

K J SOMAIYA INSTITUTE OF MANAGEMENT STUDIES & RESEARCH

PGDM (B) – 2017-19 TRIMESTER (I)

ENDTERM EXAMINATION

BUSINESS STATISTICS

Date 25<sup>th</sup> September 2017

TIME: 3 HRS

TOTAL MARKS: 50

NOTE:

1. Write detail analysis in the answer sheet.
2. Kindly make assumptions, if any.
3. Question number 1,2,3,4 and 6 carry 8 marks.
4. **Question number 5 is compulsory and carries 10 marks.**
5. Refer to the excel file for relevant data.

Q.1.

As the US population ages, the number of people needing medical attention increases. Unless a cure is found in the next decade, one of the most expensive diseases requiring such care is Alzheimer's, a form of dementia. To estimate the total number of Alzheimer's cases in future, a survey was undertaken. The survey determined the age bracket were 1-65=74, 2- 75-84, 3-85and over and whether the individual had Alzheimer's (1=no, 2=yes). Here are the projections for the number of Americans (thousands) in each of the three age categories. (Refer to excel file)

Age category	2017	2022	2027
65 to 74	26,967	32,312	36,356
75 to 84	13,578	15,895	20,312
85 and over	6,292	6,597	7,239

1. Determine the 95% confidence interval estimates of the proportion of Alzheimers patients in each of the three age categories.
2. For each tear listed, determine 90% confidence interval estimate of the total number of Americans with Alzheimer's disease.

Q.2. The monthly returns of RIMM and the standard and poor's index (a measure of overall NYSE stock market) were recorded for each month between January 2008 and December 2012. Some of these data are shown here. Estimate the market model and analyze the results.( Refer to excel file)

Q. 3. A producer of various kinds of batteries has been producing "D" size batteries with a life expectancy of 87 hours. Due to an improved production process, management believes that there has been an increase in the life expectancy of their "D" size batteries. A sample of 36 batteries showed an average life of 88.5 hours. Assume from past information that it is known that the standard deviation of the population is 9 hours.

- a. At 90% confidence using the critical value approach, test management's belief.
- b. Estimate confidence interval for mean at 95%

Q.4. The recent average starting salary for new college graduates in IT systems is \$47,550. Assume salaries are normally distributed with a standard deviation of \$4,500.

1. What is the probability of a new graduate receiving a salary between \$45,000 and \$50,000?
2. What percent of starting salaries are no more than \$42,250?
3. What is the cutoff for the bottom 5% of the salaries?
4. What is the cutoff for the top 3% of the salaries?

Q.5

1. The manager of a grocery store has taken a random sample of 100 customers. The average length of time it took these 100 customers to check out was 3.0 minutes. It is known that the standard deviation of the population of checkout times is one minute, therefore
  - a. The standard error of the mean equals-
  - b. With a .95 probability, the sample mean will provide a margin of error of-
  - c. The 95% confidence interval for the true average checkout time (in minutes) is-
2. Explain an empirical rule?
3. How do we detect outliers with the help of Box and whisker plot?
4. The owner of a pharmacy outlet wants to determine what proportion of people who enter his shop are his regular customers. What size sample should he take so that at 97% confidence the margin of error will not be more than 0.1?
5. An electronics retailer is interested in studying the incomes of consumers in a particular area. The population standard deviation is known to be \$1,000. What sample size would the researcher need to use for a 95% confidence interval if the difference between UCL and LCL should not be more than \$100?