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**NEW SCHEME**

**Sixth Semester B.E. Degree Examination, Dec. 06 / Jan. 07**  
**Computer Science and Engineering**  
**UNIX Systems Programming**

Time: 3 hrs.]

[Max. Marks:100

- Note:** 1. Answer any *FIVE* full questions.  
2. Diagrams must be neatly drawn.  
3. Programs if any must be well documented.

- 1 a. What is the need for standardization of UNIX and C programming language? Bring out the major differences between ANSI C and K&R C with examples. (08 Marks)  
b. List at least four compile time limits along with their minimum values and explain their meaning. Write program that displays the values of the above configuration limits using sysconf and pathconf functions. (08 Marks)  
c. Write short notes on POSIX.1 FIPS standard. (04 Marks)
- 2 a. Give a detailed description of the kernel support for files and also explain with a neat diagram the data structure it maintains for its files. (08 Marks)  
b. Explain the following APIs along with their prototype definitions:  
i) open ii) lseek iii) fstat iv) chmod v) link vi) umask. (12 Marks)
- 3 a. List and explain five different file types that are supported on UNIX along with the procedure to create file of each type. (10 Marks)  
b. List common set of attributes of a file, maintained by a file system and explain the need for storing these attributes. (05 Marks)  
c. Which of the above (Q.3 b) attributes remain unchanged? Name the commands to be used to change modification time and the hard link count. (05 Marks)
- 4 a. Give the complete description and usefulness of fcntl and lseek file APIs with an example for each. (08 Marks)  
b. Describe the stat structure used in stat or fstat API. How do you use fstat to display access permission and file types? Give the code listing that is required. (10 Marks)  
c. For what type of sticky flag is applicable? What is its implication when set? (02 Marks)
- 5 a. Process creation and management are the corner stone of a multi-user and multitasking OS. Justify this statement and list the advantages of allowing any process to create new processes. (06 Marks)  
b. Give the description of fork system call, explaining its purpose, prototype, description and the values it returns on success and meaning of the error when it fails. (06 Marks)  
c. What is a Zombie process? What is the overhead associated with Zombies? Write a program that waits for its child process to terminate and returns its exit status. Use appropriate macros to display all possible exit status values. (08 Marks)

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- 6 a. What is race condition? How would you use polling to avoid race conditions? What is the disadvantage of polling? Suggest a suitable technique that obviates the problem associated with polling. (06 Marks)
- b. What is a signal? Explain the different dispositions of a signal when it occurs. When do you say a signal is pending? Write a program that masks SIG\_PIPE and SIG\_ABORT signals, check if they are pending. If pending, unmask and service them. (08 Marks)
- c. What is a Daemon process? Give examples. Explain the procedure along with the code to create a Daemon process. (06 Marks)
- 7 a. List the different IPC mechanisms supported on UNIX or POSIX along with their characteristics. Explain with code example how would you run a pager to display output of parent in the child process, using pipe. (07 Marks)
- b. What is a Coprocess? Illustrate with an example code the usefulness of a coprocess. (06 Marks)
- c. Bring out the importance of key in IPC on system V UNIX. What are the different ways of generating a key? Explain with example, how would you create a message queue and perform send and receive messages. (07 Marks)
- 8 a. Illustrate need and use of setjmp and longjmp functions with an example. How are sigsetjmp and siglongjmp different from the above? (07 Marks)
- b. How would you create hard and soft links to a file? Bring out the important differences between the two with an example. (06 Marks)
- c. With a neat sketch, describe the terminal login process clearly indicating the role of each process in the process. Also indicate the important differences between terminal and network logins. (07 Marks)

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