "Super-Stick" Co. produces two types of industrial adhesives – "Regular" and "Extra Strong". A batch of 1000 liters of regular uses 10 production hours, while a batch of 1000 liters of extra strong uses 12 production hours. The company has regular time production capacity of 440 hours per week. Sales forecasts for the next week are: 20,000 liters of regular and 25,000 liters of extra strong.

The company has set the following goals in order of priority.

P1: Sales forecasts for both the products must be met.

P2: Overtime work should be minimized.

P3: Under-utilization of capacity should be avoided.

P4: Overtime worked, if any, should be limited to 20 hours.

- (a) Formulate a Goal Programming Model.
- (b) Determine the optimal solution.
- (c) State how GP is different than normal LP.

**Q 6.** Kamal Organics is a company operating in processing of by-products. A chemical xytol when processed in dept. 1 yields 3 units of xylene and 2 units of toluene per unit of xytol processed. Xylene may be processed in dept. 2 and then sold at unit price of 90/- or sold as it is at a unit price of 50/- Toluene may be processed in dept. 3 and then sold at unit price of 100 or sold as it is at unit price of 40/-

The cost of processing in 3 depts. are (Rs/unit) 1: 100/- 2:30/- 3:40/-

The supply of xytol is limited to 1500 units for the planning period. All the 3 processing depts., share a common machine facility whose total capacity is limited to 3300 hrs. Each unit of A and B processed generates chemical Q which can be stored maximum 25 units. All units of Q beyond 25 should be disposed with cost of disposal 20/unit of Q. The hrs/unit required by all 3 materials of the common machine facility is as given in 3 depts.

Dept. A: Xytol: 60 min/unit

Dept. B: Xylene: 20 min/unit

Dept. C: Toluene: 30 min/unit

- (a) Formulate the problem as a linear problem.
- (b) Determine optimum solution.
- (c) State and explain different methods of allocation of joint costs.

**Q 7. Write short notes on any 2 from below:**

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