POKHARA UNIVERSITY

Level: Bachelor   Semester – Fall   Year   : 2005
Programme: BCA   Full Marks: 100
Course: Probability & 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) Write short notes on: 2×5

    i) Importance of statistics

    ii) Random Variable

    iii) Point Estimate and Interval Estimate

    iv) Primary and Secondary data

    v) Properties of Normal distribution

2. a) What are the Graphs of frequency distribution? The Regional Hospital   8
at Pokhara has the following data representing weight in pounds at birth of 200 premature babies.

Class	Frequency
0.5 – 0.9	10
1.0 – 1.4	19
1.5 – 1.9	24
2.0 – 2.4	27
2.5 – 2.9	29
3.0 – 3.4	34
3.5 – 3.9	40
4.0 – 4.4	17

Construct on ogive that will help you answer the following questions.

    i) What was the approximate middle value in the data set?

    ii) If premature babies under 3.0 pounds are normally kept in an incubator for several days as a precaution about what percentage

of babies will need on incubator?

b) Write the difference between populations and samples. The age of 20 members of a village is as follows.

| 66 | 61 | 83 | 51 | 82 | 54 | 65 | 56 | 60 | 92 |
| 65 | 87 | 51 | 64 | 68 | 70 | 75 | 66 | 68 | 74 |

Use this data to construct relative frequency distribution using 5 equal intervals. A social service programme requires that approximately 75% of the programme participants be less than 75, is the programme in compliance with the policy?

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3. a) An advertising executive is studying television viewing habits of married men and women during prime time hours. On the basis of past viewing records, the executive has determined that during prime time, husbands are watching television 60% of the time. It has also been determined that when the husband is watching television, 40% of the time the wife is also watching television. When the husband is not watching television, 30% of the time the wife is watching television. Find the probability that,

i) If the wife is watching television, the husband is also watching television.

ii) the wife is watching television in prime time.

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b) A vendor at a Dasarath Rangashala must determine whether to sell ice cream or soft drinks drinks at today's game. The vendor believes that the profit made will depend on the weather. The payoff is as follows.

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Actions

Event	Sell Soft Drinks	Sell Ice Creams
Cool weather	Rs. 50	Rs. 30
Warm weather	60	90

On the basis of her past experience at this time of year, the vendor estimates the probability of warm weather as 0.60.

i) Compute the expected value for selling soft drinks and selling ice creams.

ii) On the basis of results of (i), which should the vendor choose to sell, soft drinks or ice cream? Why?

4. a) An important part of the customer service responsibilities of a   8
telephone company relates to the speed with which troubles in
residential service can be repaired. Suppose past data indicate
that the likelihood is 0.70 that troubles in residential service can
be repaired on the same day.

   i) For the first five troubles reported on a given day, what is
      the probability that,

      a) all five will be repaired on the same day ?

      b) at least three will be repaired on the same day ?

      c) fewer that two will be repaired on the same day ?

   ii) What assumptions are necessary in (i)

b) What do you mean by correlation? From the following data,   7
compute the line of regression for estimating blood pressure.

Age in Years	56	42	72	36	63	47
Blood pressure:	147	125	160	118	149	128

5. a) The quality control manager at a light bulb factory needs to   8
estimate the average life of a large shipment of light bulbs. The
process standard deviation is known to be 100 hours. A random
sample of 64 light bulbs indicated a sample average life of 350
hours.

   i) Set up a 95% confidence interval estimate of the true
      average life of light bulbs in this shipment.

   ii) Do you think that the manufacturer has the right to state the
      light bulbs last an average of 400 hours?

b) The automobile dealer, Kathmandu Automobile, wants to   7
estimate the promotion of customers who still own the cars they
purchased 5 years earlier. A random sample of 200 customers
selected from the automobile dealer's records indicates that 82
still own cars that were purchased 5 years earlier.

   i) Set up a 95% confidence interval estimate of the population
      of all customers who still own the cars 5 years after they
      were purchased.

ii) How can the results in (i) be used by the automobile dealers to study satisfaction with cars purchased at the dealership?

6. a) Explain the requisites of a good estimator.　　　　　　　　　　4+3

Nepal Bank is trying to determine the number of tellers available during the lunch rush on Fridays (in Kathmandu only). The bank has collected data on the number of people who entered the bank during the last 3 months on Fridays from 11 A. M. to 1 P.M. Using the data below, standard deviation of the population from which the sample was drawn

| 242 | 275 | 289 | 306 | 342 | 385 |
| 245 | 269 | 305 | 294 | 328 | 279 |

b) From a random sample of 60 buses. Sajha Yatayat has calculated the mean number of passenger per kilometre to be 4.1. From previous studies, the population standard deviation is known to be 1.2 passengers per kilometre.

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a) Find the standard error of the mean.

b) Construct a *95* and *98* percent confidence interval for the mean number of passenger per kilometre for the population.

7. a) SAT Service advertises that 80 percent of the time, its preparatory⁻ course will increase an individual's score on the college board exams by at least 50 points on the combined verbal and quantitative total score. The marketing manager wants to see whether t h i s is a reasonable claim or not. He has reviewed the records of 125 students who took the course and found that 94 of them did, indeed, increase their scores by at least 50 points. Use p-value approach to determine whether SAT's advertisement should be changed?

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b) A large hotel chain is trying to decide whether to convert more of its rooms to non-smoking rooms. In a random sample of 400 guests last year, 166 had requested non smoking rooms. This year, 205 guests in a sample of 380 preferred the non-smoking rooms. Would you recommend that the hotel chain convert more rooms to non-smoking? Support your recommendation by testing the appropriate hypothesis at a 0.01 level of significance.

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