**Quantitative Methods - I**

**Jun 2025 Examination**

**PLEASE NOTE: This assignment is application based, you have to apply what you have learnt in this subject into real life scenario. You will find most of the information through internet search and the remaining from your common sense. None of the answers appear directly in the textbook chapters but are based on the content in the chapter**

**Q1. From a large batch of batteries, a sample of size 50 is drawn. The average lifespan of the batteries is 1200 hours with a standard deviation of 200 hours.**

**1. Find the probability that the mean lifespan of the sample is less than 1150 hours. (3 Marks)**

**2. Calculate the 95% confidence interval for the sample mean lifespan. (4 Marks)**

**3. Discuss the effect of increasing the sample size to 100 on the standard error and the probability calculation. (3 Marks)**

**(10 Marks)**

**Ans 1.**

**Introduction**

Analyzing actual facts and making wise conclusions depend much on statistical techniques. Interpreting data and grasping differences in various processes depend on quantitative techniques, especially inferential statistics and probability theory. In this regard, companies and researchers regularly deal with sampling methods to project population values. Analyzing the lifetime of batteries utilizing statistical techniques including probability computations, confidence intervals, and standard error analysis is the presented challenge. These techniques allow one to evaluate the dependability of estimations and the probability of particular results. In quality control, risk assessment, and decision-making, knowledge of these ideas is absolutely

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**Q2A. A deck of cards contains 10 red and 6 black cards. If two cards are randomly drawn without replacement, what is the probability that both cards drawn are black?**

**What is the probability that at least one of the two cards drawn is red? Total 5 Marks**

**Ans 2A.**

**Introduction**

Business decision-making depends much on probability since it helps companies evaluate risks, project future results, and maximize processes. To project uncertainty in market trends, financial investments, and quality control procedures, businesses turn to probability models. Knowing probability helps companies to make data-driven decisions, lower possible losses, and increase efficiency. Probability offers a methodical strategy to handle uncertainty and

**Q2B. A milling machine is set to produce rods that have an average length of 15.00 cm. The machine is known to have a standard deviation () of 0.3 cm. The customer specifies the rod length to be within 14.80 cm and 15.20 cm. What is the acceptance percentage given the setting and age of the machine (age determines the standard deviation)? (5 Marks)**

**Ans 2B.**

**Introduction**

Essential tools in statistical analysis, confidence intervals offer a range within which a population parameter is probably to lie. Confidence intervals are used by companies, academics, and legislators to guide judgments grounded on sample data. Organizations can lower uncertainty in forecasting, quality control, and performance assessment by approximating population characteristics with a given degree of confidence. In many different domains, confidence intervals govern decision-making procedures and assist to evaluate the