Tribhuvan University

Faculty of Humanities and Social Science

Semester: III

Subject: Probability and Statistics

2023

Group B

Attempt any SIX questions

2. Discus the role of statistics in computer application.
3. Define Statistics? The following of telephone calls received at an exchange for 200 successive one-minute intervals are given below.

No of cells	0	1	2	3	4	5	6
Frequency	15	22	28	35	42	34	24

Compute the mean, median and mode...

4. Define correlation. Calculate and analyze the correlation coefficient between the number of study hours and the number of sleeping hours of different students.

No of study Hrs	2	4	6	8	10
No of Sleeping Hrs	10	9	8	7	6

Also find coefficient of determination and interpret it.

5. Define regression. The following table gives information on ages and cholesterol levels for sample of 10 men.

Age	58	69	43	39	63	52	47	31	74	36
Cholesterol level	189	235	193	177	154	191	213	165	198	181

6. Define binomial distribution. During one stage in the manufacture of integrated circuit chips, a coating must be applied. If 70% of chips received a thick enough coating, find the probability that among 15 chips
   i) at least 12 will have thick enough coatings
   ii) exactly 10 will have thick enough coatings
7. In measuring reaction time, a psychologist estimates that the standard deviation is 0.95 sec, how large a sample of measurements must be taken in order to be 95% confident that the error his estimate of mean will not exceed 0.01 second?
8. Define sampling. A population consists of the four numbers 1, 3, 4, 8. (1) Write down all possible sample size of two without replacement. (ii) Show that sample mean is an unbiased estimate of population mean.

Group C

Attempt any TWO questions

9. An analysis of monthly wages paid to workers in two firms A and B belonging to the same industry gives the following results:

	Frim A	Firm B
No of workers	500	600
Average monthly wage	186	175
Variance of distribution of wages	81	100

i) Which firm A or B, has a larger wage bill?
ii) In which firm, is there greater variability in individual wage?
iii) Calculate combined mean and combined variance of the wage of firm A and B.

10. The length of human pregnancies from conception to birth approximates a normal distribution with a mean of 266 days and a standard deviation of 16 days. (i) What probability of all pregnancies will last between 240 and 270 days? (i) What probability of all pregnancies will last more than 275 days? (iii) What probability of all pregnancies will last less than 272 days?

11. Define ANOVA. Given data, using one-way ANOVA test the hypothesis that means of three samples are equal

Sample I	4	5	6	5
Sample II	7	5	6	5
Sample III	4	8	9	2

Tribhuvan University

Faculty of Humanities and Social Science

Semester: III

Subject: Probability and Statistics

2022

Group B

Attempt any SIX questions

2. Differentiate between Convenient sampling and Systematic random sampling with suitable examples.
3. From the following data, find Mean and Median. Then use an empirical relation across mean, median and mode to find Mode.

Age group	10-20	20-30	30-40	40-50	50-60
No of months(f)	10	35	17	12	9

4. When Mean is 34.69 for 65 total observations, find the missing frequency from the following data.

Expense-class in thousand rupees	10-20	20-30	30-40	40-50	50-60
No of 5star hotels establishment	9	12	25	10	?

5. Use Karl Pearson's correlation method to examine the relationship between marks obtained in two subjects:

Students	A	B	C	D	E	F	G	H	I	J
Statistics	42	51	65	57	56	28	19	24	33	80
Mathematics	42	61	66	54	57	28	29	21	35	87

6. The number of defective articles is found to be 2% in a lot of 300 sample articles per day, then find out following probabilities using suitable probability distribution that (i) There are exactly two defective articles per day (b) there are at least 2 defective articles per day.
7. Six coins are tossed 500 times such that probability of getting a head is 21% in each toss. Fita Binomial distribution for a number of heads with the following frequency distribution:

X	0	1	2	3	4	5	6	Total
F	165	80	70	55	45	50	35	500

8. In a Hospital, the height of patients follows normal distribution with mean height of 53 inches with standard deviation of 3 inches. Then find out the following probabilities of heights of patients that: i) less than 57 inches, ii) more than 64 inches, iii) between 50 and 56 inches. Use Normal table.

Group C

Attempt any TWO questions

9. Automobile Company Sells Cars of different model during a year. Data are presented in the following table.

Prices of cars	12	13	40	15	16	70	80	90	15	77
Demand of cars	24	28	12	13	10	6	5	4	11	5

Now, fit a linear regression model of demand of cars. Interpret the intercept and slope of the model Also, find the demand of cars when price is 25 lakhs. Also, find the coefficient of determination and interpret it.

10. An analysis of daily wages, paid to workers in two firms A and B belonging to the same industry, gives the following results.

Year	Firm A	Firm B
No of workers	200	300
CV of daily wages	5	6
Variance of distribution of wages	67	86

a) Which firm A or B has a larger wage bill?

b) In which firm, A or B, is there a greater consistency or uniformity or variability in individual wages?

c) Find out the combined average of both firms A and B.

11. Perform a one-way ANOVA to differentiate average sales of computers from three electronic shops as given below at 5% level of significance:

Shop A	10	15	18	21	35
Shop B	23	45	45	55	57
Shop C	45	67	78	78	90

Which shop has a greater averages sale of computers? Use F table for Ftab (2, 12) at 5%

Tribhuvan University

Faculty of Humanities and Social Science

Semester: III

Subject: Probability and Statistics

2021

Group B

Attempt any SIX questions

2. Discus the role of statistics in computer application.
3. The following table shows the monthly salary of employees in a certain locality of Lalitpur Sub-metropolitan City:

Salary (000)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No of employees	15	22	28	35	24	20	16

4. Define the term correlation. Compute Karl Bearson's coefficient of correlation between advertisement cost and sales as per the data given below:

Advertisement costs (000)	39	65	62	90	82	75	25	98	36
Sales cost (000)	47	53	58	86	62	68	60	91	95

5. The following table gives the age of the computers of a certain company and annual maintenance costs:

Age of computers(yrs)	2	4	6	8	10
Maintenance costs (00)	10	15	22	32	46

Obtain the regression equation of maintenance cost on age of computer, Also, estimate the cost of maintenance for 10 years old computer.

6. Fit a Poisson distribution of the following data and calculate the expected frequencies:

X	0	1	2	3	4	5	6	7	8
F	56	156	132	92	37	22	4	0	1

7. Determine First Q1, D7and P80 from the following data:

Age in year	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No of people	10	11	27	35	29	17	11	10

8. A box contains 30 items of which 10 are defectives. If two items are selected randomly from the box without replacement, what is the probability that (a) Both are defective b) Both are non-defective

Group C

Attempt any TWO questions

9. The following data represents the scores made in an intelligence test by the groups of students from section A and section B of National College:

Student no.	1	2	3	4	5	6	7	8	9	10
Section A	9	8	10	6	7	6	7	8	9	10
Section B	10	8	6	8	9	8	7	8	5	8

Test which group is more consistent to make scores in the intelligence test on the basis of coefficient of variation.

10. The lifetime of a certain electronic component is a normal random variate with the expectation of 5000 hours and a standard deviation of 100 hours. Compute the probabilities under the following conditions: a) Lifetime of components is less than 3012 hours, b) Lifetime of components between 4000 to 6000 hours, c) Lifetime of components less than 4500 hours, and d) Lifetime of components more than 7000 hours
11. Perform the ANOVA form Two-Way classification.

Varieties	Blocks		
	1	2	3
A	10	9	8
B	7	7	7
C	8	5	4
D	5	4	4

Tribhuvan University

Faculty of Humanities and Social Science

Semester: III

Subject: Probability and Statistics

2020

Group B

Attempt any SIX questions

2. Write down the process of collecting Primary data.
3. Determine first quartile (Q_1) 7th Decile (D_7) and 80th Percentile (P_{80}) from the following data:

Age in Year	10	12	14	16	18	20	22	24	26
No. of People	2	11	24	35	27	17	11	8	5

4. Calculate correlation coefficient between income and expenditure in foods of certain families of Kathmandu Metropolitan from the following information

Income (000 Rs)	10	11	12	13	14
Expenditure in food (000Rs)	9	8	9	12	11

5. A box contain 50 item of which 20 are defectives. If one item is selected randomly from the box, what is the probability that it is a non-defective item?
6. What is sampling? The Standard Deviation of marks in an entrance exam in BCA students is 0.5. How large a sample must be taken in oder to be 95% confidence that the error of his/her estimate will not exceed 0.01.
7. Calculate the median and mode from following distribution

Expenditure (000Rs)	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Number in families	7	12	15	13	8	5

8. A test was given to three candidates taken at random from three province of Nepal. the scores of candidates are given below:

Gandaki	9	7	6
Lumbini	7	4	5
Bagmati	6	5	6

Carry out one-way ANOVA

Group C

Attempt any Two question

9. From the following data, determine average marks of student, standard deviation and coefficient variation

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
No of people	54	90	86	58	62	82	78	66	70

10. In a normal Distribution with mean = 200 and standard deviation = 20, Find the probability that

    i) $P(X > 180)$ ii) $P(X < 220)$ iii) $P(160 < X < 240)$

    iv) $P(X > 220)$ v) 10% value are less than what value of X?

11. Describe simple random sampling with suitable example.

Tribhuvan University

Faculty of Humanities and Social Science

Semester: III

Subject: Probability and Statistics

2019

Group B

Attempt any SIX questions

2. Describe scope and limitation of statistics.

3. Determine average wages from following data:

Wage	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70
No of worker	10	13	18	21	24	28	20	11	8

4. Calculate Karl Pearson's correlation coefficient from the following data:

Sales	43	41	36	34	50
Expenses	10	22	13	19	17

5. Estimate the marks in JAVA when the marks in statistics in 65 by using following data.

Marks in statistics	57	58	59	59	60	61	62	64
Expenses	77	78	75	78	82	82	79	81

6. Fit Bionomial Distribution from the following data where p = 0.5

No. of health	0	1	2	3	4
Frequency	28	62	46	20	4

7. How do you determine sample size in sampling? explain briefly

8. Write short notes on simple random sampling.

Group C

Attempt any Two question

9. Student's age in the regular daytime BCA program and the morning time BCA program of campus are described by two samples. If the homogeneity in age of the class is positive factor in learning make suggestions, with reason which of two groups will be easier to teach

Popular BCA Program		Morning BCA Program	
Age	Number of students	Age	Number of students
23	9	27	19
29	2	31	8
28	5	30	5
22	10	29	4
30	1	28	6
21	4	33	5
25	11	34	5
26	6	35	11
27	3	36	2
24	9	32	4
Total	60	Total	60

18. Given a normal distribution with mean 200 and s.d 20, find the probability that.

i) $P(x > 180)$ ii)$P(x < 220)$ iii)$P(160 < x < 240)$ iv) $P(x > 220)$

i) $P(x < 180 \text{ or } x > 220)$

ii) 10% of the values are less than what values of x?

11. The labor productivity indexes of Nepal are recorded is below:

Sector	Year		
	2015	2016	2017
Agriculture	100	125	138
Manufacturing	100	60	53
community and social service	100	89	80

Dose the labor productivity index vary die to the;

i) Difference in the sector ii) Difference in the time period