

Reg. No.:

Name :



VIT

Vellore Institute of Technology  
(Deemed to be University under Section 3 of U.O. Act 1986)**Continuous Assessment Test (CAT)-I – Sep 2022**

Programme :	B.Tech	Semester :	Fall Semester 2022
Course Code :	BMAT202L/IMAT202L	Class :	CH2022231001609.
Course Title :	Probability and Statistics	Nbr(s)	CH2022231001613, CH2022231002106, CH2022231001614, CH2022231001616, CH2022231001617, CH2022231001620, CH2022231001624, CH2022231001626, CH2022231001627, CH2022231001846
Faculty(s) :	Dr. Kalyani Desikan, Dr. G.K.Revathi, Dr.B.Jagannathan, Dr.S.Dhanasekar, Dr.Poulomi De, Dr.R.Jayagopal, Dr.Sudip Debnath, Dr.S.Balaji, Dr.Thasari Dilleswar, Dr.Sethukumarasamy	Slot :	F1+TF1
Time :	90 Minutes	Max. Marks :	50

**Answer all the Questions****(5 X 10 = 50 Marks)**

Q. No.	Sub-division	Question Text	Marks																										
1.		<p>a) The following series provides the details of the daily income of workers employed in a firm. Compute</p> <p>i) Highest income of lowest 50% workers</p> <p>ii) Mode</p> <table><tr><td>Daily Income</td><td>10-15</td><td>15-20</td><td>20-25</td><td>25-30</td><td>30-35</td><td>35-40</td></tr><tr><td>No of Workers</td><td>5</td><td>10</td><td>15</td><td>20</td><td>10</td><td>5</td></tr></table> <p>b) In an examination the marks of 100 students are listed in the table below:</p> <table><tr><td>Marks obtained</td><td>0-20</td><td>20-40</td><td>40-60</td><td>60-80</td><td>80-100</td></tr><tr><td>No. of students</td><td>15</td><td><math>f_1</math></td><td>25</td><td><math>f_2</math></td><td>20</td></tr></table> <p>Calculate the unknowns <math>f_1</math> and <math>f_2</math> when the mean of the marks is given as 55.</p>	Daily Income	10-15	15-20	20-25	25-30	30-35	35-40	No of Workers	5	10	15	20	10	5	Marks obtained	0-20	20-40	40-60	60-80	80-100	No. of students	15	$f_1$	25	$f_2$	20	6+4
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2.	Find the mean deviation about mean and coefficient of variation for the following data	10																								
	<table><tr><td>Class</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>Frequency</td><td>5</td><td>10</td><td>15</td><td>13</td><td>8</td><td>4</td><td>2</td></tr></table>	Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Frequency	5	10	15	13	8	4	2									
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Frequency	5	10	15	13	8	4	2																			
3.	The probability mass function of a discrete Random Variable $X$ is given by $P(X = r) = kr^3, r = 1, 2, 3, 4$  (i) Find the value of ' $k$ '  (ii) The distribution function of $X$ .  (iii) Find the $P(X \geq 2)$  (iv) Find the mean and variance.	10																								
4.	a) Calculate the correlation coefficient for the following data: <table><tr><td>X</td><td>25</td><td>27</td><td>31</td><td>32</td><td>28</td></tr><tr><td>Y</td><td>34</td><td>35</td><td>38</td><td>39</td><td>31</td></tr></table> b) Calculate the rank correlation coefficient for the following data: <table><tr><td>X</td><td>15</td><td>17</td><td>11</td><td>22</td><td>18</td></tr><tr><td>Y</td><td>24</td><td>32</td><td>30</td><td>29</td><td>31</td></tr></table>	X	25	27	31	32	28	Y	34	35	38	39	31	X	15	17	11	22	18	Y	24	32	30	29	31	5+5
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5.	a) The following data pertain to marks in two subjects A and B in an examination <table><tr><td></td><td>A</td><td>B</td></tr><tr><td>Average marks</td><td>39.5</td><td>47.5</td></tr><tr><td>Standard deviation of marks</td><td>10.8</td><td>16.8</td></tr></table> Coefficient of correlation between the two marks is 0.42. Obtain the two lines of regression. Estimate the marks in subject B for students who secured 50 marks in subject A. b) In a college 200 students appeared for their final examinations in Statistics ( $X_1$ ), Mathematics ( $X_2$ ) and English ( $X_3$ ). Correlation analysis was performed and the following were the details pertaining to the simple correlation coefficients between the 3 subjects: $r_{12} = 0.90, r_{13} = 0.75$ and $r_{23} = 0.70$ . (i) Calculate the multiple correlation coefficient by treating the first variable as dependent and second and third variables as independent. Interpret the multiple correlation coefficient. (ii) Calculate the partial correlation coefficient by treating the third variable as constant. Interpret the partial correlation coefficient.		A	B	Average marks	39.5	47.5	Standard deviation of marks	10.8	16.8	5+5															
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