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B.Pharm. (Semester-II) Mid-Semester Examinations: 2009

[Time: 2 Hours] **Date: 07/04/2009** **[Max. Marks: 40]**

APPLIED MATHEMATICS [BIOSTATISTICS]

SECTION-I (ESSAYS): Attempt any TWO. **(8 x 2 = 16)**

1. **(a) Define following terms: Population, Sample, Standard Error, Null Hypothesis, Critical region.**
   (b) How many kind of decision making possibilities for testing null hypothesis? Explain Type-I and Type-II errors in testing of hypothesis.
2. **(a) What are the advantages of sampling? Explain simple random sampling?**
   (b) What is ‘ χ^2 -test’ ? Under what conditions is it applicable?
3. **(a) What are nonparametric tests? In what ways they different from parametric tests?**
   (b) Describe cross over designs.

SECTION-II (SHORT QUESTIONS): Attempt any FOUR **(4 x 4 = 16)**

4. **A population is divided into three strata consisting N_i individuals. From each stratum sample is drawn. The observation on a certain characteristic X on individuals in the samples are as shown below:**

Stratum	N_1	n_1	Values of X
1	30	4	7,6,3,8
2	40	3	12,15,16
3	60	6	3,4,8,2,16,13

Estimate: (i) Total of population.
(ii) Mean of population.

5. **Two types of drugs were used on 5 and 7 patients for reducing their weights. Drug A is imported and drug B indigenous. The decrease in the weight after using the drugs for six months was recorded as given below.**

Drug A	11	13	12	14	10		
Drug B	12	9	8	15	14	9	10

Is there significant difference in the efficacy of the two drugs? If not, which drug should you buy?

6. **An I.Q. test was administered to 5 medical representatives before and after they were trained. The results are given below:**

Candidate No.:	1	2	3	4	5
I.Q. before training:	110	120	123	132	125
I.Q. after training:	120	118	125	136	127

Test whether there is any change in I.Q. after the training program.

7. **Two granulations were prepared by different procedures. Seven random samples of powdered mix of equal weight (equal to the weight of the final dosage form) were collected from each batch and assayed for active material, with the following results.**

Granulation A	Granulation B
20.4, 20.6, 20.6, 20.7, 21.0, 20.9,19.8	20.2, 21.0, 20.4, 19.0, 21.5, 18.9, 21.8

Test whether the two samples can be regarded to have come from the population having equal variance.

8. **In order to compare the effectiveness of two sunburn lotions, a random sample of seven subjects is selected. Lotion A is applied to the left side of their faces and lotion B to the right side. After the subjects have sat in the sun watching a three-hour tennis match, the degree of sunburn is measured on a scale.**

Subject	1	2	3	4	5	6	7
Lotion A	48	62	42	69	74	35	84
Lotion B	46	49	48	63	43	32	53

Applying Wilcoxon signed rank test, determine whether the data support the claim that the two lotions are equally effective.

SECTION-III (VERY SHORT QUESTIONS): Attempt any FOUR. **(2 x 4 =8)**

9. **Two groups, A and B, consist of 100 people each who have a disease. A serum is given to group A but not to group B (which is called the control); otherwise the two groups are treated identically. The following table show the outcomes of the treatment. Test the hypothesis at 5% level of significance, that the recovery is independent of the use of the serum.**

	Recover	Do not recover
Group A (Using serum)	75	25
Group B (not using serum)	65	35

10. **The following data show the blood pressure reduction (in mm Hg) caused in 10 animals by a new antihypertensive compound.**

    20, 18, 15, 12, 8, 16, 18, 17, 14, 21

11. **Discuss merits and demerits of cross over design.**
12. **Write Krushkal-Wallis algorithm for solving a problem.**
13. **Give brief explanation about washout period and carry over effect.**

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