CBCS SCHEME

18BT31

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Third Semester B.E. Degree Examination, Feb./Mar.2022
Biostatistics

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Below given is the frequency distribution of grains per sprike. Draw "less than" and "more than" frequency distribution of the data in same diagram.   **(06 Marks)**

Number of grains:	17–19	20–22	23–25	26–28	29–31	32–34	35–37	38–40	41–43
Number of plants:	8	15	18	21	26	19	12	7	4

   b. Compute the median from the data given below: **(07 Marks)**

Class in Interval (N)	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Frequency (f)	2	11	26	17	8	6	3	2	1

   c. Describe Factorial experiment. Mention its advantage and disadvantages.   **(07 Marks)**

OR

2 a. (i) Explain completely randomized block design.
      (ii) Three varieties A, B and C of mungbean are tested in a randomized block design with four replications. The plot yield in pounds are as follows:

A :	6	C	5	A	8	B	9
B :	8	A	4	B	6	C	9
C :	7	B	6	C	10	A	6

      Given $F_{0.05}(2, 6) = 5.14$
      Analyze the experimental yield and state your conclusion.   **(06 Marks)**

   b. Explain historical controlled studies.   **(07 Marks)**

   c. Find the Quartile deviation for the following data. The variable is weight of fishes.

Fishes:	140-142	142-144	144-146	146-148	148-150	150-152	152-154	154-156	156-158	158-160
Weight:	10	15	17	19	20	26	29	30	22	12

                                                                          (07 Marks)

Module-2

3 a. Discuss various measure of spreads.   **(06 Marks)**

   b. Define skewness of a data. Explain a method used to reduce skewness of a data.   **(07 Marks)**

   c. In a population of 10,000 of the people, it is known that the heights of a certain population of individuals are approximately normally distributed with a mean of 70 inches and standard deviation of 3 inches. What is the probability that a person picked at random from this group will be between 65 and 74 inches tall? [A(1.67) = 0.4525 and A(1.33) =0.4082]   **(07 Marks)**

OR

4 a. Define: (i) Null hypothesis   (ii) Significance level   (iii) Confidence interval
             (iv) Type I error and Type II error.   **(06 Marks)**

   b. It is known that in a certain population 10 percent of the population is color blind. If a random sample of 25 people is drawn from this population, find the probability that, (i) five or fewer will be color blind. (ii) Six or more will be color blind   (iii) between 2 and 4 inclusive will be color blind.   **(07 Marks)**

   c. Explain briefly about cohort studies.   **(07 Marks)**

Module-3

5 a. A certain stimulus administrated to each of 12 patient resulted in the following increases of blood pressure: 5, 2, 8, −1, 3, 0, −2, 1, 5, 0, 4, 6 . Can it be concluded that the stimulus will increase the blood pressure? [$t_{0.05}$ for ndf = 2.201] **(06 Marks)**

b. For the following data test the hypothesis that the median measure in the population X is less than the median measure in the population Y, using Mann-Whitney U-test. Use $\alpha = 0.05$. Given $U_{0.05}(4,7) = 4$ **(07 Marks)**

X	60	45	23	32			
Y	10	25	20	54	32	65	8

c. Find the co-efficient of correlation between the height of fathers and sons from the following data: **(07 Marks)**

Height of Fathers (X)	65	66	67	68	69	70	71
Height of Sons (Y)	67	68	66	69	72	72	69

OR

6 a. Explain regression analysis. Find out regression equation of Y on X from the following data for 7 fishes of a species. **(06 Marks)**

X	25	28	35	32	31	36	29	38	34	32
Y	43	46	49	41	36	32	31	30	33	39

b. To test the hypothesis that the average number of days a patient is kept in the three local hospitals say, A, B and C is the same, a random check on the number of days that seven patients stayed in each hospital reveals the following:

Hospital A	8	5	9	2	7	8	2
Hospital B	4	3	8	7	7	1	5
Hospital C	1	4	9	8	7	2	3

Test the hypothesis at $\alpha = 0.05$ [$F_{0.05}(2, 18) = 3.55$] **(07 Marks)**

c. The samples of sizes 9 and 8 give the sum of squares of deviations from their respective means equal to 160 inches^2 and 91 inches^2 respectively. Can these be regarded as drawn from same normal population? $\left[F_{0.05}(8,7) = 3.73\right]$. **(07 Marks)**

Module-4

7 a. Explain and illustrate the randomized block design. **(06 Marks)**
b. Discuss biological study design with an example. **(07 Marks)**
c. Explain the random effect regression **(07 Marks)**

OR

8 a. Under what circumstances stratified random sampling design is considered appropriate? How would you select such sample? Explain by means of an example. **(06 Marks)**
b. Discuss multiple source of variation. **(07 Marks)**
c. Explain briefly the different types of informal study design. **(07 Marks)**

Module-5

9 a. What are the general rules to write SAS program? **(06 Marks)**
b. Explain the decision statement available in SAS program with syntax and example. **(07 Marks)**
c. Write a SAS program to find the area of a circle. **(07 Marks)**

OR

10 a. Explain importing and exporting data with syntax in SAS. **(06 Marks)**
b. Mention SAS arithmetic operators with an example. Discuss the different types of variables in SAS. **(07 Marks)**
c. Discuss the following syntax used in SAS program:
(i) PROC FREQ   (ii) PROC UNIVARIATE   (iii) TABLES
(iv) PROC TTEST   (v) PROC REG   (vi) PROC CORR **(07 Marks)**

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