

POKHARA UNIVERSITY

Level: Bachelor Semester – Spring 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. Write short notes on: 2×5

- a) Quantitative and categorical variables.
- b) Marginal and joint probability
- c) Central limit theorem
- d) Steps in hypothesis testing
- e) Random variable

2. a) (i) Explain the basic steps to be followed in the general procedure for designing a Survey Research. 4

(ii) Discuss the advantages of sampling over the census. 3

- b) Homer Willis, a fishing boat captain from Salter Path, North Carolina, believes that the break-even catch on his boats is 50 pounds per trip. Here are data on a sample of catches on 20 fishing trips Homer's boats have made recently: 8

65	67	34	36	20
70	56	45	80	50
46	81	65	90	42
48	70	75	60	54

Construct an ogive that will help you answer these questions

- a) Roughly what proportion of the trips breaks even for Homer?
- b) What is the approximate middle value in the data array for Homer's boats?
- c) What catch do Homer's boats exceed 80 percent of the time?

3. a) An advertising executive is studying television viewing habits of 7

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.
- b) A vendor at a Dasarath Rangashala mut determine whether to sell ice cream or soft drinks at today's game. The vendor believes that the profit made will depend on the weather. The payoff table 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 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,
 - (1) all five will be repaired on the same day?
 - (2) at least three will be repaired on the same day?
 - ii) What assumptions are necessary in (i)
- b) A large hotel chain is trying to decide whether to convert more of its

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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 of its room non-smoking? Support your recommendation by testing the appropriate hypothesis at a 0.01 level of significance.

5. a) The average daily sales of 500 branch offices were Rs. 150 thousand and the standard deviation Rs. 15 thousand. Assuming the distribution to be normal, indicate how many branches have sales between.

i) Rs. 120 thousand and Rs. 145 thousand

ii) Greater than Rs. 140 thousand

(Given that, $Z_2 = 0.4772$, $Z_{0.33} = 0.1293$, $Z_{0.67} = 0.2486$)

- b) When a sample of 70 retail executives was surveyed regarding the poor November performance of the retail industry. 66 percent believed that decreased sales were due to unseasonably warm temperatures, resulting in consumers delaying purchase of cold-weather items,

i) Estimate the standard error of the proportion of retail executives who blame warm weather for low sales.

ii) Construct a 95% confidence interval.

6. a) The mean lifetime of a sample of 100 light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the tubes produced by it is 1600 hrs. Is the claim acceptable by using a level of significance at 0.05?

- b) Define small size sample test. A random sample of size 20 from a normal population gives a sample mean of 42 and sample standard deviation of 6. State both the null and alternative hypotheses and test the hypothesis at a significance level of 0.05 that the population mean is less than 44.

7. a) Define correlation. Write the properties of correlation coefficient. Calculate the Coefficient of correlation between the following price and sales. How would you describe the relationship between price and sales on the basis of your result?

Price (Rs):	25	19	28	26	20	18	24	20
Sales (Units):	60	54	66	70	53	59	62	51

- b) Cost accountants often estimate overhead based on the level of production. At a standard company, they have collected information on overhead expenses and units produced at equation for predict future overhead.

Overhead:	19.1	17.0	17.2	15.0	25.0	17.3	23.4
Units:	4.0	4.2	5.3	3.5	5.6	3.9	4.8

- i) Develop the estimating equation that best describes the data.
- ii) Predict overhead when 5.0 units are produced.
- iii) Calculate the standard error of estimate.