

**VPM's**  
**DR VN BRIMS, Thane**  
**Programme: MMS (2018-20) (Operations)**  
**Third Semester Examination October 2019**

<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>7</b>	<b>Duration</b>	<b>3 Hours</b>
<b>Total No. of printed pages</b>	<b>2</b>	<b>Date</b>	<b>23.10.2019</b>

	<b>Instructions:-</b>	<b>Marks</b>																																										
	<ul style="list-style-type: none"> <li>• <b>Q. No 1</b> is compulsory.</li> <li>• Attempt <b>Any Four</b> from the Remaining Six Questions.</li> <li>• Figures to the right indicate marks in full.</li> <li>• State clearly any assumptions if only required.</li> <li>• <b>Students can use EXCEL software.</b></li> <li>• Write answers and rough work in the answer-sheet provided.</li> <li>• <b>Your files should be named as Specialization_roll no. and keep it on desktop)</b></li> </ul>																																											
<b>Q. 1</b>	<p>The following data gives demand distribution with probabilities.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Demand</td> <td style="width: 10%;">25</td> <td style="width: 10%;">30</td> <td style="width: 10%;">35</td> <td style="width: 10%;">40</td> <td style="width: 10%;">45</td> <td colspan="4"></td> </tr> <tr> <td>Probability %</td> <td>16</td> <td>21</td> <td>29</td> <td>26</td> <td>8</td> <td colspan="4"></td> </tr> </table> <p>(a) Estimate average demand and standard deviation of demand. Construct probability distribution and allocation of random numbers.</p> <p>(b) Assume cost of carrying is 4/unit and cost of lost sales is 5/unit. Estimate total cost of operations if stock level assumed is 35 and 40.</p> <p>(c) If selling price per unit is 25/unit estimate total profits for stock level of 35 and 40. Use following random numbers for demand.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>68</td><td>27</td><td>75</td><td>86</td><td>87</td><td>13</td><td>80</td><td>68</td><td>99</td><td>77</td><td>58</td> </tr> <tr> <td>68</td><td colspan="10"></td> </tr> </table>	Demand	25	30	35	40	45					Probability %	16	21	29	26	8					68	27	75	86	87	13	80	68	99	77	58	68											<b>20</b>
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<b>Q. 2</b>	<p>Answer <b>Any two</b> from the following.</p> <p>Consider demand of a product for last 8 quarters.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Quarter</td> <td style="width: 10%;">1</td> <td style="width: 10%;">2</td> <td style="width: 10%;">3</td> <td style="width: 10%;">4</td> <td style="width: 10%;">5</td> <td style="width: 10%;">6</td> <td style="width: 10%;">7</td> <td style="width: 10%;">8</td> <td colspan="2"></td> </tr> <tr> <td></td> <td>682</td> <td>775</td> <td>868</td> <td>713</td> <td>806</td> <td>899</td> <td>775</td> <td>868</td> <td colspan="2"></td> </tr> </table> <p>Estimate demand for quarter 9 using optimum values of smoothing constants by following.</p> <p><b>a.</b> Single exponential method</p> <p><b>b.</b> Double exponential-slope</p> <p><b>c.</b> Double exponential-Average</p>	Quarter	1	2	3	4	5	6	7	8				682	775	868	713	806	899	775	868			<b>5x2 = 10</b>																				
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		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 1 for each component. Forecast demand for next year using regression adjusted with seasonality. Calculate EOQ for	
	<b>a.</b>	Component A	
	<b>b.</b>	Component B	
	<b>c.</b>	Component C	
<b>Q. 4</b>		Answer <b>Any two</b> from the following.	<b>5x2 = 10</b>
		Prepare MRP based on data in Q 3 for	
	<b>a.</b>	Component A	
	<b>b.</b>	Component B	
	<b>c.</b>	Component C	
<b>Q. 5</b>		Answer <b>Any two</b> from the following.	<b>5x2 = 10</b>
		A company produces single product P which requires 3 hrs/unit. Operating days are 25/month and 8 hrs/day. Demand forecast for next 8 months is as given. Month    1            2            3            4            5            6            7            8  Demand 682    775    868    713    806    899    775    868 Other cost details are: Wages NT 100/hr    Wages OT 150/hr Hiring cost 1200/worker    Layoff cost 1500/worker Inventory carrying cost 30/unit/month Workers at beginning of month 1 are 10 and stock is 25. Prepare aggregate plan using	
	<b>a.</b>	Level Strategy	
	<b>b.</b>	Chase Strategy	
	<b>c.</b>	Modified Level Strategy	
<b>Q. 6</b>		Answer <b>Any two</b> from the following.	<b>5x2 = 10</b>
		Explain following with reference to joint cost and production planning with examples of sugar industry:	
	<b>a.</b>	Joint Products	
	<b>b.</b>	Separable Costs	
	<b>c.</b>	Split-off point	
<b>Q. 7</b>		“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. Formulate a Goal Programming Model to determine the optimal plan. Find solution.	<b>10</b>