United International University

School of Science and Engineering

CT-02 Trimester: Summer-2020 Section: A

Course Title: Probability and Statistics

Course Code: Stat 205 Marks: 20 Time: 30 Mins

(Answer all the questions)

1. Given that $\boldsymbol{E[X + c] = 10}$ and $\boldsymbol{E[(X + c)^2] = 116}$. Find the mean and variance of $\boldsymbol{X}$. **[8]**

2. It is claimed that $\mathbf{55}\%$ of the birds in a particular region have severe disease. Suppose that $\mathbf{15}$ birds are selected at random. Let $\boldsymbol{X}$ is the number of birds that are have the disease. Assuming independence, how is $\boldsymbol{X}$ distributed? **Find** the probability that **(i)** at least ***two*** birds, **(ii)** at most ***thirteen*** birds and **(iii) none** of the birds have the disease. **[8]**

3. Consider the ***mgf*** of random variable $\boldsymbol{X}$ is $\boldsymbol{M(t) = \frac{0.3e^t}{1-0.7e^t}}$. How $\boldsymbol{X}$ is distributed? Find $\boldsymbol{E(X)}$. **[4]**