**Investment Assignment – 55 points**

**Question 1 – 20 points**

**Topic: Return on Investment (ROI)**

ROI is used by executives to decide where to invest financial assets. The finance group of a company may use ROI to decide whether to fund project A or project B. The formula for calculating ROI is given below.

$$ROI=\frac{Expected Returns-Cost of Investment}{Cost of Investment}$$

Lenor Company manufactures memory chips. The company wants to expand production to a faster memory chip which will cost $2M. This new chip is expected to bring $6M over the next three years. What is the ROI? Use approximately 100 words to explain your answer.

**Topic: Return on Security Investment (ROSI)**

Question 2 – 20 points

Security investment is a little more complex. There are no tangible gains in investment directed at information security. The return is measured on risk avoidance. The formula for calculating ROSI is given below.

$$ROSI=\frac{\left(Risk Exposure\* \% of RISK MITIGATED\right)-Solution Cost}{Solution Cost} $$

Kaplan University has been attacked by the BAD-VIRUS before. The damages as a result of the BADVIRUS in 2014, was $52,000 for all occurrences and all users. The implementation of an anti-Virus solution was $25000 for all of its users. The anti-Virus solution worked 75% of the time on BAD-VIRUS.

Identify the following from the data given:

What is the Risk Exposure?

What is the percentage of risk mitigated?

How much did the solution Cost

Using the formula given in Question 2, compute ROSI?

Do think that anti-Virus solution is worth the investment? Use approximately 150 words to explain your answer.

**Topic: Quantifying Risk Exposure**

Problem 3 – 20 points

Before we look at an equation to calculate Risk Exposure (RE) on an annual basis (ALE), let me point out that the equation for Risk Exposure uses two variables - Single Lost Exposure (SLE) and Annual Loss Exposure (ARO). ALE is the product of these two variables. The equation for ALE is given below.

$$ALE=SLE\*ARO$$

Suppose the ARO is 0.5 (once in two years) and the SLE is $10,000. Computer the ALE. Use approximately 50 words to explain what this value means.

**Topic: A more Complex Problem using ALE**

Problem 4 – 40 points

Definition of vulnerability, threat and risk of problem #4

1. Vulnerability – No backup
2. Threat – A Laptop failure
3. Risk – Data Loss

What is the asset in problem 4?

Suppose the asset is worth $50,000. The Single Lost Expectancy (SLE) is computed by multiplying the Actual Value by the Exposure Factor

In our case the *SLE = Actual Value (AV) X Exposure Factor (EF).* The **Exposure Factor** is the loss that can occur as a result of the threat. For problem #4, we are going to assume that the SLE is $10,000. What is EF?

EF = \_\_\_\_\_\_\_\_\_\_

We are going to keep the ARO (the frequency of the threat every year) as .5 assuming that the laptop crashes once every two years.

Compute the ALE. Remember $ALE=SLE\*ARO$

ALE = \_\_\_\_\_\_\_\_\_\_\_\_\_

Generally the equation below is used to decide whether to implement a particular mitigation strategy

Mitigation Investment (M1) = ALE1 (before the Mitigation Investment) – ALE2 (after the Mitigation Investment) – Total Cost of implementing the mitigation strategy (TC).

$$MI=ALE1-ALE2-TC$$

Suppose the cost of completing and maintaining a backup for a laptop is $400 and the ALE2 is $1000. What should be the allowable investment for this security risk? Explain in less than 200 words.