Tribhuvan University
Institute of Science and Technology
2080
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Bachelor Level / First Year/ Second Semester/ Science
Computer Science and Information Technology **(STA 169)**
(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. Define statistics and discuss its importance in the field of computional sciences. The following are the numbers of minutes that a person had to wait for the bus to work on 20 working days: 15, 10, 2, 17, 5, 8, 3, 10, 2, 9, 5, 9, 13, 1, 10, 12, 5, 10, 8, 4. Compute mean, median ,mode, standard , variance and coefficient of variation.

2. Define normal distribution. What are the main characteristics of a normal distribution? Extruded plastic rods are automatically cut into length 5 inches. Actual lengths are normally distributed about a mean of 5 inches and their standard deviation is 0.05 inches. (i) What proportion of rods exceed tolerance limits of 4.9 inches to 5.1 inches? (ii) Proportion of rods having tolerance rod which is greater than 6.5 inches.

3. Differentiate between correlation and regression analysis. Raw materials used in the production of synthetic fiber are stored in a place which has no humidity control. Measurements of the relative humidity in the storage place and the moisture content of a sample of the raw materials (both in percentage) on 10 days yielded the following results.

Humidity % (x)	48	55	30	44	36	31	62	48	42	50
Moisture content % (y)	11	13	10	12	9	7	16	11	9	14

 (i) Compute correlation coefficient between humidity and moisture content and interpret the result.
 (ii) Find the regression equation of moisture content on humidity.
 (iii) Estimate the moisture content if humidity is 45%.
 (iv) Interpret the value of regression coefficient.

Section B

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

4. What is sampling? Explain the main purpose of sampling. Describe briefly Stratified sampling.

5. What do understand by measurements of dispersion? Two batsmen A and B made the following runs in a series of cricket matches.

A	19	25	10	30	18	28	50	33	28
B	5	75	80	17	38	40	90	0	55

Who is more consistent player? Give your statistical reasoning.

6. Define skewness and kurtosis. The first four moments about the mean are 0, 14.75, 39.75 and 152.31. Compute skewness and kurtosis and interpret the results.

7. What are the partition values? From the following distibution of scores 200 students of a college:

Scores	30-40	40-50	50-60	60-70	70-80	80-90
Number of students	14	50	60	45	20	11

Compute (i) the minimum scores obtained by top 10% students (ii) the range of middle 60% students.

8. Define mutually exclusive events and independent events in probability. A problem of mathematics is given to three students, A, B and C whose chances of solving the problem are in ratio 2: 3: 5. Find the probability that (i) all of them solve the problem. (ii) none of them solve the problem.(iii) the problem will be solved.

9. Define Baye's theorem. Stores A, B and C have 100, 75 and 50 employees and, respectively,70,60 and 50 percent of these are women. Registration are equally likely among all employees regardless of sex. One employee resigns, and this is woman. What is the probability that she works in store B?

10. Under what conditions binomial probability distribution is used? Five unbiased coins are tossed 100 times and the following results were obtained:

No. of heads	0	1	2	3	4	5
Frequency	5	24	35	22	10	4

Fit the Binomial distribution.

11. Define Poisson probability distribution. Cars arrive at a petrol station at an average rate of 3 per minute. Assuming that the cars arrive at random, find the probability that (a) no cars arrive during a particular minute (b) at least one car arrive during a particular minute (c) four cars arriving per 2 minute.

12. Let X and Y be two continuous random variable having joint pdf
$f(x,y) = c (x^2 + y^2)$, $0 < x < 1$, $0 < y < 1$
        $= 0$, otherwise
Determine (a) the value of c   (b) $P(x < 0.5, y > 0.5)$.

13. Write short notes on any two : (a) Random variable and probability distribution (b) Five number summary (c) Sampling error.