CSC164-2079 ✡

Tribhuvan University

Institute of Science and Technology

2079

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Bachelor Level / First Year/ Second Semester/ Science
Computer Science and Information Technology **(STA. 164)**
(Statistics I)
NEW COURSE

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long answer questions.

Attempt any **TWO** questions. **(2×10=20)**

1. What do you understand by measures of central tendency and dispersion in descriptive statistics? What are the different measures of dispersion? The grouped frequency distribution in the table represents the masses of a sample of 50 of the people from the data file, "Brain size".

Mass (lbs.)	1-2	2-3	3-4	4-5	5-6	6-7
Frequency	8	10	15	9	6	2

Compute mean, standard deviation, variance and coefficient of variation and interpret them.

2. Discuss the meaning of (i) positive (ii) negative (iii) perfect correlation between two variables.The following show the improvement (gain in reading speed) of 8 students in a speed reading program and the number of weeks they have been in program.

Number of weeks	4	5	3	9	7	10	4	5
Speed gain (words per minute)	85	120	48	192	164	234	74	110

   a. Compute correlation coefficient and interpret its result.
   b. Find the regression equation of speed gain on number of weeks.
   c. Estimate speed gain of a student who has been in program for 6 weeks and interpret the slope of the line.

3. The joint density function of two continuous random variables X and Y is

   $f(x,y) = kxy \quad 0<x<4,\ 1<y<5$
   $= 0 \quad$ otherwise

   (a) Find the value of constant k. (b) Find $P(x>3, y<2)$ (c) Find $P(1<x<2,\ 2<y<3)$.

Section B

Short answer questions.

Attempt any **EIGHT** questions. **(8×5=40)**

4. Differentiate between primary data and secondary data. What are the sources of secondary data?

5. What is sampling? Define simple random sampling and stratified random sampling with some relevant examples.

6. What aspects of summary measures of data can be explained by the measures of skewness ? Kelvin Horn is the national sales manager for National Text Books. He has a sales staff of 10 who visit college professors all over the United States. Each Sunday morning he requires his sales staffs to send him a report. Listed below are the number of visits last week.

25	6	10	13	15	2	18	5	20	30

Compute the five number summary.

7. What are the requisites for good average? From the following distibution of marks 200 students of a college:

Marks	30-40	40-50	50-60	60-70	70-80	80-90
No. of students	14	50	60	45	20	11

Compute (i) the minimum marks obtained by top 10% students.
(ii) modal marks.

8. The first four moments of a distribution about x=2 are 1, 2.5, 5.5, and 16. Calculate the first four moments about the mean. Test the skewness and kurtosis. Interpret the results.

9. Define independent and mutually exclusive events. Three groups of children contain respectively 2 boys and 2 girls, 3 boys and 1girl, 1 boy and 3 girls respectively. One child is selected at random from each group. Find the probability of selecting one boy and two girls.

10. What is conditional probability? Three roads A,B and C lead away from a jail. A prisoner escaping from the jail selects a road at random. If road A selected, the probability of escaping is 1/10. Similarly for road B it is 1/8 and for road C it is 1/5.
(i) What is the probability that the prisoner will succeed in escaping?
(ii) If the prisoner had succeeded in escaping, what is the probability the he had chosen the road A?

11. Define binomial distribution. Under what conditions is the binomial distribution appropriate? The probability of a novice archer hitting the target with any shot is 0.3. Given that the archer shoots six arrows, find the probability that the target is hit at least one.

12. State features of normal distribution. In a photographic process, the developing time of prints as a random variable having normal distribution with mean of 18.25 seconds with standard deviation 0.34 seconds. Find the probability that at least 17 .64 seconds to develop one of the prints.

13. Define random variable. If X is the number of points rolled with a balanced die, find E(X) and variance of X. Also find expected value of random variable $g(Y) = 2X^2 + 1$.