

SARDAR PATEL UNIVERSITY
MSc (I/II/III/IV Semester) Examination

Wednesday, 12 December 2012

10.30 am - 1.30 pm

PS02EBIT01/PS01EBIC01/PS01EBOT01/PS04EBIT06/PS01EMIC01/
PS03EZOO01 - Biostatistics

Total Marks: 70

Q1. Choose the most appropriate option for each question. [8]

- a. Box and whisker plots are uniform in their use of the box; the band near the middle of the box is always the _____.
- A) 50th Percentile B) Mean
C) 4th Quartile D) All of Above
E) None of Above
- b. In statistical table row heading is called as:
- B) Stub B) Caption
C) Headnote D) Rowhead
E) None of Above
- c. The difference between the largest and the smallest data values of given data set is designated as:
- A) Coefficient of variation B) Interquartile range
C) Variance D) Range
E) None of Above
- d. Regression models predict a value of the Y variable given known values of the X variables if prediction value is within the range of values in the dataset used for model-fitting is known as.
- A) Extrapolation B) Homoscedasticity
C) Interpolation D) Ordered logit
E) None of Above
- e. The following is the probability of getting at least one head in two throws of an unbiased coin.
- A) 3/6 B) 3/4
C) 1/4 D) 2/4
E) None of Above

- f. Grouping table method is used to ascertain mode of the data series, this table has _____ columns in it.
- A) IV
 - B) V
 - C) VII
 - D) VI
 - E) None of Above
- g. In statistics the degree of freedom (ν) depends upon:
- A) Number of parameter estimated
 - B) Sample size
 - C) Number of items
 - D) A & B Both
 - E) None of Above
- h. From following which is the distribution free statistical test.
- A) t - test
 - B) F - test
 - C) Z - test
 - D) χ^2 - test
 - E) None of Above

Q2. Answer the following questions (Any seven): [14]

- a. Explain frequency polygon and give its advantages over histogram.
- b. Define various types of mean used in statistics. Discuss about relationship among them and prove it.
- c. Explain various parts of table with diagram.
- d. Define mutually exclusive and not mutually exclusive events. Give biological example for both and also explain appropriate theorem for both.
- e. Define the class limits and class boundaries. How it differs from each other?
- f. What is Null hypothesis? Explain various types of errors in testing a hypothesis.
- g. Define regression. Discuss importance of regression analysis in life-science.
- h. What is Variance Ratio Test? Discuss assumptions on which this test is based on.
- i. Explain most widely used non-parametric test in statistical work.
- j. Define and explain Kurtosis.

Q3. Answer the following questions:

- a. Calculate the Quartile Deviation (Q.D.) and Mean Deviation (M.D.) from the mean for following data: [6]

A.A.Range	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Proteins	6	5	8	15	7	6	3

- b. Calculate Mean, Median, Harmonic Mean and Geometric mean of the following data: [6]
2, 6, 10, 14, 8, 16, 18, 20, 3

OR

- b. What is primary and secondary data? Explain the stratified method for collection of data. [6]

Q4. Answer the following questions:

- a. By using grouping and analysis table check whether the given data is bimodal or not [6]
Calculate mode for following data by using appropriate equation:

Similarity score	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of seq.	5	9	13	21	20	18	8	3

- b. List different types of t-test. Explain the paired t-test with its importance. [6]

OR

- b. Compute coefficient of variation from the following data and comment on their consistency. [6]

Molecular Weight of Class A proteins	15	10	07	05	03	02
Molecular Weight of Class B proteins	20	10	05	04	02	01

Q5. Answer the following questions:

- a. Calculate mean, median and mode for following data and comment on the skewness of the data distribution: [6]

No. of leaves	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of Plants	5	9	13	21	20	18	8	3

- b. The following data represents the yields of alcohol in milliliter form two different microorganism. [6]

Microorganism A	60	65	71	74	76	82	85	87		
Microorganism B	61	66	67	85	78	63	85	86	88	91

Test whether the two samples have same variance at 5% level. (For $v_1 = 9$ and $v_2 = 7$, $F_{0.05} = 3.68$)

OR

- b. Explain Bar Charts and Box Plots. [6]

Q6. Answer the following questions:

- a. A certain drug is claimed to be effective in curing colds. In an experiment on 328 people with cold, 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 $v = 2$, $\chi^2_{0.05} = 5.99$ $v = 1$, $\chi^2_{0.05} = 3.84$ $v = 3$, $\chi^2_{0.05} = 7.81$ $v = 4$, $\chi^2_{0.05} = 9.49$) [6]

	Helped	Harmed	No effect
Drug	104	20	40
Sugar pills	88	24	52

- b. The effectiveness of growth of medical plants in 10 areas, the preferences for farming these medical plants area wise taken from two Botany Professors A and B respectively. Their preference of ranking are given below: [6]

Professor	Area of Farming									
	1	2	3	4	5	6	7	8	9	10
A	6	5	3	10	2	4	9	7	8	1
B	4	9	8	1	2	3	10	5	7	6

Calculate the Spearman's correlation coefficient and give your finding about these two professors preferences.

OR

- b. List the method for study the correlation. Explain the scatter diagrams in detail. [6]