

**Assignment Code: DA-AG-006**

# Statistics Advanced - 1| Assignment

**Instructions:** Carefully read each question. Use Google Docs, Microsoft Word, or a similar tool to create a document where you type out each question along with its answer. Save the document as a PDF, and then upload it to the LMS. Please do not zip or archive the files before uploading them. Each question carries 20 marks.

**Total Marks:** 200

**Question 1:** What is a random variable in probability theory?

**Answer:**

**Question 2:** What are the types of random variables?

**Answer:**

**Question 3:** Explain the difference between discrete and continuous distributions.

**Answer:**

**Question 4:** What is a binomial distribution, and how is it used in probability?

**Answer:**

**Question 5:** What is the standard normal distribution, and why is it important?

**Answer:**

**Question 6:** What is the Central Limit Theorem (CLT), and why is it critical in statistics?

**Answer:**

**Question 7:** What is the significance of confidence intervals in statistical analysis?

**Answer:**

**Question 8:** What is the concept of expected value in a probability distribution?

**Answer:**

**Question 9:** Write a Python program to generate 1000 random numbers from a normal distribution with mean = 50 and standard deviation = 5. Compute its mean and standard deviation using NumPy, and draw a histogram to visualize the distribution.

*(Include your Python code and output in the code box below.)*

**Answer:**

**Question 10:** You are working as a data analyst for a retail company. The company has collected daily sales data for 2 years and wants you to identify the overall sales trend.

```
daily_sales = [220, 245, 210, 265, 230, 250, 260, 275, 240, 255,  
              235, 260, 245, 250, 225, 270, 265, 255, 250, 260]
```

- Explain how you would apply the Central Limit Theorem to estimate the average sales with a 95% confidence interval.
- Write the Python code to compute the mean sales and its confidence interval.

*(Include your Python code and output in the code box below.)*

**Answer:**