"Investing in Africa's future"

COLLEGE OF ENGINEERING AND APPLIED SCIENCES(CEAS)
NCSE 411: CLOUD INFRASTRUCTURE AND SERVICES

END OF SECOND SEMESTER EXAMINATIONS
APRIL 2025
LECTURER: MR MAGWAGWA
DURATION: 3 HOURS

INSTRUCTIONS

Answer the question as per the instructions given in the sections

Answer **ALL** Questions in **Section A**

Answer Any Two (2) Questions in **Section B**

Start **each** question on a new page on your answer sheet.

The marks allocated to **each** question are shown at the end of the section.

Section A

Question One

As a DevOps Engineer, you are tasked with implementing cloud infrastructure for a web application that experiences fluctuating traffic. Discuss the load balancing strategies available to you, the algorithms you would use, and how you would implement auto-scaling in this context. **[30 Marks]**

Question Two

a) Discuss how parallel and distributed computing can enhance the performance of data processing tasks in a cloud environment. Provide examples of applications that benefit from these computing theories. **[20 Marks]**
b) Explain how you would handle potential bottlenecks in the MapReduce process. **[5 Marks]**
c) Explain the role of service models (IaaS, PaaS, SaaS) in Cloud Computing. **[5 Marks]**

Section B

Question Three

a) Identify three critical components of a Service Level Agreement (SLA) that impact cloud service performance. **[10 Marks]**
b) Compare and contrast uses of the SLA, SLO and SLI **[10 Marks]**

Question Four

a) Explain the different types of virtualization and how each contributes to resource management in a cloud environment. **[10 Marks]**
b) Discuss the key performance metrics a DevOps Engineer would use to diagnose cloud performance issues. **[10 Marks]**

Question Five

a) With the aid of a diagram, explain the component of a cloud infrastructure **[5 Marks]**
b) Discuss the importance of Identity and Access Management (IAM) in cloud security. **[7 Marks]**
c) Compare and contrast the Google File System and Hadoop Distributed File System. **[8 Marks]**

END OF PAPER