FM : 60
Time : 3 hrs

Special Instruction: **You are required to write down the commands you run and their outputs for each action you do.**

1.
   (a) Create a directory with your roll no. and make it the current working directory
   (b) What is your user name / login name?
   (c) Which shell is associated with the user?
   (d) Does your computer has ***vi***, ***emacs***, ***ed***, ***grep*** and ***awk*** installed ?
   (e) Which version of the unix/linux kernel do you have?

2.
   (a) Inside your working directory, create 10 (ten) empty files with filenames containing “mtx”.
   (b) Using any text editor, type the following text and save it with the name “intro”.: -

       The Unix operating system was pioneered by Ken
       Thompson and Dennis Ritchie at Bell Laboratories
       in the late 1960s.
       One of the primary goals in
       the design of the Unix system was to create an
       environment that promoted efficient program
       development.

   (c) Print the contents of the file “intro” with line numbers.
   (d) Add the contents of the file “intro” twice into a new file “intro2”.
   (e) Count lines, words and characters of both the files.

3.
   (a) Show all the environment variables in alphabetical order.
   (b) Set 5 (five) shell variables; two of them should contain shell commands and the rest should have numbers.
   (c) Concatenate the three variables that contain values.
   (d) Find the summation of the three variables.
   (e) Execute the two commands from within the shell variables.

4. [Hint: Use ***ed*** or ***grep*** which one is appropriate to perform the following tasks: -]
   (a) Replace all occurrences of “Unix” in the file “intro” by “Unix/Linux”; and save the changes.
   (b) Delete all the vowels of the file “intro”. How many characters are remaining in the file now?
   (c) Search for “Unix” in files “intro” and “intro2”.
   (d) Explain step-by-step the command sequence ***ls /etc -l | grep '^d' | wc -l***
   (e) How many lines are there in the file “intro2”, which contain the words having two characters only [e.g. of. to, by etc.]

5. Make necessary modifications to the shell script below in order to print the no. of lines that contain any numerical value. *[Hint: Take the file “intro2” as the argument for testing.]*

```
#!/bin/bash
# countem is the script name
echo "File \"$1\" contains \
exactly ‘wc $1 | cut -c6-7‘ lines."
```

```
exit 0
```

6. Taking the following shell program as an example, write a script that sums 3 (three) random numbers. The script should run in verbose mode and should also show every instruction details including iterations inside the loop.

```
#-------------------------------------------------
# 10 random numbers generation
#-------------------------------------------------
#!/bin/bash
i=0
while [ $i -lt 10 ]
do
        x=$RANDOM
        echo $x
        let i=$i+1
done
```