- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. Discuss the meaning of probability with suitable example. Three unbiased coins are tossed simultaneously find the probability of getting, i) Exactly all tails ii) At least one tail iii) At most two tails (iv) Exactly one tail or two tails. [2+3]

2. Define negative binomial distribution. Find mean and variance of negative binomial distribution. An item is produced in large numbers. The machine is known to produce 5% defective. A quality control inspector examines the items by taking them at random. What is the probability that at least 4 items are to be examined to get 2 defectives? Also, find the mean and variance. [1+2+3]

3. At a certain examination, 10% of the student who appeared for the paper in statistics got less than 30 marks and 97% of students got less than 62 marks. Assuming the distribution to be normal, find the mean and the standard deviation of the distribution. [3]

4. Define probability mass function (p.m.f). A random variable X has the density function $f(x) = a+bx^2, 0 < X < 1$. Determine a and b show that, mean is 2/3. Also find the variance of the distribution. [4]

5. Define rank correlation coefficient. Calculate the (a) multiple correlation coefficients $R_{1.23}$ and interpret the result. (b) Partial correlation coefficient $r_{12.3}$; given that the simple correlation coefficient between sales in units (X_1), advertisement (X_2), and price in rupees(X_3) are $r_{12} = 0.70$, $r_{13} = 0.61$ and $r_{23} = 0.40$. [2+2]

6. Define various source of non-sampling error. [4]

7. Define standard deviation. Calculate the coefficient of variation for the following distribution giving 300 telephone cells according to their duration in second. [1+4]

Duration (in sec)	0-30	30-60	60-90	90-120	120-150	150-180	180-210
No. of calls	9	17	43	82	81	44	24

8. Define and elaborate two types of error in testing of hypothesis. Experience shows that a fixed dose of a certain drug causes an average increase of pulse rate of 10 beats per minute. A group of 9 patients given the same dose showed the following increase 13, 15, 14, 10, 8, 12, 16, 9, 20 drugs? Test at 5% level of significance whether this group is different in response to the drugs? [2+3]

9. a) The following table represents the sales of three salesmen in four different districts

Districts	Sales figure (000) sales person		
	A	B	C
Pokhara	14	20	16
Dang	12	23	15
Mugu	10	20	10
Palpa	8	18	12

Test whether there is any significant difference in the sales of different districts. [5]

10. Define degree of freedom. A television producer of a farming show believes that the show is more popular with rural viewers than urban viewers. To test the claim, a TV station showed the program to 300 rural viewers and 100 urban viewers. It was noted that 65 of the rural viewers and 18 of the urban viewers enjoyed the program. Test the producer's belief at 5% level of significance. [1+4]

11. What is point estimation? From a population of 540, a sample of 60 individuals is taken. From this sample, the mean is found to be 6.2 and the standard deviation is 1.368.
i) Find the estimated error of the mean.
ii) Construct a 96% confidence interval for the mean. [1+3]

THE END