

CHUKA



UNIVERSITY

## UNIVERSITY EXAMINATIONS

**FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF  
BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE**

**ACSC 429: UNIX SYSTEMS ADMINISTRATION AND PROGRAMMING (LINUX)**

**STREAMS: BSC. ACSC**

**TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 16/04/2025**

**8.30 A.M. – 10.30 A.M.**

**INSTRUCTIONS:****SECTION A (COMPULSORY)****QUESTION 1 (COMPULSORY) [30 MARKS]**

- a) Assume a certain text.txt file contain the following text “*this boy is the cruel one who hit a dog*”. Explain what the following awt command will perform to text.txt, and hence print the output. (4 marks)

```
awk '{ print $2, $1 }' data.txt
```

- b) While using vi command for editing text, you can use either h, j, k, and l keys to move the cursor. Outline how each of the keys affects the cursor movement (4 marks)
- c) Using an example showing an output, explain what the following environment variables does
- i) HOME (2 marks)
  - ii) UID (2 marks)
  - iii) PATH (2 marks)
- d) Write a shell script using FUNCTIONS that prompt a user to enter his first name, and two numbers. it then prints the name and the sum of two numbers (6 marks)
- e) Differentiate between the following items in Unix operating system: -
- i) Shell scripting vs. perl scripting (2 marks)
  - ii) echo "Hello" > file.txt vs. echo "World" >> file.txt (2 marks)
- f) Explain what the following UNIX pipelines does (6 marks)
- i) ls -lt | head
  - ii) du | sort -nr
  - iii) find . -type f -print | wc -l

**SECTION B (ANSWER TWO QUESTION FROM THIS SECTION)**

**QUESTION 2 [20 MARKS]**

- a) Explain what a process is; hence outline a command that list all the processes that are going on in a UNIX system. (3 marks)
- b) Outline the steps of changing a shell from Bourne shell to C shell in UNIX. (3 marks)
- c) When you type *ls -l* the system returns lines of statements with 7 columns each. Using an example, explain the contents of each column in their respective order (8 marks)
- d) Using a case statement programming tool, write a shell script that prompts a user to enter a number between 1 and 5 inclusively. If the user enters 1 it returns excellent, 2 it returns good, 3 it returns average, 4 it returns below average, and 5 it returns fail. (6 marks)

**QUESTION 3 [20 MARKS]**

- a) Explain SIX special variables that can be used in shell scripting. (6 marks)
- b) Using an example, Explain the following redirection commands
  - i) `P>&m` (2 marks)
  - ii) `P>>somefile` (2 marks)
  - iii) `find . -name 'my*' 2>error.log` (3 marks)
- c) Explain what happens when each of the following codes are keyed in a bash console. Hence write the output.
  - i) `declare -i number`  
`number=2+4*10`  
`echo $number` (2 marks)
  - ii) `another=2+4*10`  
`echo $another` (2 marks)
  - iii) `number="foobar"`  
`echo $number` (3 marks)

**QUESTION 4 [20 MARKS]**

- a) Explain the usage of the following Linux commands in TCP/IP management
  - i) `route -n` (2 marks)
  - ii) `netstart -t` (2 marks)
  - iii) `ifconfig -a` (2 marks)
- b) Write a shell script that will prompt a user to enter a number, then it returns the factorial of the number. (6 marks)
- c) Explain the following terminologies with regard to UNIX programming language (8 marks)
  - i) Filter
  - ii) Pipeline
  - iii) Kernel
  - iv) Shell

**QUESTION 5 [20 MARKS]**

- a) Explain the importance of the following directories in UNIX (5 marks)
- i) /lost+found/
  - ii) /usr/bin/
  - iii) /usr/include/
  - iv) /usr/lib/
  - v) /usr/local/
- b) Name FIVE Unix commands that can be used to shut down the system, hence outline how the command shuts down (5 marks)
- c) With reference to perl scripting: -
- i) Write a perl script that prompts a user to enter two integers, then it returns their sum and product, only if the second integer is greater than the first integer. If the second integer is lesser than the first integer, it prompts the user to enter a first integer which is greater than the second, and the system exits. (7 marks)
  - ii) Outline how to set permissions of the above script such that the user has all the privileges, while group and others have only read and execute privileges. (3 marks)
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