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# SNS College of Technology, Coimbatore-35.

(An Autonomous Institution)

Internal Assessment -II

Academic Year 2023-2024 (Even)

Fourth Semester

(Common to Agri, Auto, Food Technology, Mech)

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## 19MAT202 – STATISTICS AND NUMERICAL METHODS (REGULATION 2019)

Time: 1.30 Hours

Maximum Marks: 50

		<b>PART – A (5 x 2 = 10 MARKS) ANSWER ALL QUESTIONS</b>	<b>CO</b>	<b>Blooms</b>																								
1.		Analyze the main advantage of CRD over RBD.	CO2	(Und)																								
2.		Is Latin square is applicable for 2x2 ? Explain.	CO2	(Rem)																								
3.		Show that the NR formula for finding square root of N is $x_{n+1} = \frac{x_n^2 + N}{2x_n}$ , where N is a real number.	CO3	(Und)																								
4.		Solve the system of equations $x - 2y = 0, 2x + y = 5$ by Gauss elimination method.	CO3	(Und)																								
5.		Why Gauss-Seidal method is a better method than Jacobi's iterative method.	CO3	(Rem)																								
		<b>PART –B (13+13+14 = 40 MARKS) ANSWER ALL QUESTIONS</b>																										
6.	a)	The following table gives the number of refrigerators sold by four sales man in three months : <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="4">Sales man</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>May</td> <td>50</td> <td>40</td> <td>48</td> <td>39</td> </tr> <tr> <td>June</td> <td>46</td> <td>48</td> <td>50</td> <td>45</td> </tr> <tr> <td>July</td> <td>39</td> <td>44</td> <td>40</td> <td>39</td> </tr> </tbody> </table>	Months	Sales man				A	B	C	D	May	50	40	48	39	June	46	48	50	45	July	39	44	40	39	CO2	(Ana) (13)
Months	Sales man																											
	A	B	C	D																								
May	50	40	48	39																								
June	46	48	50	45																								
July	39	44	40	39																								

		<p>i) Do the salesman significantly differ in performance?</p> <p>ii) Is there significant difference between the months?</p>																		
		<b>(OR)</b>																		
	b)	<p>A farmer wishes to test the effect of four different fertilizers A, B, C, D are the yield of wheat. In order to eliminate sources of error due to variability in soil fertility, he uses the fertilizers in a Latin Square arrangement as indicated in the following table, where the members indicate yields in bushels per unit area.</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">A18</td> <td style="padding: 5px;">C21</td> <td style="padding: 5px;">D25</td> <td style="padding: 5px;">B11</td> </tr> <tr> <td style="padding: 5px;">D22</td> <td style="padding: 5px;">B12</td> <td style="padding: 5px;">A25</td> <td style="padding: 5px;">C19</td> </tr> <tr> <td style="padding: 5px;">B15</td> <td style="padding: 5px;">A20</td> <td style="padding: 5px;">C23</td> <td style="padding: 5px;">D24</td> </tr> <tr> <td style="padding: 5px;">C22</td> <td style="padding: 5px;">D21</td> <td style="padding: 5px;">B10</td> <td style="padding: 5px;">A17</td> </tr> </table> <p>Perform an analysis of variance to determine if there is a significant difference between the fertilizers at 5% level of significance.</p>	A18	C21	D25	B11	D22	B12	A25	C19	B15	A20	C23	D24	C22	D21	B10	A17	CO2	(Ana) (13)
A18	C21	D25	B11																	
D22	B12	A25	C19																	
B15	A20	C23	D24																	
C22	D21	B10	A17																	
7.	a) i)	Identify the real positive root of $3x - \cos x - 1 = 0$ using Newton's Raphson method correct to four decimal places.	CO3	(App) (6)																
	ii)	<p>Solve the following system of equations ,using Gauss Jordan method</p> $2x + 3y - z = 5$ $4x + 4y - 3z = 3$ $2x - 3y + 2z = 2$	CO3	(App) (7)																
		<b>(OR)</b>																		
	b) i)	Determine an approximate root of $x \log_{10} x - 1.2 = 0$ by Newton Raphson method.	CO3	(App) (6)																
	ii)	Using Gauss Jordan method, find the inverse of $\begin{pmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{pmatrix}$ .	CO3	(App) (7)																

8.	a)	<p>Analyze the variance in the Latin square of yields (in quintals) of wheat where P,Q,R,S represent the different manures used.</p> <p style="text-align: center;"> S222   P221   R223   Q222  Q224   R223   P222   S225  P220   Q219   S220   R221  R222   S223   Q221   P222 </p> <p>Test whether the different manures used have given significantly different yields.</p>	CO2	(Ana) (14)
<b>(OR)</b>				
	b)	<p>Compare the solution of Gauss Jacobi method and Gauss- Seidel method correct to 4 decimal places:</p> <p> <math>x + y + 8z = 20</math>  <math>4x + 2y + z = 14</math>  <math>x + 5y - z = 10</math> </p>	CO3	(App) (14)

**Rem/Und:** Remember/ Understand

**App:** Apply

**Ana:** Analyze

**Eva:** Evaluate

**Cre:** Create

**Prepared by**

**Verified by**

**Dean(S&H)**