SARDAR PATEL UNIVERSITY
External Examination
M.Sc. (Biochemistry) Semester –II
Subject: PS02EBIC21- Biostatistics
Saturday, 30ᵗʰ March, 2019

Time: 02:00 p.m. to 05:00 p.m.   Total marks: 70

Note: *Figures to right side indicate marks.*

Q.1 Choose the most appropriate alternative for the following: [8]

1. Editing of primary data is done for:
    - A) Completeness
    - B) Consistency
    - C) Accuracy
    - D) All of Above
    - E) None of Above

2. Analysis of variance is a statistical method of comparing the _____ of several populations.
    - A) Standard Deviation
    - B) Mean
    - C) Variances
    - D) Median
    - E) None of Above

3. Binomial probability distribution is suitable for handling probability of _____ random variable.
    - A) Individual
    - B) Discrete
    - C) Continuous
    - D) All of Above
    - E) None of Above

4. To verify whether two dependent samples have been drawn from populations having equal means, which test if most suitable?
    - A) Paired t-test
    - B) Two sample t-test
    - C) ANOVA
    - D) Chi-square test
    - E) None of Above

5. The value of second quartile (Q_2) is equals to:
    - A) Mean
    - B) Mode
    - C) 75ᵗʰ Percentile
    - D) 4ᵗʰ Deciles
    - E) None of Above

6. The shape of percentile curve is similar to the shape of _____
    - A) Less than Ogive
    - B) More than Ogive
    - C) Frequency Polygon
    - D) Frequency Curve
    - E) None of Above

(P.T.O)

7. Events are said to be _____ when one does not occur more often than the others.

    B) Mutually Exclusive   B) Equally likely

    C) Dependent   D) All of Above

    E) None of Above

8. In positively skewed distribution relation between mean, median and mode is:

    A) Mean > Median > Mode   B) Mean < Median < Mode

    C) Median > Mean > Mode   D) All of Above

    E) None of Above

Q.2 Attempt _any seven_ of the following: **[14]**

1. Define statistics and explain various sequential stages of statistical investigation.

2. Give the relationship between A.M., H.M. and G.M. and prove it.

3. Enlist the various measures of dispersion. Discuss anyone of them with its importance.

4. State BAYES' theorem and derive the BAYES' Equation.

5. Define sample. Write down the merits and demerits of sample survey.

6. Differentiate between paired t-test and two sample t-test.

7. Explain various types of correlation with the help of scattered diagrams.

8. State the addition theorem and prove it.

9. What are Type I and Type II errors in probability?

Q.3 A. Compute Skewness (β_1) and Kurtosis (β_2) and comment on the symmetry and peakness of the curve.   **[6]**

No. of leaves	40-50	50-60	60-70	70-80	80-90
No. of Plants	10	25	30	23	12

B. Draw (i) Histogram (ii) Frequency polygon and (iii) Percentile curve using following data in your answer sheet: **[6]**

Molecular weight in Mole	10-15	15-20	20-25	25-30	30-35	35-40	40-45
No. of Protein	12	24	32	20	17	17	13

OR

B. Give equations for computing Kelly's coefficient of skewness with the meaning and equation of each symbol in equation.   **[6]**

Q.4 A. Calculate value of coefficient of variation for following data. [6]

No. of leaves	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of flowers	5	9	13	21	20	17	7	3

B. Calculate value of mode for following data. [6]

No. of leaves	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of flowers	5	9	13	21	20	17	7	3

OR

B. From the following data obtain the regression equations of X on Y and Y on X. [6]

Sr. No.	1	2	3	4	5
No. of Proteins	6	2	10	4	8
No. of Active sites	9	11	5	8	7

Q.5 A. Define and describe statistical inference? Discuss various steps of hypothesis testing; also discuss about four possibilities of results when hypothesis is tested in statistic. [6]

B. The manufacturer of certain makes drug claims that his drugs have a mean dissolution time of 25 minutes with standard deviation of 5 minutes. A random 6 sample of such drug were taken to test dissolution time and it gave the following dissolution time : [6]

Dissolution time of six drugs in minutes	24	26	30	20	20	18

Carry out "t – test" for the data and comment on the claim of the manufacturer is valid or not at 1% level of significance. (Value of "t" at 1% level of significance is 4.032)

OR

B. Sperm sample was analyzed for having normal or abnormal morphological features. 400 sperms were analyzed and found that 216 sperms were abnormal. Test the hypothesis that the sperm sample has 50% of normal and 50% of abnormal sperms in it by using the standard error for testing the number of successes at 5% level of significance. (at 5% level of significance value of S.E. = 1.96SE) [6]

(P.T.O)

Q.6 A. Find value of value of Karl Pearson's coefficient of correlation for the following data. [6]

No. of leaves (X)	48	35	17	23	47
No. of flowers (Y)	45	20	40	25	45

B. A certain drug is claimed to be effective in curing colds. In an experiment on 328 people with [6] colds, half of them were given the drug and half of them given sugar pills. The patients' reactions to the treatment are recorded in the following table. Test the hypothesis that the drug is no better than sugar pills for curing colds (For $\upsilon = 2$, value of χ^2 at 5% level of significance is 5.99)

	Helped	Harmed	No Effect
Drug	104	20	40
Sugar Pills	88	24	52

OR

B. Two random samples were drawn from two normal population and their values are as follows: [6]

Sample 1	66	67	75	76	82	84	88	90	92	--	--
Sample 2	64	66	74	78	82	85	87	92	93	95	97

Test whether the two populations have the same variance at the 5% level of significance using "F" test. (For $\upsilon = 10$ and $\upsilon = 8$, value of F at 5% level of significance is 3.36)

*****X*****

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