 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **NOVEMBER 2012**

# ST 3902 - STATISTICS FOR ECONOMISTS

Date : 10/11/2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**SECTION- A**

**Answer ALL the following: (2 X 10 = 20)**

1) State any two measures of central tendency.

2) Give the formula for rank correlation coefficient.

3) Define independent events.

4) What are the parameters of normal distribution?

5) Define probability of type II error.

6) What is the test statistic for equality of means in large sample test?

7) Write the four components of time series.

8) Give the formula for Fisher’s ideal index number.

9) Define Optimal solution of an Linear Programming Problem.

10) State any two method 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 mean deviation about mean for the following data given below.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
| No. of students | 3 | 8 | 9 | 15 | 20 | 13 | 8 | 4 |

12) Find the coefficient of correlation between X and Y for the following data:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 10 | 12 | 13 | 16 | 17 | 20 | 25 |
| Y | 19 | 22 | 26 | 27 | 29 | 33 | 37 |

13) Five men in a company of 20 are graduates. If 3 are picked out from this 20 persons

random, what is the probability that (i) all are graduates (ii) exactly 2 are graduates and (iii)

atleast one is a graduate.

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 | m2 | 2m2 | 7m2+m |

(i)Find the value m (ii) Evaluate (a) p( X < 6 ) (b) p( X ≥ 6) (c) p( 0 < X < 5 )

15) Number of road accidents during a month follows Poisson distribution with mean 6. Find the

probability that in a certain month number of accidents will be (i) not more than 3, (ii)

between 2 and 4 and (iii) exactly 5?

16) 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?

17) From the following data, calculate price index numbers for 2011 with 2008 as base year by:

(i) Laspeyre’s method, (ii) Paasche’s method and (iii) Fisher’s ideal method

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2008 | | 2011 | |
| Commodity | Price | Quantity | Price | Quantity |
| A | 20 | 10 | 40 | 10 |
| B | 50 | 12 | 60 | 5 |
| C | 40 | 10 | 50 | 10 |
| D | 20 | 20 | 20 | 25 |

18) Suggest optimal assignment of the workers to jobs if the completion time (in hours) of

different jobs by different workers is as given below:

Tasks

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Men | I | II | III | IV |
| Zico | 8 | 7 | 9 | 10 |
| Jay | 7 | 9 | 9 | 8 |
| Muthu | 10 | 8 | 7 | 11 |
| Febin | 10 | 6 | 8 | 7 |

**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 | 65 | 66 | 67 | 67 | 69 | 71 | 72 | 70 | 65 |
| Y | 67 | 68 | 69 | 68 | 70 | 70 | 69 | 70 | 70 |

(ii) Find the standard deviation for the following data given below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Class | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
| Frequency | 2 | 8 | 20 | 35 | 20 | 15 |

20) (i) Three urns are given. Urn 1 contains 2 white, 3 black and 4 res balls, urn 2 contains 3

white, 2 black and 2 red balls and urn 3 contains 4 white, 4 black and 1 red ball. One urn

is chosen at random and two balls are drawn from the urn. If the balls happen to be white

and red, what is the probability that they were drawn from urn 3?

(ii) If 10% of the screws produced by an automatic machine are defective, find the

probability that of 20 screws selected at random, there are (i) exactly two defectives, (ii)

at the most 3 defectives and (iii) between one and four defectives. Find the mean and

variance of the number of defective screws?

21) (i) 10 Accountants were given intensive coaching and four tests were conducted in a month.

The scores of tests 1 and 4 are given below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Marks in I test | 50 | 42 | 51 | 42 | 60 | 41 | 70 | 55 | 62 | 38 |
| Marks in IV test | 62 | 40 | 61 | 52 | 68 | 51 | 64 | 63 | 72 | 50 |

Does the score from test I to test IV show an improvement?

(ii) A random sample of 200 tins of coconut oil gave an average weight of 4.95 kgs with a

standard deviation of 0.21 kgs. Do we accept the hypothesis of net weight 5 kgs per tin at

1% level? (12+8)

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

data:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Sales  (‘000 Rupees) | 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 | 20 | 22 | 17 | 4 | 120 |
| Cochin | 24 | 37 | 9 | 7 | 70 |
| Ranchi | 32 | 37 | 20 | 15 | 50 |
| Requirement | 60 | 40 | 30 | 110 |  |

(10+10)

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