

MBA (GM) Sem.-1 Examination

FC-105

Q & MT

January-2025

[Max. Marks : 70]

Time : 2-30 Hours]

<p>Q-1(A)</p> <p>(A) (B)</p>	<p>The probabilities of X, Y and Z becoming managers are $\frac{4}{9}$, $\frac{2}{9}$ and $\frac{1}{3}$ respectively. The probabilities that the Bonus Scheme will be introduced if X, Y and Z becomes managers are $\frac{3}{10}$, $\frac{1}{2}$ and $\frac{4}{5}$ respectively.</p> <p>(a) What is the probability that the Bonus scheme will be introduced (b) If the Bonus scheme has been introduced, what is the probability that the manager appointed was x?</p> <p>From the data given below, calculate Mean Deviation and Quartile Deviation.</p> <table border="1" data-bbox="391 1052 1308 1153"> <thead> <tr> <th>Marks</th> <th>0-10</th> <th>10-20</th> <th>20-30</th> <th>30-40</th> <th>40-50</th> <th>50-60</th> <th>60-70</th> </tr> </thead> <tbody> <tr> <td>No. of students</td> <td>4</td> <td>6</td> <td>12</td> <td>20</td> <td>10</td> <td>6</td> <td>3</td> </tr> </tbody> </table>	Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	No. of students	4	6	12	20	10	6	3	<p>07</p> <p>07</p>																							
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<p>Q-2 (A)</p> <p>(A) (B)</p> <p>(B)</p>	<p>A manufacturing concern employing a large number of workers finds that, over a period of time, the average absenteeism rate is three workers per shift,</p> <p>(a) Exactly two workers will be absent. (b) More than four workers will be absent.</p> <p style="text-align: right;">$(e^{-3} = 0.0498)$</p> <p>Apply chi square test to find out if the following figures provide evidence of the effectiveness of inoculation. Test at 5% level of significance table value of chi square is $(5\%, 1) = 3.84$, $(5\%, 2) = 5.99$</p> <table border="1" data-bbox="383 1444 1300 1590"> <thead> <tr> <th>Particular</th> <th>Attacked</th> <th>Not attacked</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>inoculated</td> <td>20</td> <td>300</td> <td>320</td> </tr> <tr> <td>Non-inoculated</td> <td>80</td> <td>600</td> <td>680</td> </tr> <tr> <td>Total</td> <td>100</td> <td>900</td> <td>1000</td> </tr> </tbody> </table> <p style="text-align: center;">OR</p> <p>From the following pay off matrix find Maximum EMV, EPPI and EVPI and also find best act by Maximax, Maximin, Laplace and Horwich principle($\alpha=0.3$)</p> <table border="1" data-bbox="383 1691 1189 1937"> <thead> <tr> <th rowspan="2">State of nature</th> <th rowspan="2">Probability</th> <th colspan="3">Act</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>S1</td> <td>0.10</td> <td>25</td> <td>-10</td> <td>-125</td> </tr> <tr> <td>S2</td> <td>0.70</td> <td>400</td> <td>440</td> <td>400</td> </tr> <tr> <td>S3</td> <td>0.20</td> <td>650</td> <td>740</td> <td>750</td> </tr> </tbody> </table>	Particular	Attacked	Not attacked	Total	inoculated	20	300	320	Non-inoculated	80	600	680	Total	100	900	1000	State of nature	Probability	Act			A	B	C	S1	0.10	25	-10	-125	S2	0.70	400	440	400	S3	0.20	650	740	750	<p>07</p> <p>07</p> <p>14</p>
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(P.T.O)

Q-3 (A)	The following table gives the distribution of total cultivable area (X) and the area under cultivation of wheat (Y) in a district of 69 villages.	14																																										
	<table border="1"> <thead> <tr> <th colspan="6">Total cultivable area (in bighas)</th> </tr> <tr> <th>Area under wheat cultivation</th> <th>0-500</th> <th>500-1000</th> <th>1000-1500</th> <th>1500-2000</th> <th>2000-2500</th> </tr> </thead> <tbody> <tr> <td>0-200</td> <td>12</td> <td>6</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>200-400</td> <td>2</td> <td>18</td> <td>4</td> <td>2</td> <td>1</td> </tr> <tr> <td>400-600</td> <td>-</td> <td>4</td> <td>7</td> <td>3</td> <td>-</td> </tr> <tr> <td>600-800</td> <td>-</td> <td>1</td> <td>-</td> <td>2</td> <td>1</td> </tr> <tr> <td>800-1000</td> <td>-</td> <td>-</td> <td>1</td> <td>2</td> <td>3</td> </tr> </tbody> </table>	Total cultivable area (in bighas)						Area under wheat cultivation	0-500	500-1000	1000-1500	1500-2000	2000-2500	0-200	12	6	-	-	-	200-400	2	18	4	2	1	400-600	-	4	7	3	-	600-800	-	1	-	2	1	800-1000	-	-	1	2	3	
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	Obtain the two lines of regression and if total cultivable area in bighas is 1300, then find area under wheat production.																																											
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(A)(B)	Calculate the correlation coefficient between the height of father and height of son from the given data:	07																																										
	<table border="1"> <tbody> <tr> <td>Height of father (in inches)</td> <td>64</td> <td>65</td> <td>66</td> <td>67</td> <td>68</td> <td>69</td> <td>70</td> </tr> <tr> <td>Height of son (in inches)</td> <td>66</td> <td>67</td> <td>65</td> <td>68</td> <td>70</td> <td>68</td> <td>72</td> </tr> </tbody> </table>	Height of father (in inches)	64	65	66	67	68	69	70	Height of son (in inches)	66	67	65	68	70	68	72																											
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(B)	Calculate spearman's rank correlation between marks assigned to ten students by judges X and judges Y in a certain competitive test as shown below:	07																																										
	<table border="1"> <tbody> <tr> <td>Marks by X judge</td> <td>52</td> <td>53</td> <td>42</td> <td>60</td> <td>45</td> <td>41</td> <td>37</td> <td>38</td> <td>25</td> <td>27</td> </tr> <tr> <td>Marks by Y judge</td> <td>65</td> <td>68</td> <td>43</td> <td>38</td> <td>77</td> <td>48</td> <td>35</td> <td>30</td> <td>25</td> <td>50</td> </tr> </tbody> </table>	Marks by X judge	52	53	42	60	45	41	37	38	25	27	Marks by Y judge	65	68	43	38	77	48	35	30	25	50																					
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Marks by Y judge	65	68	43	38	77	48	35	30	25	50																																		
Q:4 (A)	A diet sick person must contain at least 4000 units of vitamins, 50 units of minerals and 1400 of calories. Two foods A and B are available in the market at a cost of Rs. 40 and 30 respectively. One unit of A contains 200 units of vitamins, 1 unit of minerals and 40 calories and one unit of B contains 100 units of vitamins, 2 units of minerals and 40 calories. Solve the above problem graphically.	14																																										
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(A)(B)	Solve the following transportation problem by Vogel's Approximation Method.	07																																										
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(B)	A company has five jobs to be done on 5 machines. The following matrix shows the return in Rs. of assigning machine to the job. Assign the five jobs to the five machines so as to maximise the total profit.	07																																										
	<table border="1"> <thead> <tr> <th rowspan="2">Machines</th> <th colspan="5">Jobs</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12</td> <td>18</td> <td>20</td> <td>8</td> <td>20</td> </tr> <tr> <td>2</td> <td>20</td> <td>4</td> <td>8</td> <td>1</td> <td>16</td> </tr> <tr> <td>3</td> <td>21</td> <td>7</td> <td>13</td> <td>10</td> <td>17</td> </tr> <tr> <td>4</td> <td>2</td> <td>18</td> <td>21</td> <td>16</td> <td>16</td> </tr> <tr> <td>5</td> <td>9</td> <td>13</td> <td>20</td> <td>15</td> <td>19</td> </tr> </tbody> </table>	Machines	Jobs					a	b	c	d	e	1	12	18	20	8	20	2	20	4	8	1	16	3	21	7	13	10	17	4	2	18	21	16	16	5	9	13	20	15	19		
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Q: 5 (A)	What is queuing theory? Explain its elements and list its applications.	04
(B)(A)	Define Markov model with one example.	03
(C)(B)	At hair saloon shop, the customers arrive at the average interval of 6 minutes and the service man takes on an average 5 minutes for serving the person.	07
	Calculate: <ol style="list-style-type: none">1. Counter utilization level.2. Average no. of customers in service3. Average no. of customers in queue.4. Average waiting time of the customers in the system.5. Expected average waiting time in the queue.6. Probability that the service man is idle.7. Probability that the service man is busy.	