Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(BT) (2011 Onwards)   (Sem.–4)
BIOSTATISTICS
Subject Code : BTBT-401
Paper ID : [A1166]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
 1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
 2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
 3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Answer briefly :**

   a. Give an example of data on a ratio scale.

   b. What is frequency polygon?

   c. Calculate the geometric mean of following data: 1, 27, 8, 2, 18. Also find the median of the data.

   d. Define range. What is the limitation of range as measure of dispersion?

   e. In a deck of playing cards, what is the probability of selecting either a queen of club or king of spade?

   f. Differentiate between leptokurtic and platykurtic frequency distributions.

   g. What is power of a statistical test?

   h. What is two tailed hypothesis testing?

   i. What is Mann-Whitney test?

   j. In which situation calculation of Spearman rank correlation coefficient 'r_s' is preferred over correlation coefficient 'r'? What are the maximum and minimum possible values of r_s?

SECTION-B

2. Consider the following data, which are a sample of amino acid concentrations (mg/100 ml) in arthropod hemolymph :

240.6, 238.2, 236.4, 244.8, 240.7, 241.3, 237.9

Calculate the standard deviation of the data.

3. It is observed that 24 per cent of a specific population have blood group B. For a sample of size 20 drawn at random from this population, find the probability of that exactly three persons with blood group 'B' will be found.

4. The following table gives the number of child births that occurred on various days of the week. Performing 'Chi-Square Test', to test whether the child births are equally distributed over the week :

Day	Mon.	Tue.	Wed.	Thus.	Fri.	Sat.	Sun.
No. of child births Observed	14	17	12	11	15	14	15
No. of child births expected	14	14	14	14	14	14	14

5. Perform 'Wilcoxon paired-sample test' to test if the lengths of hindleg and foreleg are same in the deer based on following data :

Deer	1	2	3	4	5	6	7	8	9	10
Hindleg (cm)	142	140	144	144	142	146	149	150	142	148
Foreleg (cm)	138	136	147	139	143	141	143	145	136	146

6. What is random sampling? What is the significance of sampling in statistical hypothesis testing? Also discuss the assumptions of two sample t-test.

SECTION-C

7. Perform a two sample t-test for the two-tailed hypotheses that mean blood-clotting times are equal for the two groups of individuals, administered with one of the two different drugs. The data of blood-clotting time (in minutes) is as following :

Drug A	8.8	8.4	7.9	8.7	9.1	9.6	
Drug B	9.9	9.0	11.1	9.6	8.7	10.4	9.5

8. a. Describe ANOVA (Analysis of Variance) test and write about its applications in biostatistics.

    b. Nineteen pigs are assigned at random among four experimental groups. Each group is fed a different diet. The data are pig weights, in kilograms, after being raised on these diets. We wish to ask whether pig weights are the same for all four diets. The total sum of squares is 4354.698 and among-groups sum of square is 4226.348. Perform single-factor analysis of variance test to find whether pig weights are the same for all four diets.

9. Calculate the simple correlation coefficient for the following data consisting of wing and tail lengths (cm) among the birds of a particular species :

Wing length	10.4	10.8	11.1	10.2	10.3	10.2	10.7	10.5	10.8	11.2	10.6	11.4
Tail length	7.4	7.6	7.9	7.2	7.4	7.1	7.4	7.2	7.8	7.7	7.8	8.3

Also comment on the correlation between the two variables.