 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Com.** DEGREE EXAMINATION - **COMMERCE**

FIRST SEMESTER – NOVEMBER 2012

# CO 1812 - ADVANCED BUSINESS STATISTICS

Date : 01/11/2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**Section: A**

**Answer all the questions: 10 x 2 =20**

1. A man travels 20kms at 40kms per hour, 10 kms at 60kms per hour, what is his average speed?
2. State whether the following statements are True or False:

a) The positively skewed distribution of the value of mode is greater than the mean.

b) The median is a positional measure of central tendency.

1. Fill in the blank: When the mean is 79 and variance is 64, CV------------------?
2. What is Skewness?
3. Distinguish between Positive and Negative Correlation.
4. What is Time Series?
5. Two cards are drawn from a well shuffled pack of 52 cards. Find the probability that they are both aces, if the first card is not replaced.
6. What is meant by theoretical frequency distribution?
7. What are Type I and Type II errors in testing hypothesis?
8. What are non parametric tests?

**Section: B**

**Answer any five questions: 5 x 8 = 40**

1. Distinguish between process control and product control. State the utilities of Statistical Quality Control.
2. Explain the procedure followed in testing a hypothesis.
3. Discuss the utilities of time series analysis to a businessman and to an economist.
4. Calculate Karl Pearson’s coefficient of skewness from the following data:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks | 15 | 20 | 25 | 30 | 35 | 40 |
| No of students | 12 | 18 | 25 | 24 | 20 | 21 |

1. You are given below the following information about advertisement expenditure and Sales:

|  |  |  |
| --- | --- | --- |
| Particulars | Advertisement Expenditure (X) | Sales (Y) |
| Mean | `20 crores. | `120 crores. |
| S.D | `5 crores. | `25 crores. |

Correlation coefficient 0.8

Calculate the two regression equations.

Find the likely sales when advertisement expenditure is `25crores.

What should be the advertisement budget if the company wants to attain sales target of `150crores.

1. The following table shows the number of customers returning the products in a marketing territory. Fit a Poisson Distribution.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Number of Returns | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Number of Stores | 4 | 14 | 23 | 23 | 18 | 9 | 9 |

1. The following contingency table shows that classification of 1000 workers in a factory, according to the disciplinary action taken by the management and their promotional experience:

|  |  |  |  |
| --- | --- | --- | --- |
| Disciplinary Action | Promotional Experience | | Total |
| Promoted | Not Promoted |
| Offenders | 30 | 670 | 700 |
| Non offenders | 70 | 230 | 300 |
| Total | 100 | 900 | 1000 |

Use Chi-Square test to ascertain whether the disciplinary action taken and promotional experience are associated.

1. A) A company has been producing steel tubes of mean inner diameter of 2cm. A sample of 10 tubes gives an inner diameter of 2.01 cm and a variance of 0.004cm. Is the difference in the value of mean significant? The value of t for 9 df at 5% level = 2.262.

B) A sample of 900 items has a mean 3.4 and a standard deviation 2.61. Can the sample be regarded as drawn from a population with a mean 3.25 at 5% level of significance?

**Section: C**

**Answer any two questions: 2 x 20 = 40**

1. The sales of a company for the last eight years are given below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Sales ( ` in thousands) | 52 | 45 | 98 | 92 | 110 | 185 | 175 | 220 |

Fit a straight line trend by the method of least squares and estimate the sales for 2013.

1. The following data represent the number of units of production per day by 5 different workers using 4 different types of machines:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| WORKERS | MACHINE TYPE | | | |
| A | B | C | D |
| 1 | 44 | 38 | 47 | 36 |
| 2 | 46 | 40 | 52 | 43 |
| 3 | 34 | 36 | 44 | 32 |
| 4 | 43 | 38 | 46 | 33 |
| 5 | 38 | 42 | 49 | 39 |

Construct a Two Way ANOVA by coding method of subtracting each value by 40 to test whether the mean productivity is the same for the different machine type and to test whether the five men differ with respect to mean productivity.

1. A company’s trainees are randomly assigned to groups which are taught a certain industrial inspection procedure by three different methods. At the end of the instructing period they are tested for inspection performance quality. The following are their scores.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Method | Scores | | | | | | |
| A | 70 | 73 | 69 | 75 | 80 | 58 | |
| B | 72 | 74 | 50 | 62 | 76 | 57 | 81 |
| C | 83 | 55 | 67 | 68 | 78 | | |

Use the Kruskal-Wallis Test to determine at the 0.05 level of significance whether the three methods are equally effective.

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