Statistics Question Bank

First Paper

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Contents

Chapter 1

Statistics, Variable and Concepts of Different Symbols

1.1 Creative Questions

1. **Income and expenditure (both in thousands) of some individuals are collected:**

Income (x)	20	30	25	10
Expenditure (y)	15	27	18	5

   (a) What is a discrete variable? 1

   (b) Can fractional numbers be discrete? Explain briefly. 2

   (c) Are, in the stem, $\sum_{i=1}^{n}\sum_{i=1}^{n} x_i y_j = \sum_{i=1}^{n} x_i y_i$? Show statistically. 3

   (d) Prove empirically that sum of square is unequal to square of sum of numbers. 4

2. **Call duration of 6 calls in a customer care center are**

   2, 2.5, 1.5, 5, 6, 3

   (a) What is a sample? 1

   (b) Are all quantitative variables continuous? 2

   (c) Determine $\sum_{i=1}^{7}(x_i - 3)^3$ 3

   (d) Find the values of $\sum_{i=1}^{7}(x_i - 5)^2$ and $\sum_{i=1}^{7} x_i^2 + 5$. 4
   Explain mathematically why they are unequal.

3. **Below are some information**

$x_1 = 3, x_2 = 4, x_3 = 1, x_4 = 0$
$y_1 = 1, y_2 = 5, y_3 = 0, y_4 = 2$

(a) What is a qualitative variable? 1

(b) Find $\sum_{i=1}^{4} x_i^2$ 2

(c) Prove that $\sum_{i=1}^{4}(x_i + y_i) = \sum_{i=1}^{4} x_i + \sum_{i=1}^{4} y_i$ 3

(d) Find the value of $\sum_{i=1}^{4} x_i y_i - \sum_{i=1}^{4} x_i + 4$ 4

1.2 Short Questions

Chapter 2

Data Collection, Presentation, and Organization of Data

1. **Frequency distribution of marks in statistics of a college is given in the following table.**

Marks	Number of Students Group - A	Number of Students Group - B
25-30	11	10
30-35	18	16
35-40	21	22
40-45	26	28
45-50	14	9

   (a) What is data 1

   (b) What are the disadvantages of secondary data? 2

   (c) Calculate the arithmetic mean of Group - A 3

   (d) Compute the combined mean. Is it greather than the arithmetic mean of Group - B? Explain the possible reason(s). 4

2.1 Creative Questions

2.2 Short Questions

Chapter 3

Measures of Central Tendency

3.1 Creative Questions

1. **In the test examination, marks of 11 students in statistics are: 90, 92, 93, 49, 44, 88, 80, 58, 83, 71, 76.**

   (a) What is central tendency? 1

   (b) When is median better than arithmetic mean? Explain with an example. 2

   (c) Find the 3rd the quartile and 61st percentile from the data and explain. 3

   (d) Do quantiles depend on change of origin and scale. Prove using two examples. 4

2. **The arithmetic and geometric means of the first and third quartiles of a distribution are 10 and 8, respectively. The second quartile is 10.**

   (a) What is the formula suggested by Pearson to find skewness? 1

   (b) Which moments are useful in measuring central tendency and dispersion? 2

   (c) Find skewness from the stem using a suitable formula. 3

   (d) Which method of finding skewness od you think is the best and why? 4

3. **Scores of a batsman in the last 20 innings are**

   28, 30, 16, 48, 50, 86, 105, 20, 10, 36,
   12, 25, 20, 35, 65, 12, 10, 76, 55, 32

   (a) Write down the formula of weighted harmonic mean 1

   (b) Can median be a better measure of central tendency than arithmetic mean for this data? 2

(c) Draw a stem and leaf plot from the data and explain. 3

(d) Make a frequency distribution from the data and also find and interpret cumulative 4
frequencies and percentages.

3.2 Short Questions

Chapter 4

Measures of Dispersion

4.1 Creative Questions

1. **Temperatures of two cold regions for five days are as below:**

   City A: 2, 1, -1, 0, 3

   City B: 3, 0, -2, 2, 3

   (a) What is standard deviation?? 1

   (b) Is standard deviation of a set of negative values negative? Justify mathematically. 2

   (c) Find Mean Deviation about mean of the values of city A. 3

   (d) Which city has more consistent weather? Verify statistically. 4

4.2 Short Questions

Chapter 5

Moments, SKewness, and Kurtosis

5.1 Creative Questions

1. **For a particular data set, Median = 120, Mode = 110, Standard Deviation = 4, and Coefficient of Variation (CV) = 3.2**

   (a) Why is CV used? 1

   (b) Find arithmetic mean.. 2

   (c) Find skewness according to Pearson's method (SK_P) 3

   (d) Does (SK_P) convey the proper idea about the data as to the given information? Justify. 4

1. **US Dollar exchange (to taka) in Bangladesh since 1980 to 2005 (after each 5 years) were:**
   16, 31, 36, 40, 52, 64

   (a) What are moments? 1

   (b) Which moment is equal to the variance? Show mathematically. 2

   (c) Find, from the stem, the first and second raw moments about 1. 3

   (d) Find skewness and kurtosis of and explain. 4

2. **The first four moments about 3 of a distribution are -1, 5, -10, and 120.**

   (a) What are moments used for? 1

   (b) Can the second central moment be greater than the third central moment? 2

   (c) Find the second and third moments about arithmetic mean of the distribution. 3

   (d) Find skewness and kurtosis and comment on the values. 4

3. **Marks obtained by a student in 7 subjects are**

70, 66, 55, 45, 80, 30, 82

(a) What is negative skewness? 1

(b) Draw graphs of positive and negative skewness showing the locations of mean and median. 2

(c) Determine the five number summary from the stem and explain. 3

(d) Are the data symmetric? If not, comment on the pattern of data. 4

5.2 Short Questions

Chapter 6

Correlation and Regression

6.1 Creative Questions

6.2 Short Questions

Chapter 7

Time Series

7.1 Creative Questions

1. **GDP (in bn. US$ PPP) of Bangladesh since 1980 to 1985 according to an estimate of International Monetary Fund: 41.2, 47.4, 52.0, 56.5, 61.0, 65.3**

   (a) What is time series data? 1

   (b) What are the components of a time series model? 2

   (c) Determine the 3-yearly moving average from the data. 3

   (d) Find trend of the data using another method (other than (c)), plot both, and comment which is better. 4

2. **Annual sales of company are as given in the following**

Year	2010	2011	2012	2013	2014	2015	2016
Profit (million)	40	45	46	53	65	70	73

   (a) What is a trend? 1

   (b) Do the data in the stem seem to have a trend? 2

   (c) Find the trend using semi-average method. 3

   (d) Find the trend using 2-yearly moving average method. Would it better if we used 3-yearly method? 4

3. **Income of a freelancer in 6 successive months (from Jan to Jun) was found to be 46.0, 49.5, 51.5, 50.6, 56.5, and 60 (in thousands BDT.).**

   (a) What is time series data? 1

   (b) What are the components of a time series model? 2

   (c) Determine the 3-monthly moving average from the data. 3

   (d) Draw the moving averages on a graph paper and interpret. 4

7.2 Short Questions

Chapter 8

Published Statistics in Bangladesh

8.1 Creative Questions

8.2 Short Questions

Conclusion

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