Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**ME – SEMESTER II (OLD) – • EXAMINATION – SUMMER 2016**

**Subject Code: 1721408** **Date:19/05/2016**

**Subject Name: Research Methodology**

**Time:10:30 am to 01:00 pm** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Enlist various problems encountered by Researchers in India. | **07** |
| | **(b)** | Clearly differentiate between Research Methods and Research Methodology. | **07** |
| **Q.2** | **(a)** | Explain various steps involved in defining the Research problem. | **07** |
| | **(b)** | Describe three basic principles of experimental design with suitable example. | **07** |
| | | **OR** | |
| | **(b)** | Define the following terms:<br>(i) Extraneous variable<br>(ii) Research Hypothesis<br>(iii) Treatments | **07** |
| **Q.3** | **(a)** | Differentiate between primary data and secondary data. Indicate merits and demerits of data collection through questionnaire. | **07** |
| | **(b)** | What are the guiding considerations in the construction of questionnaire? Explain. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is Multivariate analysis? Briefly explain various multivariate analyses. | **07** |
| | **(b)** | Construct a box–and–whisker plot for the given data.<br><br>56, 32, 54, 32, 23, 67, 23, 45, 12, 32, 34, 24, 36, 47, 19, 43 | **07** |
| **Q.4** | **(a)** | What is a Hypothesis? Explain following terms with respect to hypothesis testing.<br>(a) One-tailed and Two-tailed test<br>(b) z-test and t-test<br>(c) p-value | **07** |
| | **(b)** | The breaking strengths of cables produced by a manufacturer have a mean of 1800 pounds (lb) and a standard deviation of 100 lb. By a new technique in the manufacturing process, it is claimed that the breaking strength can be increased. To test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850 lb. Can we support the claim at the 0.01 significance level? | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Describe various measures of relationships often used in context of research studies. | **07** |
| | **(b)** | The mean height of 50 male students who showed above- | **07** |

average participation in college athletics was 68.2 inches (in) with a standard deviation of 2.5 in, while 50 male students who showed no interest in such participation had a mean height of 67.5 in with a standard deviation of 2.8 in.
Test the hypothesis that male students who participate in college athletics are taller than other male students. ($\alpha = 0.05$)

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| **Q.5** | **(a)** | What is ANOVA? Differentiate between one-way ANOVA and two-way ANOVA. | **07** |
| | **(b)** | Table below shows the yields in bushels per acre of a certain variety of wheat grown in a particular type of soil treated with chemicals A, B, or C. Find (a) the mean yields for the different treatments, (b) the grand mean for all treatments, (c) the total variation, (d) the variation between treatments, and (e) the variation within treatments. Set up ANOVA table for the data. Give your comments on results. Use $\alpha = 0.05$. | **07** |

**OR**

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| **Q.5** | **(a)** | Briefly explain the layout of the Research report. | **07** |
| | **(b)** | Write a short note on "Types of Reports". | **07** |

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