

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: IMSC  
BRANCH: QEDS

SEMESTER : I  
SESSION : MO/2022

SUBJECT: ED103 STATISTICAL METHODS II

TIME: 3 Hours

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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| Q.1(a) In the frequency distribution of heights (in cm) of 500 students, the frequency of the class interval 130-134, defined in terms of class-limits is 40. Find, for this class, (i) class-boundaries, (ii) class-mark, (iii) relative frequency, (iv) class width and (v) frequency density. [5] | 1  |
| Q.1(b) Given that the cumulative frequencies of less-than type and more-than type corresponding to a class interval are 320 and 230 respectively, when the total frequency is 500. Find the frequency of the interval. [5]   | 1  |
| Q.2(a) If a variable x takes the values 1, 2, ..., r with $F_1, F_2, \dots, F_r$ as the corresponding more-than type cumulative frequencies, then prove that $\bar{x} = \frac{1}{n} \sum_{i=1}^r F_i$ . [5]  | 2  |
| Q.2(b) A student obtained the mean and standard deviation of 100 observations as 40.1 and 5.0 respectively. It was later found that he copied 50 wrongly instead of the correct value 40. Find the correct mean and correct standard deviation. [5]  | 2  |
| Q.3(a) A variable takes only two distinct values a and b, each with equal frequency. Find the second, third and fourth central moments. [5]  | 3  |
| Q.3(b) If x and y are uncorrelated variables and their standard deviations are 3 and 4, respectively, find the correlation coefficient between $5x + 2y$ and $2x - 5y$ . [5]   | 3  |
| Q.4(a) For 5 pairs of values of x and y, the values of x+y are 24, 28, 30, 33, 35 and variances of x and y are 6 and 2 respectively. Calculate the correlation coefficient between x and y. [5]  | 3  |
| Q.4(b) Define multiple correlation coefficient and partial correlation coefficients. [5]   | 5  |
| Q.5 If x and y are two correlated variables with correlation coefficient r and having the same variance, find the regression coefficient of x on (x+y) and that of (x+y) on x. Hence find the correlation coefficient between x and (x+y). [10]  | 4  |

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