Subject: LINUX INTERNALS

Time: 3 Hours **DECEMBER 2010** **Max. Marks: 100**

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 half an hour 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. In Linux, a task is a generalization of the usual _____ concept.
(A) Thread
(B) Class
(C) Process
(D) Program

b. How many entries are made in the kernel for each file used in the system?

(A) Three **(B)** Two
(C) One **(D)** Four

c. The expansion for Linux kernel acronym LILO is:

(A) Last In Last Out **(B)** LInux LOader
(C) Last In Linux Out **(D)** LInux Last Out

d. The simplest variant of connectionless data exchange are:

(A) Signals **(B)** Semaphores
(C) Message Queues **(D)** None of the above

e. All the information which is essential for managing the file system is held in:

(A) Data block **(B)** Inode block
(C) Boot bock **(D)** Super block

f. In _____ mode, the driver constantly interrogates the hardware.

(A) Interrupt **(B)** Polling
(C) Either of the above **(D)** None of the above

g. The following are network devices under Linux:

(A) IDE disk, Ethernet **(B)** IDE disk, SLIP-PLIP
(C) Ethernet, SLIP-PLIP **(D)** Ethernet, Semaphore

h. Message queues and semaphores are features of

(A) Interprocess Communication **(B)** Memory management
(C) Device management **(D)** Interrupts

i. LINUX Kernal is written in which languages?

(A) C and C++. **(B)** C# and C
(C) Only C **(D)** C and Assembler

j. Files are held on block devices, which can process requests to read or write blocks of data. Which of the following combination specifies the valid block sizes for any given device?

(A) 512, 1024, 2048, 4096 **(B)** 128, 512, 1024, 2048
(C) 512, 1024, 2048, 4096, 8192 **(D)** 64, 128, 512, 1024, 2048

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

Q.2 a. Mention any four main characteristics of LINUX operating system. **(4)**

b. Explain sequence of steps to compile Kernel. **(8)**

c. Mention any four group device drivers in LINUX along with subdirectories in which they are stored. **(4)**

Q.3 a. Describe the six most important states in a process management. **(6)**

b. Explain any two process management algorithms. **(6)**

c. Mention any four system calls and give its syntax. **(4)**

Q.4 a. Explain how linear address translation is done in architecture independent memory model. **(6)**

b. Mention any four memory page flags used in paging under LINUX. **(4)**

c. Explain working of block device caching. Mention functions used in block device caching. **(6)**

Q.5 a. Explain how inter-process communication is supported by LINUX in kernel between process and network. **(8)**

b. Explain pipes and give their functionality. **(3)**

c. Explain any two system V IPC techniques. **(5)**

Q.6 a. Explain different layers in the LINUX file system. Draw the block diagram of layered file system. **(8)**

b. Explain structure of a Ext2 file system Proc file system. **(8)**

Q.7 a. Mention any four characters and block devices used in LINUX. **(4)**

b. Explain different transfer operation modes supported by the DMA controller? **(4)**

c. Explain working of polling and interrupts in device drivers. **(8)**

Q.8 a. Explain TCP and UDP protocols. **(8)**

b. Explain any two network devices under LINUX. **(8)**

Q.9 a. Can the LINUX kernel be debugged using GNU debugger gdb? If so, what are the conditions needed to be satisfied? **(4)**

b. Mention various module function used in Kernel. Explain Kernel daemon. **(4)**

c. In the development of the multi-processor LINUX system, mention the changes needed to upgrade kernel. **(8)**