LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A., B.Com. DEGREE EXAMINATION – ECONOMICS & COMMERCE

FOURTH SEMESTER – APRIL 2010

ST 4205 / 4200 / 3202 / 3200 - ADVANCED STATISTICAL METHODS

Date & Time: 19/04/2010 / 1:00 - 4:00   Dept. No.   Max. : 100 Marks

SECTION – A

Answer ALL the questions: (10 X 2 = 20)

1) Find out whether the data are consistent
   (A) = 100, (B) = 150, (AB) = 60, N = 500
2) Write the formula for Yule's Coefficient of partial association between A and B with C.
3) Define probability of an event.
4) What are the parameters of Binomial distribution?
5) Define type – I error.
6) State any two situations where Poisson law can be applied.
7) Give the test statistic for the test of specified proportion.
8) Write the ANOVA table for two way classification.
9) What are the various types of control charts?
10) Give the control limits of the $\bar{x}$ and R chart.

SECTION – B

Answer any FIVE of the following: (5 X 8 = 40)

11) In a class in which 135 candidates were examined for proficiency in English and Economics, it was discovered that 75 students failed in English, 90 failed in Economics and 50 failed in both. Find if there is any association between failing in English and Economics using (i) Yule's coefficient of association and (ii) coefficient of colligation.

12) In calculating the premium payable for life insurance policies, insurance companies use information derived from mortality tables. An extract taken from a mortality table is given below:

Males per 1,000 births

Age in years	0	25	45	65	75
Number of males living	1000	958	905	680	413

Find the probability that a male aged 25 will, (a) attain the age of 45 years, (b) attain the age of 45 years but not 75, (c) not attain the age of 65 years.

13) In an examination, 30% of the students have failed in mathematics, 20% have failed in chemistry and 10% failed in both mathematics and chemistry. A student is selected at random. What is the probability that (i) the student has failed in mathematics if it is known that he has failed in chemistry? (ii) the student has failed either in mathematics or chemistry?

14) If the chance of running a bus service according to schedule is 0.8, calculate the Probability that on a day schedule with 10 bus services (i) exactly 1 is late (ii) atleast 3 is late, (iii) atmost 2 is late.

15) The customer accounts of a certain departmental store have an average balance of Rs. 120 and a standard deviation of Rs. 40. Assuming that the account balances are normally distributed, find what proportion of accounts is (i) over Rs. 150, (ii) between Rs.100 and Rs. 150 and (iii) between Rs.60 and Rs. 90?

1

16) A sample of 400 male students is found to have a mean height of 171.38 cms. Can it be reasonably regarded as a sample from a large population with mean height 171.17 cms and standard deviation 3.3 cms?

17) The following tables gives the yields of 15 samples of plot under three varieties of seed.

A	20	21	23	16	20
B	18	20	17	15	25
C	25	28	22	28	32

Test using analysis of variance whether there is any significant difference in the average yield of seeds.

18) In a certain sampling inspection, the number of defectives found in 10 samples of 100 each are as follows:

16, 18, 11, 18, 21, 10, 20, 18, 17 and 21

Do these indicate that the quality characteristic under inspection is under statistical control?

SECTION – C

Answer any TWO of the following: (2 X 20 = 40)

19) (a) The first of three urns contains 7 white and 10 black balls, the second contains 5 white and 12 black balls and the third contains 17 white balls and no black balls. A person chooses an urn at random and draws a ball from it. The ball is white. Find the probabilities that the ball has been drawn from (i) the first (ii) the second and (iii) the third urn. (12+8)

(b) A random variable X has the following probability function.

x	0	1	2	3	4	5	6	7
p(x)	0	m	2m	2m	3m	m^2	$2m^2$	$7m^2+m$

(i) Find the value of m (ii) Evaluate (a) $P(X < 6)$ (b) $P(X \geq 6)$ (c) $P(0 < X < 5)$

20) (a) A factory employing a large number of workers finds that over a period of time, the average absentees rate is three workers per shift. Calculate the probability that in a given shift (i) exactly two workers will be absent and (ii) more than four workers will be absent and (iii) less than three workers will be absent. (12)

(b) State any four properties of normal distribution. (8)

21) (a) In a certain city 380 men out of 800 are found to be smokers. Discuss whether this information supports the view that majority of men in this city are non-smokers?

(b) 10 accountants were given intensive coaching and four tests were conducted in a month. The scores of tests 1 and 4 are given below:

Serial No.	1	2	3	4	5	6	7	8	9	10
Marks in 1st test	50	42	51	42	60	41	70	55	62	38
Marks in 4th test	62	40	61	52	68	51	64	63	72	50

Does the scores from 1st test to test 4th test show an improvement?   (8+12)

22) The yield (in kgs per plot) of four strains of grallipoli wheat planted in five randomized blocks is given below:

Blocks

	I	II	III	IV	V	
A	32	34	34	35	36	Strains
B	33	33	36	37	34	
C	30	35	35	32	35	
D	29	22	30	28	28	

Test whether (i) there is any significant difference in the mean yield of blocks.

(ii) there is any significant difference in the mean yield of wheats

****