ROLL NO. ________________

Code: AC71/AT71 Subject: UNIX SYSTEMS PROGRAMS

AMIETE – CS/IT

Time: 3 Hours **JUNE 2014** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions, answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. A program is read into memory and is executed by the kernel as result of one of the __________ exec functions.

(A) four **(B)** eight
(C) six **(D)** five

b. The binary function for process control:

(A) fork **(B)** enec
(C) waitpid **(D)** all of these

c. The current working directory is an attribute of a _______; the home directory is an attribute of a _________

(A) process, login name **(B)** email, signal
(C) login name, process **(D)** none of these

d. Portable applications that need to move to non-UNIX systems should use ________ and _________.

(A) ftell, fseek **(B)** ftello, fseeko
(C) fgetpos, fsetpos **(D)** none of these

e. A file is created by calling the ____________ function.

(A) open **(B)** fcreate
(C) fopen **(D)** all of these

f. File descriptors 2, 1 and 0 can be replaced in POSIX-compliant applications with symbolic constants:

(A) STDIN_FILENO, STDOUT_FILENO, STDERR_FILENO respectively
(B) STDOUT_FILENO, STDIN_FILENO, STDERR_FILENO respectively
(C) STDERR_FILENO, STDIN_FILENO, STDOUT_FILENO respectively
(D) STDERR_FILENO, STDOUT_FILENO, STDIN_FILENO respectively

g. The kernel maintains a file table for all open files. Each file table entry contains

(A) The file status flags for the file
(B) The current file offset
(C) A pointer to the v-node table entry for the file
(D) All of these

h. When we write data to a file, the data is normally copied by the kernel into one of its buffers and queued for writing to disk at some later time. This is called….

(A) delayed write **(B)** write
(C) later write **(D)** postponed write

i. Directories are deleted with the

(A) deldir **(B)** rmdir
(C) erasedir **(D)** fdir

j. The **_____________** function is the catchall for I/O operations.

(A) fsync **(B)** fcntl
(C) ioctl **(D)** fdatasync

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. With the help of a diagram, explain the architecture of the UNIX operating system. **(8)**

b. Write a program to turn on one or more of the status flags for a descriptor. **(8)**

Q.3 a. A file size of 0 is valid for a regular file. The *st_size* field is defined for directories and symbolic links. Should we ever see a file size of 0 for a directory or a symbolic link? **(8)**

b. What is the purpose of following functions? Explain briefly using example.
mkdir, rmdir, chdir, fchdir **(8)**

Q.4 a. What are the two functions that are provided by the standard I/O library to assist in creating temporary files? Write a program demonstrating these two functions. **(2+8)**

b. What are the three functions in Linux to fetch and set the supplementary group IDs? Describe. **(6)**

Q.5 a. Describe the similarities and differences between *wait* and *waitpid* functions. **(6)**

b. What is a *zombie*? Write a program that creates a *zombie*. **(10)**

Q.6 a. With the help of a diagram, describe the typical memory arrangement of a C program. **(8)**

b. Why are the logout records written by the init process? Is this handled the same way for a network login? **(8)**

Q.7 Write brief notes on the following:

(i) Kill and raise function
(ii) Alarm and pause function **(8+8)**

Q.8 a. Define daemon processes. Mention coding rules for daemon processes. **(8)**

b. Write a program that prints the current window size and goes to sleep. Each time the window size changes, SIGWINCH is caught and the new size is printed. We have to terminate the program with a signal. **(8)**

Q.9 a. How is Semaphores implemented? Explain with example. **(8)**

b. Explain the fopen and fclose functions. **(8)**