

**VIT**Vellore Institute of Technology
(Approved by the University under section 3 of UGC Act, 1956)

Fall Semester – 2019~2020

Continuous Assessment Test – I

Programme Name & Branch : B.Tech. / M.Tech.

Course Code & Name : MAT2001 – Statistics for Engineers
Exam Duration : 90 MinutesSlot : B1+TB1
Maximum Marks : 50**Answer ALL the Questions**Each question carries equal marks ($5 \times 10 = 50$ Marks)

| S. No. | Questions | Marks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-----|-----|-----|-----|-----|----|----|----|------|---|-------|---|---|---|---|---|---|----|---|---|---|------|
| 1. | <p>Given below is the distribution of 140 candidates obtaining marks X and cumulative frequency (c.f.) of X.</p> <table><tr><td>X:</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td></tr><tr><td>c.f. :</td><td>140</td><td>133</td><td>118</td><td>100</td><td>75</td><td>45</td><td>25</td><td>9</td><td>2</td><td>0</td></tr></table> <p>Calculate the mean, median and mode for the distribution.</p> | X : | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | c.f. : | 140 | 133 | 118 | 100 | 75 | 45 | 25 | 9 | 2 | 0 | [10] | | | | | | | | | | | |
| X : | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | |
| c.f. : | 140 | 133 | 118 | 100 | 75 | 45 | 25 | 9 | 2 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | <p>Calculate the mean, variance and standard deviation for the following frequency distribution, and hence obtain the value of co-efficient of variation.</p> <table><tr><td>X:</td><td>20-25</td><td>25-30</td><td>30-35</td><td>35-40</td><td>40-45</td><td>45-50</td><td>50-55</td><td>55-60</td><td>60-65</td></tr><tr><td>f:</td><td>35</td><td>165</td><td>215</td><td>185</td><td>145</td><td>105</td><td>75</td><td>65</td><td>45</td></tr></table> | X : | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 | 60-65 | f : | 35 | 165 | 215 | 185 | 145 | 105 | 75 | 65 | 45 | [10] | | | | | | | | | | | | | |
| X : | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 | 60-65 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f : | 35 | 165 | 215 | 185 | 145 | 105 | 75 | 65 | 45 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | <p>If the random variable X takes the values 1, 2, 3 and 4 such that $2P(X = 1) = 3P(X = 2) = P(X = 3) = 5P(X = 4)$, find the probability distribution function and cumulative distribution function of X.</p> | [10] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | <p>If the joint density for the random variables (X, Y), where X is the unit temperature change and Y is the proportion of spectrum shift that a certain atomic particle produces, is given by</p> $f(x, y) = \begin{cases} cxy^2, & 0 < x < y < 1; \\ 0, & \text{otherwise,} \end{cases}$ <p>then find (i). the value of c, (ii). $f_{Y/X}(x/y)$, (iii). $f_X(x)$, (iv). $f_Y(y)$.</p> | [10] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | <p>Ten competitions in a beauty contest were ranked by three judges A, B, C as follows:</p> <table><tr><td>A:</td><td>6</td><td>5</td><td>3</td><td>10</td><td>2</td><td>4</td><td>9</td><td>7</td><td>8</td><td>1</td></tr><tr><td>B:</td><td>5</td><td>8</td><td>4</td><td>7</td><td>10</td><td>2</td><td>1</td><td>6</td><td>9</td><td>3</td></tr><tr><td>C:</td><td>4</td><td>9</td><td>8</td><td>1</td><td>2</td><td>3</td><td>10</td><td>5</td><td>7</td><td>6</td></tr></table> <p>Discuss which pair of judges have the nearest approach to common taste of beauty.</p> | A : | 6 | 5 | 3 | 10 | 2 | 4 | 9 | 7 | 8 | 1 | B : | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 | 3 | C : | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 | 6 | [10] |
| A : | 6 | 5 | 3 | 10 | 2 | 4 | 9 | 7 | 8 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| B : | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| C : | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | |



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