POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2017
Programme: BE Full Marks: 100
Course: Probability and Statistics Pass Marks: 45
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) Over a period of 40 days the percentage relative humidity in a vegetable storage building was measured. Mean daily values were recorded as shown below: 7

60	63	64	71	67	73	79	80	83	81
86	90	96	98	98	99	89	80	77	78
71	79	74	84	85	82	90	78	79	79
78	80	82	83	86	81	80	76	66	74

i. Prepare a stem-and leaf display for these data. Show the leaves sorted in order of increasing magnitude on each stem.

ii. Draw a box plot for these data and interpret the data in practical manner.

b) The temperature in a chemical reactor was measured every half hour under the same conditions. The results were 78.1°C, 79.2°C, 78.9°C, 80.2°C, 78.3°C, 78.8°C, 79.4°C. Calculate the mean, median, lower quartile, upper quartile standard deviation and coefficient of variation. 8

2. a) A problem of statistics is given to three students A, B and C where chance of solving it is ½, ¾ and ⅔ respectively. If they independently solve it, what is the probability that 7

i. All can solve the problem

ii. None can solve the problem

iii. Problem can be solved

iv. Exactly one can solve the problem

b) State and Prove Baye's theorem for conditional probability. 8

3. a) A random variable X has the following probability function. 7

X:	2	3	4	5	6	7
F(X):	0.1	K	0.2	2 k	0.3	K

Find the value of K and calculate mean and variance.

b) Customers arrive at complaint department of a store at the rate of 3 per hour. If arrivals follow a Poisson distribution, calculate the 8

probability that

i. No customer will arrive in a hour
ii. Two or three customers will arrive in an hour
iii. At least three customers will arrive in an hour

4. a) In an examination 15% of the candidates got first class (60% marks or above), while 40% failed (securing below 40% marks). Assuming the marks to be normally distributed, estimate the mean and standard deviation. 8

b) If two random variables have the joint probability density function. 7
$F(x,y)=^2/_3 (x+2y)$; $0<x<1$, $0<y<1$

i. Find marginal density function of X& Y
ii. Find the conditional density of X given that Y=y
iii. Are X and Y independent

5. a) A random sample of 8 envelopes is taken from letter box of a post office and their weights in gms are found to be 12.1, 11.9, 12.3, 11.9, 12.1, 12.4, 12.1 and 11.5. Find 99% fiducial limits for the mean weight of envelopes received at that post office. 7

b) What is P-value? In a factory 2% fans were found to be defective in a lot of 3000 fans, and in another factory 3% fans were found to be defective in a lot of 2500 fans. Do you find that the fans in secondary factory are significantly inferior compared to the fans in the first factory? ($Use \propto = 0.05$) 8

6. a) An I.Q. test was administered to 5 persons before and after they were trained. The results are given below 8

Candidates	1	2	3	4	5
IQ Before Training	110	120	123	132	125
IQ After Training	120	118	125	136	121

Is training effective at 5% level of significance?

b) The following table gives the age X and blood pressure Y of 10 women. 7

X	56	42	36	47	49	42	60	72	63	55
Y	147	125	118	128	145	140	155	160	149	150

i. Find correlation coefficient between age and pressure
ii. Fit a regression equation of X on Y

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

a) Characteristics of good estimator
b) Error in hypothesis testing
c) Confidence Interval