**JAIPURIA INSTITUTE OF MANAGEMENT, INDORE**

**PGDM**

**FIRST TRIMESTER (Batch 2019-21)**

**END TERM EXAMINATION, SEPTEMBER-2019**

|  |  |  |  |
| --- | --- | --- | --- |
| Course Name | **Statistics for Management** | Course Code | **OM 101** |
| Max. Time | **2 hours** | Max. Marks | **40** |

**INSTRUCTIONS:**

Exam instructions, Professor may wish to include.

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**Questions.1 (6 Marks)**

The Scholar’s University offers management education to students. The university in recent past feels that on an average, female students score more marks as compared to male students. In order to validate this claim, the university collected data and processed the data on a software. The following results were obtained. State the null and alternative hypothesis and analyze the output.

|  |
| --- |
| **t-Test: Two-Sample Assuming Equal Variances** |
|   | **Female** | **Male** |
| Mean | 73.72727273 | 67.5 |
| Variance | 142.0181818 | 69.61111111 |
| Observations | 11 | 10 |
| Pooled Variance | 107.7200957 |   |
| Hypothesized Mean Difference | 0 |   |
| df | 19 |   |
| t Stat | 1.373207657 |   |
| P(T<=t) one-tail | 0.092838722 |   |
| t Critical one-tail | 1.729132812 |   |
| P(T<=t) two-tail | 0.185677444 |   |
| t Critical two-tail | 2.093024054 |   |

**Questions.2 (10 Marks)**

“Great Impact” is an advertising agency which claims that their advertisements always help in increase of sale. “Fun–n–Fashion” a garment manufacturing company is a customer of “Great Impact” and has gathered data on advertisement cost (Million rupees) and sales (Billion rupees). This data was processed using some software and the following output was received. The significance level was 0.05. Evaluate the output and comment.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* |  |  |  |  |  |  |  |
| Multiple R | 0.94253063 |  |  |  |  |  |  |  |
| R Square | 0.88836398 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.87595998 |  |  |  |  |  |  |  |
| Standard Error | 8.95442495 |  |  |  |  |  |  |  |
| Observations | 11 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 5742.546 | 5742.55 | 71.6191 | 1.4E-05 |  |  |  |
| Residual | 9 | 721.6355 | 80.1817 |  |  |  |  |  |
| Total | 10 | 6464.182 |   |   |   |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | 13.1959 | 5.1462 | 2.5642 | 0.0305 | 1.5543 | 24.8375 | 1.5543 | 24.8375 |
| Ad. cost (Million Rs ) | 2.9989 | 0.3544 | 8.4628 | 0.000014 | 2.1972 | 3.8005 | 2.1972 | 3.8005 |

**Questions.3 (6 Marks)**

The manager of a computer store has kept track of the number of computers sold per day. On the basis of this information, the manager produced the following list of the number of daily sales.



a. If we define the experiment as observing the number of computers sold tomorrow, determine the sample space.

b. Use set notation to define the event, sell more than 3 computers.

c. What is the probability of selling 5 computers?

d. What is the probability of selling 2, 3, or 4 computers?

e. What is the probability of selling 6 computers?

**Questions.4 (6 Marks)**

The Miami Beach tourist agency claims that the percentage of days in the winter (December 21 to March 21) when the highest daily temperature exceeds 75 degrees is more than 80%. A random sample of 250 days reveals that in 212 days the highest daily temperature exceeded 75 degrees. Can we infer at the 10% significance level that the tourist agency is correct?

**Questions.5 (12 Marks)**

Attempting to analyze the relationship between advertising and sales, the owner of a furniture store recorded the monthly advertising budget ($thousands) and the sales ($millions) for a sample of 12 months. The data are listed here.

a) Draw a scatter diagram. Does it appear that advertising and sales are linearly related?

b) Calculate the least squares line and interpret the coefficients.

c) Determine the standard error of estimate.

d) Is there evidence of a linear relationship between advertising and sales?

e) Estimate *β*1 with 95% confidence.

f) Predict with 90% confidence the sales when the advertising budget is $90,000.