



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.:

**SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2024-2025**

SLOT: G2+TG2

Programme Name & Branch : B. Tech (Common)
Course Code and Course Name : BMAT202L and Probability and Statistics
Date of Examination : 02-02-2025
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions

Q. No	Question	M	CO	BL																																	
1.	Compute the mean, median and mode for the following frequency distribution. <table border="1" style="margin: 10px auto;"> <tr> <td>Wages (in Rs.):</td> <td>0-100</td> <td>100-200</td> <td>200-300</td> <td>300-400</td> <td>400-500</td> <td>500-600</td> <td>600-700</td> </tr> <tr> <td>No. of Workers:</td> <td>200</td> <td>450</td> <td>800</td> <td>950</td> <td>700</td> <td>550</td> <td>350</td> </tr> </table>	Wages (in Rs.):	0-100	100-200	200-300	300-400	400-500	500-600	600-700	No. of Workers:	200	450	800	950	700	550	350	10	1	1																	
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No. of Workers:	200	450	800	950	700	550	350																														
2.	The following data represents the marks obtained, out of 100, by two students A and B in 10 tests. <table border="1" style="margin: 10px auto;"> <tr> <td>Student A :</td> <td>25</td> <td>50</td> <td>45</td> <td>30</td> <td>70</td> <td>42</td> <td>36</td> <td>48</td> <td>35</td> <td>60</td> </tr> <tr> <td>Student B :</td> <td>10</td> <td>70</td> <td>50</td> <td>20</td> <td>95</td> <td>55</td> <td>42</td> <td>60</td> <td>48</td> <td>80</td> </tr> </table> Which student is more consistent in the view of marks?	Student A :	25	50	45	30	70	42	36	48	35	60	Student B :	10	70	50	20	95	55	42	60	48	80	10	1	2											
Student A :	25	50	45	30	70	42	36	48	35	60																											
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3.	A continuous random variable (X) has the probability density function, $f(x) = kx^4, -1 < x < 0$. Find the value of k and also $P\left(X > -\frac{1}{2}/X < -\frac{1}{4}\right)$.	10	2	3																																	
4.	The following table represents the joint probability distribution of the two-dimensional discrete random variable (X, Y). Find the marginal probability distributions of X and Y , and the conditional probability distribution of Y , given $X = 1, 2$ & 3 . <table border="1" style="margin: 10px auto;"> <tr> <td></td> <td colspan="3">X</td> </tr> <tr> <td>Y</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>1</td> <td>1/12</td> <td>1/6</td> <td>0</td> </tr> <tr> <td>2</td> <td>0</td> <td>1/9</td> <td>1/5</td> </tr> <tr> <td>3</td> <td>1/18</td> <td>1/4</td> <td>2/15</td> </tr> </table>		X			Y	1	2	3	1	1/12	1/6	0	2	0	1/9	1/5	3	1/18	1/4	2/15	10	2	3													
	X																																				
Y	1	2	3																																		
1	1/12	1/6	0																																		
2	0	1/9	1/5																																		
3	1/18	1/4	2/15																																		
5.	Find out the coefficient of correlation between the sales and expenses of the following 10 firms. <table border="1" style="margin: 10px auto;"> <tr> <td>Firms</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> </tr> <tr> <td>Sales</td> <td>50</td> <td>50</td> <td>55</td> <td>60</td> <td>65</td> <td>65</td> <td>65</td> <td>60</td> <td>60</td> <td>50</td> </tr> <tr> <td>Expenses</td> <td>11</td> <td>13</td> <td>14</td> <td>16</td> <td>16</td> <td>15</td> <td>15</td> <td>14</td> <td>13</td> <td>13</td> </tr> </table>	Firms	1	2	3	4	5	6	7	8	9	10	Sales	50	50	55	60	65	65	65	60	60	50	Expenses	11	13	14	16	16	15	15	14	13	13	10	3	2
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Sales	50	50	55	60	65	65	65	60	60	50																											
Expenses	11	13	14	16	16	15	15	14	13	13																											

Answer Key Winter Semester 2024-25

BMAT202L CAT-I G2 Slot

Answer ALL the Questions

Each question carries equal marks (5 × 10 = 50 Marks)

1. Answer(s):

Mean (\bar{x}) = Rs. 363.75,

Median (M_d) = Rs. 357.8947,

Mode (M_o) = Rs. 337.5

[10 M] [CO: 1]

2. Answer(s):

Co-efficient of Variation for Student A = 31.0813 ;

Co-efficient of Variation for Student B = 48.4236 ;

Since $CV(A) < CV(B)$, the Student A has more consistent in the view of marks.

[10 M] [CO: 1]

3. Answer(s):

$k = 5$;

$P(X > -\frac{1}{2}/X < -\frac{1}{4}) = \frac{1}{33}$.

[10 M] [CO: 2]

4. Answer(s):

$\{i, p_{i^*}\}$		$\{j, p_{*j}\}$	
$x = i$	p_{i^*}	$y = j$	p_{*j}
1	5/36	1	1/4
2	19/36	2	14/45
3	1/3	3	79/180

CPD of $\bar{Y}/X = 1$

CPD of $Y/X = 2$

CPD of $Y/X = 3$

$y = j$	p_{1j}/p_{1^*}	$x = j$	p_{2j}/p_{2^*}	$y = j$	p_{3j}/p_{3^*}
1	3/5	1	6/19	1	0
2	0	2	4/19	2	3/5
3	2/5	3	9/19	3	2/5

[10 M] [CO: 2]

5. $r=0.786$