Q.P. Code: 112289 **Reg. No.:……**

First Semester MD/MS Ayurveda Regular Examinations May 2025
Biostatistics
(2024 Scheme)

Time: 3 hrs **Max marks: 100**

- ***Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers • Indicate the question number correctly for the answer in the margin space***
- ***Answer all parts of a single question together • Leave sufficient space between answers.***
- ***Simple calculator shall only be permitted***

Application based question **(20)**

1. A researcher intends to conduct a community-based cross-sectional study to estimate the prevalence of anemia among adolescent girls residing in a tribal region of southern India. The estimated prevalence of anemia is approximately 30% from past survey. The data is assumed to be normally distributed due to the large population size.
    a) Describe the rationale of using a cross-sectional study design for estimating the prevalence of the given health condition. How does this decision impact the choice of sample size estimation method.
    b) Describe the formula for sample size estimation for the above-mentioned scenario. Provide a step-by-step explanation of inputs in formula and calculate the optimum sample size at 95% confidence interval ($Z_{(1-\alpha/2)} = 1.96$) and an absolute error of 5% to ensure sufficient precision for public health planning maintaining a power of 80%. ($Z_{(1-\beta)} = 0.84$).
    c) If the researcher wants to improve the precision of the estimate to 3%, how would it affect the sample size. Calculate the new sample size.
    d) Explain the role of confidence level and precision in ensuring the reliability of the study findings. (5+6+5+4)

Short answer questions **(8x5=40)**

2. Describe Analysis of Variance (ANOVA) and its uses, including Repeated measures ANOVA.
3. What is Fisher's exact test. When is it preferred over chi-square test.
4. Explain the importance of understanding the correct use of statistics in biomedical research with relevant clinical examples.
5. Define incidence rate and prevalence rate with examples.
6. Explain the concept and uses of scatter diagram.
7. Describe survival analysis with its importance in medical research.
8. Describe methods to test the assumption of normality.
9. Explain measures of dispersion and define standard deviation.

Long answer questions **(4x10=40)**

10. Differentiate between Type I and Type II error with examples and discuss its role in decision making. Elaborate the concept of statistical power with its influencing factors.
11. Define non-parametric tests. Explain in detail the Wilcoxon's Signed-Rank Test with assumptions and its clinical applications.
12. Elaborate the utility of odds ratio, relative risk, and risk difference in epidemiological studies with relevant examples.
13. Discuss the difference between statistical significance and clinical significance. Can a result be statistically significant but not clinically significant. Justify the answer.

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