Question 1:

A prominent logistic company was in the midst of implementing its Endpoint Detection and Response (EDR) solution to gain insights into the volume of alerts it received round-the-clock. The primary objective was to assess the alert landscape before making further enhancements to its cyber-security strategy. As part of this evaluation, the company reviewed its alert management processes. Despite having a 24x7 response team, the team was not exclusively dedicated to security operations. Consequently, the company sought a cost-effective means to scale up the team's capacity and expertise. During the rollout of the EDR solution and the discussion surrounding out-of-hours alert management, the company was hit with a ransomware attack. In response to this critical situation, ArchGate was appointed as a digital forensics and incident response partner.

A.

B. What kind of usefulness ArchGate can achieve if they follow layered software structure for their digital forensic platform? [3 Marks]

b. What kind of usefulness can ArchGate achieve if they follow decomposed software structure for their digital forensic platform? [3 Marks]

B. What kind of availability tactics should be followed by ArchGate to repair the loss by the ransomware attack? [4 Marks]

Question 2

You can write your answers in the provided space or write your answer on a piece of paper and scan and upload the handwritten answers using the QR Code available in the Scan and Upload Section of this exam.

Kindly ensure all answer sheets be uploaded against the corresponding questions only. All sheets should not be uploaded against one question.

A.

a. What is the purpose of architecture evaluation? [2 Marks]

b. Explain what is meant by design trade-off with the help of an example. [2 Marks]

B. Choose the most appropriate architectural tactic (one) for each of the 3 descriptions below. Explain in detail the reason for selection the architectural tactic. Explain the quality attribute impacted by this tactic and how.

a. Wants to set up a set of equal distributed computational entities that are connected via a common protocol to share their services and provide high availability and scalability. [2 Marks]

b. Wants a system that can be divided into reusable, loosely coupled components that can be flexibly combined and arranged to transform between various data formats. [2 Marks]

c. Wants a system that quickly can analyse enormous volumes of data by sorting the data and then analysing the grouped data. [2 Marks]

Question 3:

Case Study: Modernizing a Digital Library System

Background: A large academic institution is modernizing its digital library system to better support research and educational activities. The original system, which has been in place for over a decade, is outdated and struggles with scalability, user experience, and integration with newer technologies. The goal of the modernization project is to design a new system architecture that addresses these issues while improving performance and user satisfaction.

Project Scope: The new system will include a redesigned user interface, improved data management, enhanced search functionality, and integration with other academic tools and databases. The team is considering various architectural approaches and principles to ensure the system meets current and future needs.

Now please answer the following questions. All components of your answers must relate to the above case study. General answers which do not connect to the above case will not be evaluated.

a. What architectural tactics could be employed to ensure the performance quality attribute of the new digital library system is optimized? [2 Marks]

b. What are the key considerations when reconstructing or redesigning an existing software system, such as the digital library system? [2 Marks]

c. If you wish to reconstruct the architecture before redesigning the software system, how would you go about it? [2 Marks]

d. How can the 4+1 View Model be used to analyse and design the architecture of the new digital library system? Demonstrate with rough sketches. [4 Marks]
