POKHARA UNIVERSITY

Level: Bachelor Semester – Fall Year : 2006
Programme: BCA Full Marks: 100
Course: Probability and Statistics Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) The following data are the book values (in dollars i.e. net worth divided by number of outstanding shares) for a random sample of 25 stocks from the Nepal Stock Market Exchange. 7

7	9	8	6	12
8	5	14	8	7
10	6	16	5	10
10	8	8	10	18
7	8	15	23	13

i) Develop the ordered array

ii) Form the stem-leaf display.

b) The data displayed here represent the electricity cost during the month of July 2002 for a random sample of 20 two-bedroom apartments in a city. 8

96	171	202	178	147
157	185	90	116	172
141	149	206	175	123
95	163	150	154	130

i) Plot the percentage polygon.

ii) Form the cumulative percentage distribution.

2. a) The operation manager of a plant that manufactures tires wishes to compare the actual inner diameter of two grades of tires, each of which is expected to be 575 millimeters. A sample of five tires of each grade was selected, and the results representing the inner diameters of the tires, ordered from smallest to largest were as follows: 7

Grade X	Grade Y
568 570 575 578 584	573 574 575 577 578

For each of the two grades of tires, compute the arithmetic mean, median and standard deviation. Which grade of tire is providing better quality? Explain.

b) A manufacturer of flashlight batteries took a sample of 13 batteries from a day's production and used them continuously until they were drained. The numbers of hours they were used until failure were 342 426 317 545 264 451 1,049 631 512 266 492 562 298 8

i) List the five number summary.

ii) Form the box-and-whisker plot, and describe the shape.

3. a) A public-interest group was planning to make a court challenge to auto insurance rates in one of the three cities: Kathmandu, Pokhara, Narayangarh. The probability that it would choose Kathmandu was 0.4; Pokhara 0.35 and Narayangarh 0.25. The group also knew that it has a 60 percent chance of a favourable ruling if it chooses Pokhara, 45 Percent if it chooses Kathmandu and 35 percent if it chooses Narayangarh. If the group did receive a favourable ruling, which city did it most likely choose? 7

b) During a study of automobile accidents, the Highway safety council found that 60% of all accidents occur at night, 52% are alcoholic related and 37% occur at night and are alcohol related. Find the probability that: 8

(i) an accident was alcohol-related, given that it occurs at night

(ii) an accident occurs at night, given that it was alcohol – related?

4. Campus stores have been selling the Believe it or not: Wonders of statistics study guide for 12 semesters and would like to estimate the relationship between sales and numbers of sections of elementary statistics taught in each semester. The following data have been collected:

Sales Units:	33	38	24	61	52	45	65	82	29	63	50	79
No. of Sections:	3	7	6	6	10	12	12	13	12	13	14	15

a) Develop the estimating equation that best fits the data 8

b) Calculate the sample coefficient of determination and sample coefficient of correlation. 7

5. a) Bill Johnson has just bought a VCR from Jims videotape service at a cost of Rs. 300. He now has the option of buying and extended service warranty offering 7 years of coverage for Rs. 100. After 7

talking to friends and reading reports, Bill Believes the following maintenance expenses could be incurred during the next five years.

Expenses:	0	50	100	150	200	250	300
Probability	0.35	0.25	0.15	0.10	0.08	0.05	0.02

Find the expected value of anticipated maintenance costs. Should Bill pay Rs. 100 for the warranty?

b) Anita Daybride is a Red Cross workers aiding earthquake Victims in rural Columbia. Ms. Daybride knows that typhus is one of the most prevalent post-earth quake diseases. 44% of earthquake victims in rural areas contract the disease. If Anita treats 12 earth– quake victims what is the probability that 8

(i) four or more have typhus?
(ii) eleven or less have typhus.

6. a) The marks obtained by students in a degree examination are normally distributed. The mean marks and standard deviation of distribution are 500 and 100 respectively. If 674 appear in the examination and out of those 500 are to be declared passed, what should be the minimum pass marks? 7

b) A random sample of 200 consumer accounts at a large brokerage firm is selected for the purpose of estimating the mean number of transactions per year for each consumer. The sample mean is 43 and standard deviations are 12. Determine 95% confidence limits for the mean number of all customer accounts of the firm. 8

OR

A policy of a Standard Chartered Bank branch is that its ATMs must be stocked with enough cash to satisfy customers making withdrawals over an entire weekend. Customer goodwill depends on such service meeting customer needs. At this branch the expected average amount of money withdrawn from the ATMs per customer transaction over the weekend is Rs 160 with an expected standard deviation of Rs. 30. Suppose that a random sample of 36 customer transactions is examined, and it is observed that the sample mean withdrawn is Rs 172. 8

(i) State the null and alternative hypothesis.

(ii) At the 0.05 level of significance, using the critical value approach to hypothesis testing, is there evidence to believe that the true average withdrawal is greater than Rs 160?

7. Write short notes on **(Any Two):** 2×5

a) Sources of data

b) Cumulative Frequency Polygon (Ogive)

c) Relation between regression and correlation.

d) Binomial distribution.

e) Z test of hypothesis for a population mean.