follows:

$\Sigma x = 132.0$, $\Sigma y = 151.7$, $\Sigma x^2 = 1944.0$, $\Sigma y^2 = 2570.48$, $\Sigma xy = 2233.2$

i. Find the linear regression equation of y on x.

ii. What is the correlation coefficient?

iii. What fraction of the variance of y is explained by the correlation?

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

a) Criteria of good estimator

b) Error in hypothesis testing

c) Methods of primary data collection

POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2016

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) From the following frequency distribution, 7

Income (Rs 000)	0-10	10-20	20-30	30-40	40-50	50-60
No. of Persons	5	10	18	23	7	6

Conduct on ogive that will help you the answer to find the number of persons having income:

i. Less than Rs. 35000

ii. Between Rs. 20000 and Rs. 50000

iii. More than Rs. 25000

b) An analysis of monthly wages paid to the workers in two firms A and B belonging to the same industry gives the following results: (use population) 8

	Firm A	Firm B
No. of workers	500	600
Average monthly wages (Rs)	186	175
Variance of distribution of wages (Rs)	81	100

i. Which firm, A or B has a larger wage bill?

ii. In which firm, A or B is there greater variability in individual wages?

iii. Calculate (a) the average monthly wages (b) the variance of the distribution of wages, of all the workers in the firm A and B taken together.

2. a) State and prove Bayes Theorem of probability. 5

b) From a group of 3 Nepalese, 4 Indian and 5 Americans, a subcommittee of four persons are selected randomly. Find the probability that the subcommittee will consists of 5

i. 3 Nepalese and 1 Indian
ii. 1 Nepalese, 1 Indian and 2 Americans
iii. 4 Americans

c) A manufacturing firm produces steel pipes in three plants with daily production volume of 500, 1000 and 2000 units respectively. According to the past experience, it is known that the fraction of defective outputs produced by the three plants are respectively 0.005,0.008 and 0.010. If pipe is selected from a day's total production and found to be defective. From which plant the defective pipe is expected to have been produced? 5

3. a) An appliance dealer sells different models of freezers having 13.5, 15.9 and 19.1 cu.ft. of storage space purchased by the next customer to buy a freezer and p(x) be the p.m.f. given below as: 7

X;x	13.5	15.9	19.1
P(x)	0.2	0.5	0.3

i. Compute E(X) and V(X)
ii. If the price of a freezer having capacity x cubic feet is 25x - 8.5, what is the expected price paid by the next customer to buy a freezer?
iii. What is the variance of the price 25x - 8.5 paid by the next customer?

b) The joint probability density function of two continuous random variables 8

$$f(x,y) = Axy; \quad 0 < x < 1, \quad 0 < y < x$$

i. Find A
ii. Find marginal density function of X and Y
iii. Find conditional density function of Y given X=x and conditional density function of X given Y=y
iv. Check for independence of X and Y

4. a) From a lot of 10 times containing 3 defectives a sample of 4 items is drawn at random. Let the random variable X denote the number of defective items in the sample. Answer the following: 5
i. E (X)
ii. V (X)
iii. The probability distribution of X.

b) In a certain examination test 2000 students appeared in statistics. The average deviation was 5%. How many students do you expect to obtain more than 60% marks? What are the minimum marks of the top 100 students? Assume that the markets are normally distributed.

c) The length of time (in seconds) that a user views a page on webside before moving to another page is log-normal random variable with parameters $\mu = 0.5$ and $\sigma^2 = 1$. 5
i. What is the probability that a page is viewed for more than 10 second?
ii. What is the length of time 50% of user view the page?
iii. What is the mean and standard deviation of the time until a user moves from the page?

5. a) The accompanying data on cube compressive strength (MPa) of concrete specimens appeared in the article "Experimental Study of Recycled Rubber-Filled High- Strength Concrete" 7
112.3, 97.0, 92.7, 86.0 , 102.0, 99.2, 95.8, 103.5, 89.0, 86.7
Suppose the concrete will be used for a particular application unless there is strong evidence that true average strength is less than 100 MPa. Should the concrete be used?

b) Hotel's manager in Kathmandu wants to know the hotels average daily registration. The following table presents the numbers of guest registered each of 27 randomly selected days. Calculate the sample mean, standard errors of mean and 95% confidence limits of population mean. 8

61	57	53	60	64	57	54	58	63
61	50	59	50	60	57	58	62	63
60	54	54	61	51	53	62	57	60

6. a) A social study group wants to determine if people think that there is too much violence on television in these days. 70% of 2000 men selected at random believed so 60% of 4000 women selected at random also believed that there is too much violence on television. The group wants to test if there is a significant difference in the viewers of men as compared to views expressed by women. Test the hypothesis at α=0.05. 7

b) Shear stress (y) and rate of shear (x) can be measured for a liquid in a viscometer. For 12 pairs of values the data can be summarized as 8