

JK Lakshmipat University Jaipur

M Tech Second Semester
End Term Backlog Examination, 2021-22

AS2102: Statistical Data Analysis - II

Time: 120 Minutes

Max. Marks: 40

Calculator is permitted to use.

Q. No.	Question	Max Marks																																																												
1	The following are the number of typing mistakes made in five successive weeks by four typists working for a publishing company <table><tr><td>Typist I:</td><td>13</td><td>16</td><td>12</td><td>14</td><td>15</td></tr><tr><td>Typist II:</td><td>14</td><td>16</td><td>11</td><td>19</td><td>15</td></tr><tr><td>Typist III:</td><td>13</td><td>18</td><td>16</td><td>14</td><td>18</td></tr><tr><td>Typist IV:</td><td>18</td><td>10</td><td>14</td><td>15</td><td>12</td></tr></table> Carry out a one way ANOVA to test at the 0.05 level of significance whether the differences among the four sample means is significant.	Typist I:	13	16	12	14	15	Typist II:	14	16	11	19	15	Typist III:	13	18	16	14	18	Typist IV:	18	10	14	15	12	10																																				
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Typist IV:	18	10	14	15	12																																																									
2	Production from the duration from 1995 to 2013 is as follows: <table><tr><td>Year</td><td>1995</td><td>1996</td><td>1997</td><td>1998</td><td>1999</td><td>2000</td><td>2001</td><td>2002</td><td>2003</td></tr><tr><td>y</td><td>5</td><td>6</td><td>8</td><td>10</td><td>5</td><td>3</td><td>7</td><td>10</td><td>12</td></tr><tr><td>Year</td><td>2004</td><td>2005</td><td>2006</td><td>2007</td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2012</td><td>2013</td></tr><tr><td>y</td><td>11</td><td>9</td><td>13</td><td>15</td><td>18</td><td>15</td><td>11</td><td>14</td><td>17</td><td>22</td></tr></table> Construct a time series plot. What type of pattern exists in the data? a) Develop three-month moving averages for this time series. does the b) What is the moving average forecast for the next month?	Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	y	5	6	8	10	5	3	7	10	12	Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	y	11	9	13	15	18	15	11	14	17	22	10																		
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3	a. A case study has 4 factors of 4 levels and 1 factor of 3 levels; choose the smallest orthogonal array to be used. Justify your answer. b. A DOE was set up for 4 factors at 3 levels at a freezer manufacturing plant on their door molding machine. The experiment was designed and conducted using the Taguchi method of orthogonal arrays. The quality characteristic (mean square defect count) was computed for each experiment, and is presented in the table below: $\eta_i = -10 \log_{10}$ (mean square defect count for experiment i) <table><tr><th>Experiment No.</th><th>Factor A</th><th>Factor B</th><th>Factor C</th><th>Factor D</th><th>Mean square defect count</th></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>210</td></tr><tr><td>2</td><td>1</td><td>2</td><td>2</td><td>2</td><td>80</td></tr><tr><td>3</td><td>1</td><td>3</td><td>3</td><td>3</td><td>300</td></tr><tr><td>4</td><td>2</td><td>1</td><td>2</td><td>3</td><td>900</td></tr><tr><td>5</td><td>2</td><td>2</td><td>3</td><td>1</td><td>16,000</td></tr><tr><td>6</td><td>2</td><td>3</td><td>1</td><td>2</td><td>6,400,000</td></tr><tr><td>7</td><td>3</td><td>1</td><td>3</td><td>2</td><td>40,000</td></tr><tr><td>8</td><td>3</td><td>2</td><td>1</td><td>3</td><td>3,200,000</td></tr><tr><td>9</td><td>3</td><td>3</td><td>2</td><td>1</td><td>25,000,000</td></tr></table> Carry out an ANOM by following these steps: Estimate the factor effects (i.e. calculate mA_1, mA_2 etc.). Plot these factor effects. Select optimum pressure, temperature, time and catalyst setting the molding process should run for minimizing surface defects (maximizing η).	Experiment No.	Factor A	Factor B	Factor C	Factor D	Mean square defect count	1	1	1	1	1	210	2	1	2	2	2	80	3	1	3	3	3	300	4	2	1	2	3	900	5	2	2	3	1	16,000	6	2	3	1	2	6,400,000	7	3	1	3	2	40,000	8	3	2	1	3	3,200,000	9	3	3	2	1	25,000,000	5 15
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