

Vivekananda College of Engineering & Technology, Puttur

[A Unit of Vivekananda Vidyavardhaka Sangha Puttur @]

Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

CRM08

Rev 1.11

BS

29-07-2022

CONTINUOUS INTERNAL EVALUATION - 2

Dept: BS	Sem /Div: IV / A, B	Sub: Complex Analysis, Probability and Statistical Methods	S Code: 18MAT41
Date: 03/08/2022	Time: 9.30am -11.00 am	Max. Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Marks	RBT	CO's
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PART A

1	a	<p>A random variable X has the following probability function for various values of x</p> <table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>P(x)</td><td>0.1</td><td>k</td><td>0.2</td><td>2k</td><td>0.3</td><td>k</td></tr></table> <p>Find (i) k (ii) $P(x < 2)$ (iii) $P(x \geq -1)$ (iv) $P(-1 \leq x \leq 2)$</p>	x	-2	-1	0	1	2	3	P(x)	0.1	k	0.2	2k	0.3	k	8	L2	CO2
x	-2	-1	0	1	2	3													
P(x)	0.1	k	0.2	2k	0.3	k													
	b	<p>The number of telephone lines busy at an instant of time is a binomial variate with the probability 0.1 that a line is busy. If 10 lines are chosen at random, what is the probability that (i) no line is busy (ii) all lines busy (iii) at least one line is busy (iv) at most 2 lines are busy</p>	8	L3	CO2														
	c	<p>In a certain city, the duration of the shower is exponentially distributed with mean 5 minutes. What is the probability that a shower will last for (i) 10 minutes or more (ii) less than 10 minutes (iii) between 10 to 12 minutes?</p>	9	L3	CO2														

OR

2	a	If $f(x) = \begin{cases} kx^2 & 0 < x < 3 \\ 0 & \text{elsewhere} \end{cases}$ is a p.d.f find k. Compute (i) $P(1 < x < 2)$ (ii) $P(x \leq 1)$ (iii) $P(x > 1)$	8	L3	CO2
	b	If the probability of a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals (i) exactly 3 suffers a bad reaction (ii) More than 2 suffers a bad reaction	8	L3	CO2

c	The marks of 1000 students in an examination follow normal distribution with mean 70 and standard deviation 5. Find the number of students whose marks will be (i) less than 65 (ii) more than 75 (iii) between 65 and 75 given $\phi(1) = 0.3413$			
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PART B

3	a	<p>The following are the marks of 8 students in Statistics(x) and Mathematics(y).</p> <table><tr><td>x</td><td>25</td><td>43</td><td>27</td><td>35</td><td>54</td><td>61</td><td>37</td><td>45</td></tr><tr><td>y</td><td>35</td><td>47</td><td>20</td><td>37</td><td>63</td><td>54</td><td>28</td><td>40</td></tr></table> <p>Calculate the rank correlation coefficient</p>	x	25	43	27	35	54	61	37	45	y	35	47	20	37	63	54	28	40	8	L2	CO3
x	25	43	27	35	54	61	37	45															
y	35	47	20	37	63	54	28	40															
	b	<p>With usual notation, compute \bar{x}, \bar{y} and r from the following lines of regression: $2x + 3y + 1 = 0$ and $x + 6y - 4 = 0$.</p>	8	L2	CO3																		
	c	<p>The following table gives the heights of fathers(x) and sons (y):</p> <table><tr><td>x</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>70</td><td>72</td></tr><tr><td>y</td><td>67</td><td>68</td><td>65</td><td>68</td><td>72</td><td>72</td><td>69</td><td>71</td></tr></table> <p>Calculate the coefficient of correlation and hence the lines of regression.</p>	x	65	66	67	67	68	69	70	72	y	67	68	65	68	72	72	69	71	9	L2	CO3
x	65	66	67	67	68	69	70	72															
y	67	68	65	68	72	72	69	71															

OR

4	a	Ten competitors in a beauty contest are ranked by 2 judges in the following order. <table><tr><td>I</td><td>1</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></tr><tr><td>II</td><td>6</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></tr></table> Calculate the rank correlation coefficient	I	1	6	5	3	10	2	4	9	7	8	II	6	4	9	8	1	2	3	10	5	7	8	L2	CO3
I	1	6	5	3	10	2	4	9	7	8																	
II	6	4	9	8	1	2	3	10	5	7																	
	b	Obtain the lines of regression and hence find the coefficient of correlation for the data <table><tr><td>I</td><td>1</td><td>3</td><td>4</td><td>2</td><td>5</td><td>8</td><td>9</td><td>10</td><td>13</td><td>15</td></tr><tr><td>II</td><td>8</td><td>6</td><td>10</td><td>8</td><td>12</td><td>16</td><td>16</td><td>10</td><td>32</td><td>32</td></tr></table>	I	1	3	4	2	5	8	9	10	13	15	II	8	6	10	8	12	16	16	10	32	32	8	L2	CO3
I	1	3	4	2	5	8	9	10	13	15																	
II	8	6	10	8	12	16	16	10	32	32																	
	c	If θ is the acute angle between the lines of regression, then show that $\tan\theta = \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2} \frac{1-r^2}{r}$ Explain the significance when $r=0$ & $r = \pm 1$.	9	L2	CO3																						