 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION - STATISTICS

FIRST SEMESTER – APRIL 2012

# ST 1817 - STATISTICAL COMPUTING - I

Date : 03-05-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

1. a) For the following frequency distribution fit a poisson distribution and test the goodness of fit at 5 % level. (12 marks)

|  |  |
| --- | --- |
| X | f |
| 0 | 212 |
| 1 | 128 |
| 2 | 37 |
| 3 | 18 |
| 4 | 3 |
| 5 | 2 |

b) The following data gives the frequency of accidents in a city during 100 weeks.

|  |  |
| --- | --- |
| No. of accidents | No.of weeks |
| 0 | 25 |
| 1 | 45 |
| 2 | 19 |
| 3 | 5 |
| 4 | 4 |
| 5 | 2 |

Fit a distribution of the form P (X = x ) = for the given data and test goodness of fit at 5 % level. (21 marks)

1. a) Five biased coin were tossed simultaneously 1000 times and at each toss the no. of heads was observed. The following table gives the no.of heads together with its frequency (17 marks)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X  ( no. of heads) | 0 | 1 | 2 | 3 | 4 | 5 |
| f(x) | 38 | 144 | 342 | 287 | 164 | 25 |

Fit a binomial distribution to the above data and test whether the fit is good at 5 % level.

b)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Travel time Y | 9.3 | 4.8 | 8.9 | 6.5 | 4.2 | 6.2 | 7.4 | 6 | 7.6 | 6.1 |
| No.of deliveries | 4 | 3 | 4 | 2 | 2 | 2 | 3 | 4 | 3 | 2 |
| Miles travelled | 100 | 50 | 100 | 100 | 50 | 80 | 75 | 65 | 90 | 90 |

1. Build a multiple linear regression model for the above data.
2. Determine (17 marks)
3. a) Find the inverse of the following matrix using partitioning method.

A =  (23 marks)

b) Find the rank of A, where A =  (10 marks)

4.a) Determine the characteristic roots and vectors of the matrix

 (15 marks)

b) Write the quadratic forms of the matrix

A =  (18 marks)

5.Compute tolerance and variance inflation factor for each explanatory variable based on auxiliary regression equation and the given data .

|  |  |  |  |
| --- | --- | --- | --- |
| Y |  |  |  |
| 8 | 5.2 | 5.1 | 2.3 |
| 9 | 5.6 | 5.2 | 1.2 |
| 7 | 4.8 | 4.7 | 1.5 |
| 5 | 4 | 3.2 | 1.6 |
| 6 | 6 | 3.2 | 1.4 |
| 4 | 5 | 5.4 | 1.8 |
| 5 | 4.5 | 3.9 | 1.9 |
| 2 | 2.3 | 2.6 | 1.8 |
| 1 | 1.5 | 1.8 | 1.5 |
| 3 | 2.6 | 2.1 | 1.6 |

(33 marks)