**B.Sc.–I 1st Semester (Hons.) Examination,**

**November–2014**

**MATHS**

**Paper–BHM–115**

**Descriptive Statistics**

*Time allowed : 3 hours ]* *[ Maximum marks : 60*

***Note :*** *Attempt **five** questions in all, selecting **one** question from each of the section. **Question No. 9 is compulsory**.*

## Section–I

**1.** (a) What are the various methods of collecting 'Primary data' ? State briefly their merits and demerits.

(b) What part does classification play in statistics ? Discuss the different methods of classification.

**2.** (a) Construct a stem and leaf display for the following data :- 48, 57, 74, 62, 68, 75, 52, 66, 78, 94, 87, 82, 44, 73.

(b) Draw a cumulative frequency curve from the following data :

| Marks | 10–20 | 20–30 | 30–40 | 40–50 | 50–60 | 60–70 | 70–80 | 80–90 | 90–100 |
|---|---|---|---|---|---|---|---|---|---|
| Frequency | 1 | 3 | 6 | 11 | 9 | 11 | 7 | 6 | 4 |

## Section–II

**3.** (a) Find out mean from the following data :

| Wages in Rs. (less than) | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
|---|---|---|---|---|---|---|---|
| No. of workers | 5 | 12 | 20 | 25 | 28 | 40 | 50 |

(b) Calculate the G.M. from the following data :

| Size | 8 | 10 | 12 | 14 | 16 | 18 |
|---|---|---|---|---|---|---|
| Frequency | 6 | 10 | 20 | 8 | 5 | 1 |

**4.** (a) What do you understand by mean deviation about Mean ? What are the merits and demerits of mean deviation ?

(b) If $n_1$, $n_2$ are the sizes $\bar{x}_1$, $\bar{x}_2$ and $\sigma_1$, $\sigma_2$ the standard deviations of two series, then the standard deviation $\sigma$ of the combined series of size $n_1 + n_2$ is given by

$$\sigma^2 = \frac{1}{n_1 + n_2}\left[n_1\left(\sigma_1^2 + d_1^2\right) + n_2\left[\sigma_2^2 + d_2^2\right]\right]$$

Where $d_1 = \bar{x}_1 - \bar{x}$, $d_2 = \bar{x}_2 - \bar{x}$ and $\bar{x} = \dfrac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$

is the mean of the combined series.

## Section–III

5. (a) The first four moments of a distribution about $x = 4$ are 1, 4, 10 and 45. Find $\mu_2$, $\mu_3$ and $\mu_4$.

(b) For the following data, calculate (I) coefficient of variation (II) $\beta_1$ and (III) $\beta_2$ coefficients

| Wages in Rs. | No. of Persons |
|---|---|
| 170 – 180 | 52 |
| 180 – 190 | 68 |
| 190 – 200 | 85 |
| 200 – 210 | 92 |
| 210 – 220 | 100 |
| 220 – 230 | 95 |
| 230 – 240 | 70 |
| 240 – 250 | 28 |

6. (a) Find the limits for Karl Pearson's Coefficient of skewness.

(b) In calculating the moments of a frequency distribution based on 100 observations, the following results are obtained :

Mean = 9, Variance = 19, $\beta_1 = 0.7$, $\beta_2 = 4$

But later on it was found that one observation 12 was read as 21. Obtain the correct values of $\beta_1$ and $\beta_2$.

## Section–IV

7. (a) Find the remaining class frequencies, given the following data : N = 23713, (A) = 1618, (B) = 2015, (C) = 770, (AB) = 587, (AC) = 428, (BC) = 335, (ABC) = 156.

   (b) Given (A) = 50, (B) = 60, (C) = 50, (Aβ) = 5, (Aγ) = 20, N = 100, find the greatest and the least possible values of (BC) so that the data may be consistent.

8. (a) Find the angle between two regression lines.

   (b) The lines of regression in a bivariate distribution are : $X + ay = 7$ and $y + ux = \frac{49}{3}$

   Find (i) The coefficient of correlation

   (ii) the ratios $\sigma_x^2 : \sigma_y^2$ : Cov (X, Y)

   (iii) the means of the distribution

   (iv) find the value of x when y = 1

## Section–V

9. (a) Explain the various sources of collecting secondary data.

(b) Convert the following frequency distribution into cumulative one :

| Marks | Below 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 |
|---|---|---|---|---|---|
| No. of students | 5 | 7 | 8 | 6 | 4 |

(c) If 8 players averaged 100 kg in weight and 12 players averaged 90 kg, find the combined average weight of all the 20 players.

(d) Calculate standard deviation of the following data : 20, 24, 22, 31, 27, 29, 30, 25

(e) A frequency distribution gave the following results :

(i) $C - V = 5$

(ii) Karl Pearson's Coefficient of skewness = 0.5

(iii) $\sigma = 2$

Find the mean and Mode of the distribution.

(f) The coefficient of corrolation between X and Y is 0.6. Their covariance is 4.8. The variance of X is 9, then find variance of Y.