

**B.A. (Honours) Examination, 2023**

**Semester-I**

**Economics**

**Course: SEEC01 (NEP)**

**(Statistical Methods - I)**

**Time: Three Hours**

**Full Marks: 60**

*Questions are of value as indicated in the margin*

Answer any six questions

1. (a) Explain the following with suitable examples:

(i) Variables and attributes

(ii) Continuous and discrete variables.

(b) Following are the weights of 20 apples (in gm). Construct a frequency table with the help of tally marks using class intervals (in grams) as (61-80), (81-100), (101-120), (121-140) and (141-160).

130, 62, 145, 118, 125, 76, 151, 142, 110, 98  
95, 116, 100, 103, 71 85, 80, 122, 132, 95

6+4 = 10

2. (a) Distinguish between class limits and class boundaries in the context of a grouped frequency distribution. How class boundaries are calculated from class limits?

(b) For the following frequency distribution, calculate the class boundaries, class widths and frequency densities corresponding to the five classes

Class	10 - 19	20 - 29	30 - 49	50 - 79	80 - 89
Frequency	15	20	30	23	12

4+6 = 10

3. (a) What are the 'less than' and 'greater than' type cumulative frequencies? What is 'ogive'? Using the frequency table given in question 2(b) above, calculate the cumulative frequencies and draw the two ogives.

(b) What are 'quartiles'? How do you calculate the quartiles for a simple frequency distribution?

6+4 = 10

4. (a) Define Arithmetic Mean (A.M.) of a set of observations  $x_1, x_2, \dots, x_n$ . How would your answer change if these values are associated with frequencies  $f_1, f_2, \dots, f_n$  respectively? How would you calculate A.M. for a grouped frequency distribution?

(b) Can you think of situation when A.M. cannot be calculated for a grouped frequency distribution? What can be an alternative measure of central tendency in such situations?

(c) The A.M. of the following frequency distribution is known to be 67.45 inches. Calculate the missing frequency ( $f_3$ ).

Height (inches)	60 - 62	63 - 65	66 - 68	69 - 71	72 - 74
Frequency	15	54	$f_3$	81	24

3+2+5=10

(.....continued)

5. (a) Define Geometric Mean (G.M.) and Harmonic mean (H.M.) for a set of observations  $x_1, x_2, \dots, x_n$  with frequencies  $f_1, f_2, \dots, f_n$  respectively. When are they considered as better measures of central tendency compared to A.M.? Give examples.

(b) Out of the total workforce in a coal mine, 50 percent of workers perform their duty underground while the rest works above at the ground level. Workers at ground level are paid Rs 20,000 per month. But those who work underground get 20 percent additional salary as their work is associated with higher risk. What is the mean salary per month in that coal mine? 6+4=10

6. (a) The marks (out of 100) obtained by 7 students in an examination are 29, 32, 33, 37, 41, 45 and 96. Find the average marks using a suitable form of average. Give reasons for your choice.

(b) A shoe dealer has the following sale statistics of a particular model during a month:

Shoe size	4	5	6	7	8	9	10
Number of pairs sold	2	5	7	20	35	10	1

What should be an appropriate measure of central tendency in this context?

(c) Does 'mode' always exist for a frequency distribution? Explain.

(d) How would you calculate mode for a grouped frequency distribution? 3+2+2+3=10

7 (a) For a set of observations  $x_1, x_2, \dots, x_n$  with frequencies  $f_1, f_2, \dots, f_n$  respectively, define the alternative absolute measures of dispersion.

(b) Why Quartile Deviation is a better measure of dispersion compared to Range?

(c) For a frequency distribution with open ended classes, which absolute measure of dispersion can you use?

(d) What is Coefficient of Variation? Why is it a 'relative measure' of dispersion?

4+2+2+2=10

8. (a) Define Mean Absolute Deviation. For the set of observations 31, 33, 34, 36, 37, 39, 40, calculate the mean deviation about their median.

(b) If  $x_1, x_2, \dots, x_n$  is a set of observations with frequencies  $f_1, f_2, \dots, f_n$ , and  $y_i = x_i - 10$ , then show that standard deviations of  $x$  and  $y$  are the same. 5+5=10