



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.Sc. DEGREE EXAMINATION - STATISTICS**

**THIRD SEMESTER – NOVEMBER 2013**

**ST 3902 - STATISTICS FOR ECONOMISTS**

Date : 15/11/2013  
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

**SECTION- A**

Answer **ALL** the following:

(10 X 2 = 20)

- 1) State any two measures of central tendency.
- 2) Give the formula for Karl Pearson's correlation coefficient.
- 3) Define mutually exclusive events.
- 4) What are the parameters of Binomial distribution?
- 5) Define type I error.
- 6) What is the test statistic for testing the equality of proportion in large sample?
- 7) Write the four components of time series.
- 8) Give the formula for Laspeyre's index number.
- 9) Define Optimal solution of an Linear Programming Problem.
- 10) State any two methods of obtaining I.B.F.S of a transportation problem.

**SECTION- B**

Answer any **FIVE** of the following:

(5 X 8 = 40)

- 11) Find the standard deviation for the following data given wages of 230 persons.

Wages in Rs.	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150
No. of persons	12	18	35	42	50	45	20	8

- 12) Find the coefficient of correlation between output and cost of an automobile factory from the following data:

Output of cars (in '000)	35	42	56	65	70	82	88	90	97	100
Cost of cars (Rs.'000)	98	90	88	84	83	82	82	80	80	81

- 13) A sub-Committee of 6 members is to be formed out of a group consisting of 7 men and 4 women. Calculate the probability that the sub-committee will consist of (i) exactly 2 women, (ii) atleast 2 women.

- 14) 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 <sup>2</sup>	2m <sup>2</sup>	7m <sup>2</sup> +m

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

- 15) After correcting the proofs of the first 50 pages of a book, it is found that on the average there are 3 errors per 5 pages. Use Poisson probabilities and estimate the number of pages with 0, 1, 2 and 3 errors in the whole book of 1000 pages.

- 16) A person buys 100 electric tubes from two well known makes taken at random from stocks

for testing purpose. He finds that 'make A' has a mean life of 1300 hours with a standard deviation of 82 hours and 'make B' has mean life of 1248 hours with a S.D of 93 hours. Discuss the significance of these results to test which makes of electric tube should the person buy.

- 17) From the following data, calculate price index numbers for 2004 with 2000 as base by:  
 (i) Laspeyre's method, (ii) Paasche's method and (iii) Fisher's ideal method

Commodity	2000		2004	
	Price	Quantity	Price	Quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	15
D	20	20	20	25

- 18) A departmental head has four subordinates and four tasks to be performed. The subordinates differ in efficiency and the tasks differ in their intrinsic difficulty. His estimate of the time each man would take to perform each task, is given in the matrix below.

Men	Tasks			
	I	II	III	IV
Zico	18	26	17	11
Jay	13	28	14	26
Muthu	38	19	18	15
Febin	19	26	24	10

How should the tasks be allocated, one to a man, so as to minimize the total man-hours?

### SECTION – C

Answer any **TWO** of the following:

( 2 X 20 = 40)

- 19) (i) Find the regression line of Y on X for the following data:

X	25	28	35	32	36	36	29	38	34	32
Y	43	46	49	41	36	32	31	30	33	39

- (ii) Find the mean and median for the following data given below:

Marks in Statistics	10-20	20-30	30-40	40-50	50-60
No. of students	3	7	10	3	2

(10+10)

- 20) (i) There are 3 boxes containing respectively 1 white, 2 red, 3 black balls; 2 white, 3 red, 1 black balls; 3 white, 1 red and 2 black balls. A box is chosen at random and from it two balls are drawn at random. The two balls are 1 red and 1 white. What is the probability that they come from the second box?  
 (ii) 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 percent of student scored (i) more than 60 marks, (ii) less than 56 marks and (iii) between 45 and 65 marks ? (8+12)

- 21) (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 evidence of an increase in mean sales.

- (ii) In a sample of 600 parts manufactures by a factory, the number of defective parts was found to be 45. The company however claimed that only 5% of their product is defective. Is the claim tenable? (12+8)

- 22) (i) Using the three year and five year moving averages determine the trend for the following data:

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Production ('000 tonnes)	21	22	23	25	24	22	25	26	27	26

- (ii) Determine an initial basic feasible solution to the following transportation problem using the Vogel's approximation method.

Distribution centres

Factory	Mumbai	Bangalore	Delhi	Chennai	Available
Kolkatta	6	5	8	8	30
Cochin	5	11	9	7	40
Ranchi	8	9	7	13	50
Requirement	35	28	32	25	

(10+10)

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