

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

M.A. DEGREE EXAMINATION – ECONOMICS

THIRD SEMESTER – NOVEMBER 2009

**ST 3902 - STATISTICS FOR ECONOMISTS**

Date & Time: 14/11/2009 / 9:00 - 12:00 Dept. No.

Max. : 100 Marks

**SECTION A**

**Answer all the questions:**

**(10 x 2 = 20 Marks)**

1. Write any two merits of median.
2. Write any two properties of standard deviation.
3. Give the conditions of independence for three events.
4. Define normal distribution.
5. Write any two uses of chi-square distribution.
6. Define simple and composite hypotheses.
7. How to fit a trend line using semi-averages?
8. Define unbalanced transportation problem.
9. When do you say that an index number is ideal ?
10. Assignment problem is a particular case of transportation problem – justify.

**SECTION B**

**Answer any five questions:**

**(5 x 8 = 40 Marks)**

- 11 Find the quartile deviation for the following data:  
Height : 126-130 131-135 136-140 141-145 146-150 151-155 156-160 161-165  
(in cms.)  
No.of boys: 31            44            48            51            60            55            43            28
12. Find the Spearman's rank correlation coefficient for the following data:  
X: 92 89 87 86 86 77 71 63 53 50  
Y: 86 83 91 77 68 85 52 82 37 57
13. Three urns of the same appearance have the following proportion of balls.  
Urn I : 2 black    1 white  
Urn II : 1 black    2 white  
Urn III : 2 black    2 white  
One of the urns is selected and one ball is drawn. It turns out to be white. What is the probability that the outcome originated from i) urn I, ii) urn II and iii) urn III?
14. Two samples are drawn from two normal populations. From the following data test whether the population variances are the same at 5% level.  
Sample I : 60 65 71 74 76 82 85 87  
Sample II : 61 66 67 85 78 63 85 86 88 91
15. A random variable X has the following probability function:  
x : 0 1 2 3 4 5 6 7  
P(X=x) : 0 k 2k 2k 3k k<sup>2</sup> 2k<sup>2</sup> 7k<sup>2</sup> + k  
Find (i) k (ii) P(X < 6) (iii) P(X ≥ 6) (iv) P(0 < X < 5)
16. Calculate Fisher's price index and show that it satisfies time and factor reversal tests. The data follows:  

Commodity	p <sub>0</sub>	q <sub>0</sub>	p <sub>1</sub>	q <sub>1</sub>
A	10	20	12	22
B	15	18	18	20
C	18	16	20	16
D	20	14	22	18
E	25	10	24	15

17. Fit a trend line by the method of least squares to the following data:
- |                 |        |      |      |      |      |      |      |      |
|-----------------|--------|------|------|------|------|------|------|------|
| Year            | : 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
| Sales(lakh Rs.) | : 76   | 80   | 130  | 144  | 138  | 120  | 174  | 190  |

18. A certain equipment needs five repair jobs which have to be assigned to five machines. The estimated time (in hours) that each machine requires to complete the repair job is given in the following table:

	Job				
	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>	J <sub>5</sub>
M <sub>1</sub>	7	5	9	8	11
M <sub>2</sub>	9	12	7	11	10
M <sub>3</sub>	8	5	4	6	9
M <sub>4</sub>	7	3	6	9	5
M <sub>5</sub>	4	6	7	5	11

Assuming that each machine can be assigned to only one job, determine the minimum time assignment.

### SECTION C

Answer any two questions:

(2 x 20 = 40 Marks)

19. Find Karl Pearson's and Bowley's coefficient of skewness for the following data:

Daily sales(in '000Rs.):	0-20	20-40	40-60	60-80	80-100	100-120
No. of items	: 20	50	59	30	25	16

20. Fit a Poisson distribution to the following data which gives the number of doddens in a sample of clover seeds:

No. of doddens(x)	: 0	1	2	3	4	5	6	7	8
Observed frequency:	56	156	132	92	37	22	4	0	1

Also test the goodness of fit at 5% level.

21. Calculate seasonal indices for the following data of sales(in lakhs Rs.) of a firm by the ratio-to-trend method.

Year	I Quarter	II Quarter	III Quarter	IV Quarter
1979	30	40	36	34
1980	34	52	50	44
1981	40	58	54	48
1982	52	78	68	62
1983	86	92	80	82

22. Find the optimum solution to the following transportation problem:

Origin	Destination				Availability
	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	
O <sub>1</sub>	21	16	25	13	11
O <sub>2</sub>	17	18	14	23	13
O <sub>3</sub>	32	27	18	41	19
Requirement	6	10	12	15	

-----