**JAIPURIA INSTITUTE OF MANAGEMENT, INDORE**

PGDM, FIRST TRIMESTER (Batch 2020 - 22)

END TERM (Improvement) EXAMINATION, December – 2020

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| Course Name | **Statistics For Management** | Course Code | **OM 101** |
| Max. Time | 2 Hours  | Max. Marks | **40** |

**INSTRUCTIONS:**

* The End-Term exam shall be a combination of Moodle, MS Excel and Pen-Paper based examination.
* All students are required to login on Moodle and open the question paper.
* Moodle password for End-Term (Improvement) Examination is: - &NumeroUno%
* Students shall find THREE questions on Moodle. Each question carries 8 marks.
* Total time allocated for these three Moodle questions is 60 minutes.
* Students are advised to use “MS Excel Data Analysis Tool Pack” to do calculations while attempting question shown on Moodle.
* Students are required to save their MS Excel File with one sheet for each question. Students must write their Excel output and interpretations (in Text Box) on the same sheet of the question.
* Student must save their MS Excel Sheets in their name (example – Rakesh\_Roshan\_ Section A) and send the MS Excel file on email id provided by examination office.
* Sending pictures of all the sheets for the theory question is COMPULSORY. In absence of the pictures of these theory question answers, a student shall be awarded ZERO marks.
* Please note that if answers of two are found similar, then both the students shall be awarded ZERO marks.
* Please write the first line of every question on the excel sheet (with name of the organization given in the question on Moodle) before proceeding for solution. In absence of writing the question and name of the organization, student may be given ZERO marks.

Q1. “Slim-Gym” claim that after a regular exercise for three months, the customers shall loose on an average at least 10 Kg weight. An independent researcher decided to verify this claim and collected the following data on customers of the Gym.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Customer No.** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Weight before Joining Gym (Kgs) | 82 | 85 | 81 | 86 | 90 | 88 | 79 | 77 | 75 | 80 |
| Weight after three month in Gym (Kgs)) | 76 | 79 | 71 | 72 | 78 | 76 | 65 | 71 | 70 | 72 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Customer No.** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| Weight before Joining Gym (Kgs) | 87 | 86 | 88 | 81 | 79 | 83 | 86 | 88 | 82 | 91 |
| Weight after three month in Gym (Kgs)) | 76 | 74 | 76 | 72 | 65 | 69 | 71 | 73 | 77 | 78 |

Analyze the data using appropriate statistical tools. Use α = 0.05. Generate meaningful insights from your analysis.  **(8 Marks)**

**.**

Q1. “Fit-Gym” claim that after a regular exercise for three months, the customers shall loose on an average at least 8 Kg weight. An independent researcher decided to verify this claim and collected the following data on customers of the Gym.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Customer No.** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Weight before Joining Gym (Kgs) | 80 | 83 | 78 | 86 | 91 | 85 | 77 | 76 | 79 | 83 |
| Weight after three month in Gym (Kgs)) | 75 | 74 | 76 | 70 | 77 | 73 | 69 | 70 | 71 | 72 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Customer No.** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| Weight before Joining Gym (Kgs) | 88 | 85 | 89 | 82 | 77 | 86 | 85 | 86 | 80 | 92 |
| Weight after three month in Gym (Kgs)) | 75 | 73 | 77 | 70 | 68 | 68 | 70 | 72 | 76 | 79 |

Analyze the data using appropriate statistical tools. Use α = 0.05. Generate meaningful insights from your analysis.  **(8 Marks)**

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Q1. “Lean - Gym” claim that after a regular exercise for three months, the customers shall loose on an average at least 11 Kg weight. An independent researcher decided to verify this claim and collected the following data on customers of the Gym.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Customer No.** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Weight before Joining Gym (Kgs) | 82 | 85 | 79 | 82 | 90 | 81 | 77 | 76 | 79 | 83 |
| Weight after three month in Gym (Kgs)) | 72 | 75 | 72 | 70 | 72 | 71 | 68 | 67 | 70 | 73 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Customer No.** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| Weight before Joining Gym (Kgs) | 85 | 86 | 88 | 80 | 79 | 82 | 83 | 82 | 84 | 90 |
| Weight after three month in Gym (Kgs)) | 73 | 75 | 71 | 70 | 64 | 68 | 73 | 73 | 72 | 77 |

Analyze the data using appropriate statistical tools. Use α = 0.05. Generate meaningful insights from your analysis.  **(8 Marks)**

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Q2. “Generic Pharma” is a multinational pharmaceutical company. The company has launched five brands of Antacids to relieve patients from stomach acidity problems. The relief time (in minutes after taking medicine) are presented below. Use appropriate statistical test and generate Excel output at 0.05 significance level. Analyze the output and develop meaningful insights for “Generic Pharma”. **(8 Marks)**

|  |  |
| --- | --- |
| Brands | Relief Time (minutes) |
| Fatafat - A | 8.5 | 9.0 | 7.5 | 8.0 | 9.0 | 9.5 |  |
| Fatafat - B | 7.8 | 8.2 | 9.0 | 7.3 | 7.5 | 7.6 | 8.1 |
| Fatafat - C | 8.2 | 8.9 | 8.5 | 7.4 | 8.3 |  |  |
| Fatafat - D | 9.0 | 9.1 | 9.3 | 9.8 | 9.1 | 9.4 |  |
| Fatafat - E | 10.6 | 10.0 | 10.1 | 10.7 | 9.9 | 8.7 | 10.2 |

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Q2. “Basic Pharma” is a multinational pharmaceutical company. The company has launched five brands of Antacids to relieve patients from stomach acidity problems. The relief time (in minutes after taking medicine) are presented below. Use appropriate statistical test and generate Excel output at 0.05 significance level. Analyze the output and develop meaningful insights for “Generic Pharma”. **(8 Marks)**

|  |  |
| --- | --- |
| Brands | Relief Time (minutes) |
| Aaram - A | 8.1 | 7.9 | 11 | 10.2 | 10.2 | 10.9 | 10.1 |
| Aaram - B | 10.8 | 10.5 | 10.9 | 9.8 | 9.2 | 9.6 | 9.8 |
| Aaram - C | 12.0 | 11.9 | 12.7 | 12.6 | 10.0 | 11.3 |  |
| Aaram - D | 13.0 | 12.0 | 11.8 | 10.9 | 13.1 |  |  |
| Aaram - E | 11.2 | 13.2 | 12.0 | 12.9 | 11.9 |  |  |

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Q2. “Universal Pharma” is a multinational pharmaceutical company. The company has launched five brands of Antacids to relieve patients from stomach acidity problems. The relief time (in minutes after taking medicine) are presented below. Use appropriate statistical test and generate Excel output at 0.05 significance level. Analyze the output and develop meaningful insights for “Generic Pharma”. **(8 Marks)**

|  |  |
| --- | --- |
| Brands | Relief Time (minutes) |
| Thandak - A | 8.3 | 7.2 | 11 | 10.2 | 10.2 |  |  |
| Thandak - B | 10.5 | 10.8 | 10.1 | 9.8 | 9.2 | 9.6 |  |
| Thandak - C | 12.2 | 11.9 | 12.3 | 12.1 | 109 | 11.4 |  |
| Thandak - D | 13.0 | 12.0 | 11.8 | 10.9 | 13.1 | 12.2 | 11.9 |
| Thandak - E | 12.8 | 12.2 | 13.0 | 12.6 | 11.7 | 13.2 |  |

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Q3. “Cert Tyres” is an automotive tyre manufacturing which makes tyres for small cars. The company operates in two shifts, Day (D) and Night (N). The company feels that shift has no role in the production output. The performance data of a sample of Week is as under: -

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Shift | D | N | D | N | D | D | N | N | D | D |
| Average number Tyres produced | 155 | 179 | 173 | 220 | 154 | 178 | 201 | 203 | 180 | 191 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| Shift | D | N | N | D | N | N | D | D | N | N |
| Average number Tyres produced | 163 | 223 | 201 | 192 | 185 | 231 | 185 | 192 | 212 | 195 |

1. State null and alternate hypothesis.
2. Analyze the data using appropriate statistical tool(s) and generate output.
3. At 0.05 level of significance, can we conclude that the company’s assumption correct? **(8 Marks)**

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Q3. “Goodhope Tyres” is an automotive tyre manufacturing which makes tyres for small cars. The company operates in two shifts, Day (D) and Night (N). The company feels that shift has no role in the production output. The performance data of a sample of Week is as under: -

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Shift | D | N | D | N | D | D | N | N | D | D |
| Average number Tyres produced | 152 | 176 | 173 | 201 | 144 | 171 | 211 | 213 | 183 | 191 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| Shift | D | N | N | D | N | N | D | D | N | N |
| Average number Tyres produced | 167 | 221 | 221 | 199 | 183 | 201 | 175 | 162 | 210 | 197 |

1. State null and alternate hypothesis.
2. Analyze the data using appropriate statistical tool(s) and generate output.
3. At 0.05 level of significance, can we conclude that the company’s assumption correct? **(8 Marks)**

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Q3. “Fastrack Tyres” is an automotive tyre manufacturing which makes tyres for small cars. The company operates in two shifts, Day (D) and Night (N). The company feels that shift has no role in the production output. The performance data of a sample of Week is as under: -

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Shift | D | N | D | N | D | D | N | N | D | D |
| Average number Tyres produced | 142 | 179 | 163 | 206 | 154 | 170 | 214 | 213 | 173 | 182 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| Shift | D | N | N | D | N | N | D | D | N | N |
| Average number Tyres produced | 168 | 231 | 201 | 179 | 187 | 213 | 178 | 163 | 219 | 198 |

1. State null and alternate hypothesis.
2. Analyze the data using appropriate statistical tool(s) and generate output.
3. At 0.05 level of significance, can we conclude that the company’s assumption correct? **(8 Marks)**

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Q4. “Aroma Spices” produces spices of different variety. The sales data, expenditure on Advertisement, Expenditure on Sale Promotion and Expenditure on Event Sponsorship for last ten years is presented below. Analyze the data using appropriate statistical tools and generate meaningful insights. **(8 Marks)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |
| Sales (Rs Cr) | 16 | 17 | 21 | 21 | 23 | 23 | 21 | 24 | 28 | 30 |
| Advertisement (Rs Lacs) | 5 | 3 | 7 | 5 | 6 | 8 | 10 | 12 | 12 | 13 |
| Sale Promotion Expenses (Rs Lacs) | 3 | 3 | 4 | 4 | 6 | 5 | 6 | 7 | 8 | 10 |
| Event Sponsorship (Rs Lacs) | 5 | 6 | 5 | 6 | 7 | 8 | 4 | 9 | 6 | 8 |

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Q5. Discuss the use of relative frequency approach in probability in a business situation. **(8 Marks)**