**CHRIST (Deemed to be University), Pune Lavasa**

**END SEMESTER EXAMINATION – FEB 2024**

**PG II Semester**

**PROGRAMME NAME: MSc (DS) MAX. MARKS: 60**

**COURSE NAME: INFERENTIAL STATISTICS USING R TIME: 3 HRS**

**COURSE CODE: MDS272**

**General Instructions**

* Answer all questions.
* Number of questions: 4
* Maximum marks: 60 [40 (Practical)+ 10(Theoretical) + 10(Viva) ]
* Append the solution manual of the questions in the Google Classwork

(a) File format: pdf or word

(b) Number of files: one

* Plagiarism of above 20% will be discarded from evaluation
* Make sure your mobile phone is switched off and placed at the designated place in the hall.
* Malpractices will be viewed very seriously.
* Answers without the question numbers clearly indicated will not be valued.

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| **Course Outcomes (COs):** The students will able to  **CO1** Demonstrate the concepts of population and samples.  **CO2** Apply the idea of sampling distribution of different statistics in testing of hypothesis.  **CO3** Estimate the unknown population parameters using the concepts of point and interval estimations using R.  **CO4** Test the hypothesis using nonparametric tests for real world problems using R. |

**SECTION A**

**Answer all the questions 4 X 10 marks = 40**

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| **Q. No** | **Questions** |
| 1 | **Comparative Analysis of Worker Attitudes**  Dynamic Solutions Ltd., with its head office situated in Kolkata and a branch in Mumbai, aims to introduce a new work plan. To gauge worker attitudes towards this plan, a survey was conducted. Out of a sample of 500 workers in Kolkata, 62% expressed support for the new plan. Conversely, out of a sample of 400 workers in Mumbai, 41% were against it. The Personnel Director seeks to determine if there is a significant difference in the attitudes of workers between the two locations at a 5% significance level. |
| 2 | **Global Solutions Inc. Satisfaction Analysis Question**  The HR department of Global Solutions Inc Corporation conducted a satisfaction survey among employees to assess job satisfaction levels. The results revealed that 772 employees expressed dissatisfaction with their current roles, 1611 reported moderate satisfaction, and 737 indicated high satisfaction and the remaining employees did not provide satisfaction ratings. However, Global Solutions Inc Corporation's HR policies anticipate a distribution of job satisfaction levels in the ratio of 1:2:1 for dissatisfied, moderately satisfied, and highly satisfied employees respectively. Considering this, analyze whether the observed satisfaction levels align with the expected ratios. Perform a hypothesis test using an appropriate statistical method to determine if there are any notable deviations exist. Based on the test results, draw conclusions about whether further inquiries or actions are necessary to address any notable deviations effectively |
| 3 | **Statistical Analysis of Healthcare Data**  a) Using the Health Care dataset, examine whether individuals admitted under emergency conditions have an average bill of 25,500, based on a suitable sample size, with a significance level of 1%.  b) Investigate whether there is equal variance in billing amounts among individuals with Diabetes and Hypertension. Utilize a suitable statistical test for validation and draw meaningful inferences from the results. |
| 4 | **Exploring the Impact of Nitrogen Content in Soil and Crop Types on Soil pH**  Test the significance of the ratio of Nitrogen (N) content in soil and the type of crop label on the average pH level. If the pH level is influenced by the ratio of nitrogen content in soil and the type of crop, conduct appropriate tests to determine which specific ratios of nitrogen content in soil and crop types result in differences. |