



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Com., B.SC. DEGREE EXAMINATION – COM., MATHS, PHY.

THIRD SEMESTER – NOVEMBER 2014

ST 3205 / ST 3202 - ADVANCED STATISTICAL METHODS

Date : 08/11/2014
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

PART A

Answer ALL the questions:

(10X2 = 20)

- 1) From the following data find out whether the data is consistent or not
(A) = 40, (B) = 60, (AB) = 25 and N = 200
- 2) Define Probability of an event.
- 3) When do we say that two events are independent?
- 4) Define conditional probability.
- 5) An urn is containing 4 white and 8 red balls, two balls are selected from it. What is the probability of both the balls to be red?
- 6) What are the parameters of binomial distribution?
- 7) State any two situations where Poisson distribution can be applied.
- 8) Write down the ANOVA for one way classification.
- 9) What is level of significance?
- 10) Give the control limits for C chart.

PART B

Answer any FIVE questions:

(5x8 = 40)

- 11) The result of a certain survey shows that out of 50 ordinary shops of small size 35 are managed by men of which 17 are in cities. 12 shops in villages are run by women. Can it be inferred that shops run by women are relatively more in villages than in cities?
- 12) The probability of 3 students A, B and C solving a problem in Statistics are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. A problem is given to all the 3 students. What is the probability that (i) no one will solve the problem, (ii) only one will solve the problem and (iii) atleast one will solve the problem?
- 13) The records of 400 examinees are given below.

Score	Educational qualification		
	B.A	B.Sc	B.Com
Below 50	90	30	60
Between 50 and	20	70	70
Above 60	10	30	20

If an examinee is selected from this group, find the probability that (i) he is a commerce graduate, (ii) he is a science graduate given that his score is above 60 and (iii) his score is below 50 given that he is a B.A. graduate.

14) A random variable X has the following probability function.

X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	K ²	2k ²	7k ² +k

(i) find the value of k (ii) $p(X \leq 4)$ (iii) $p(X > 3)$ and (iv) $p(3 < X < 7)$

15) The probability that a bomb hits a target is given by 0.8. Assuming a Binomial distribution, what is the probability that out of 10 bombings, (i) exactly 4 will be missed, (ii) atmost 3 will be missed and (iii) atleast 8 will be hitting the target?

16) Before increase in excise duty on tea, 400 people out of a sample of 500 persons were found to be tea drinkers. After an increase in duty, 400 people were tea drinkers out of a sample of 600 people. Based on the information collected, test whether there is a significant decrease in the consumption of tea?

17) There are three main brands of a certain powder. A set of 12 sample values is examined and found to be allocated among 4 groups and three brands as shown below

Groups

Brands	A	B	C	D
I	10	4	8	15
II	5	8	13	6
III	18	19	11	13

Is there any significant difference in brands preference? Answer at 5% level.

18) 20 tape-recorder were examined for quality control test. The number of defects for each tape-recorder are given below: 2, 4, 3, 1, 1, 2, 5, 3, 6, 7, 3, 1, 4, 2, 3, 1, 6, 1, 1, 1. Prepare a C-chart and conclude on it.

PART C

Answer any TWO questions:

(2X20 = 40)

19) (i) The following table shows the association among wives and husbands of their heights. Find the coefficient of contingency between the two.

	Wives		
Husbands	Tall	Medium	Short
Tall	30	50	20
Medium	20	30	10
Short	10	20	10

(ii) Each of six urns contains black and white balls, one has 8 white and 4 black balls, two have six white and 6 black balls and three have 4 white and 8 black balls. An urn is drawn at random and 3 balls are drawn. Two of the three are white and the other is black. What is the probability that the urn drawn contained 4 white and 8 black balls? (12+8)

20) (i) Students of a class were given an aptitude test. Their marks were found to be normally distributed with mean 60 and standard deviation 5. What per cent of students scored (a) more than 60 marks, (b) less than 56 marks, (c) between 45 and 65 marks? (10)

(ii) State the properties of normal distribution. (10)

21) The yield of four strains of Grallipoli wheat planted in five blocks in kgs per plot is given below.

Strains	Blocks				
	1	2	3	4	5
A	32	34	34	35	36
B	33	33	36	37	34
C	30	35	35	32	35
D	29	22	30	28	28

Test whether there is a significant difference in the mean yield between the varieties of strains and the mean yield between the blocks.

22) (i) A company arranged an intensive training course for its team of salesmen. A random sample of 10 salesmen was selected and the value (in '000) of their sales made in the weeks immediately before and after the course are shown in the following table.

Salesman	1	2	3	4	5	6	7	8	9	10
Sales before	12	23	5	18	10	21	19	15	8	14
Sales after	18	22	15	21	13	22	17	19	12	16

Test whether there is any significant increase in the mean sales.

(ii) From the following data calculate the central lines and control limits for the mean and range control charts: (10)

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean	52	50	50	51	47	52	49	54	51	56
Range	6	7	6	5	4	9	8	7	7	4
