Indian Statistical Institute

Documentation Research and Training Centre
M.S. (Library and Information Science)
2nd Semester Mid-term Examination (2022-2024)

Paper 09: Elements of Mathematics and Statistics

Time: 10.00 AM - 11.30 AM **Max. Marks: 40** **Date: 22-02-2023**

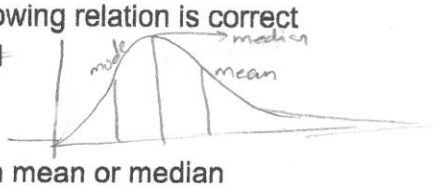
[**Instruction**: Read the question before you attempt. Only question no. 16 has two options, attempt any one. Rest all questions are mandatory.]

Section A

[1x11 = 11]

1) Which of the following divides a group of data into four subgroups?
   a) Median b) Quartiles c) Percentiles d) Standard Deviation

2) For a positively skewed curve which of the following relation is correct
   a) The mean, median, and mode are equal
   b) Median is greater than mean
   c) Mean is greater than the median
   d) Standard deviation must be greater than mean or median



3) Which of the following is not based on all the observations?
   a) Arithmetic Mean b) Mode c) Harmonic mean d) Geometric Mean

4) Data collected in the Population Census Report is
   a) Secondary data b) Primary data c) Ungrouped data d) Arrayed data

5) If a distribution is abnormally tall and peaked, then it can be said that the distribution is:
   a) Platykurtic b) Mesokurtic c) Pyrokurtic d) Leptokurtic

6) According to the empirical rule, approximately what percent of the data should lie within $\mu \pm 2\sigma$?
   a) 95% b) 75% c) 68% d) 99.7%

7) Which dispersion is used to compare the variation of two series?
   a) Standard Deviation c) Coefficient of Deviation
   b) Quartile Deviation d) Mean Deviation

8) Which of the following data sets has a mean of 10 and standard deviation of 0?
   a) 10, 10, 10 b) 0, 10, 20 c) 15, 15, 15 d) 0, 0, 0

9) Choose the following statement(s) that describes 'class frequency'?
   a) Always contains at least 5 observations
   b) The difference between consecutive lower class limits
   c) Usually a multiple of the lower limit of the first class
   d) The number of observations in each class

10) The mode of the distribution is 8. What is the median of the distribution, given that the median of the distribution is twice of its arithmetic mean
   a) 2 b) 4 c) 8 d) 10

11) If A = { 7, 2, 20, 4, 0, 9}, then n[P(A)] is

Section B

12) **(i)** A school librarian wants to conduct a survey on student satisfaction with library services. You were tasked with contacting your classmates for their opinion and then presenting it to your librarian. Would you say this population or sample data? Also explain why it is so?

(ii) Classify the following variables as continuous and discrete
   a. The number of automobile accidents each year in India
   b. Time taken to solve a problem
   c. The annual milk consumption by a family from 2010 to 2022
   d. The number of eggs laid each month by a hen

(iii) If R is a set of real numbers and Q is a set of rational numbers, then what is R-Q?

[2+2+1]

13) There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1, 50 to chemical C_2, and 30 to both the chemicals C_1 and C_2. Find the number of individuals exposed to
   a. Chemical C_1 but not chemical C_2
   b. Chemical C_2 but not chemical C_1
   c. Chemical C_1 or chemical C_2
   d. Draw the venn diagram for the same

[5]

14) **(i)** Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 owned both A and B cars. Is this data correct? Give an explanation for your answer.

(ii) Let U be the set of all triangles in a plane. If **A** is the set of all triangles with at least one angle different from 60°, what is **A'**?

[2+3]

15) Fill in the blanks:
   (i) $A \cup A' = \ldots$
   (ii) $\varphi' \cap A = \ldots$
   (iii) $A \cap A' = \ldots$
   (iv) $U' \cap A = \ldots$

[4]

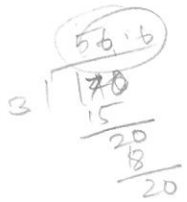
16) **(a)** The marks obtained by 30 students of Class X of a certain school in a Mathematics paper consisting of 100 marks are presented in the table below. Find the mean and mode of the marks obtained by the students. Also compare and interpret the mode and the mean.

Marks obtained (x_i)	10	20	36	40	50	56	60	70	72	80	88	92	95
Number of students (f_i)	1	1	3	4	3	2	4	4	1	1	2	3	1

Which measure of central tendency is most suitable? Justify.

OR

(b) Discuss and illustrate various graphical representation techniques in detail. [10]



10 – 20

20 - 30

30 - 40