Sl. No. 07 9.P. : 5966

4/12/17 (M)

Unique Paper Code	:	**2341301**
Name of the Paper	:	**Operating Systems (~~ER~~)**
Name of the Course	:	**BTech Computer Science**
Semester	:	**III (~~ER~~)**
Duration	:	**3 Hours**
Maximum Marks	:	**75**
Instructions	:	**Section A is Compulsory. Attempt any 4 questions from Section B. Parts of a question must be answered together.**

F-9

SECTION A

1. a) Explain Dual Mode operation of Operating system. 2

b) Which of the following information should be privileged? 2

i) Issue a trap Instruction
ii) Read the clock
iii) Turn off interrupts
iv) Switch from user to kernel mode

c) Which system calls are used for copying a file from source file to destination? 3

d) What will be the output at line A and B in the following program? 2

```
main( )
{       pid_t pid, pid1;
        pid = fork( );
        if (pid == 0)
        {       pid1 = getpid( );
                printf("child: pid is %d", pid);          /* line A */
                printf("second child pid is %d", pid1);   /* line B */
        }
        return 0;
}
```

e) How are threads different from processes? Give an example where threads are more appropriate than processes. 2

f) Differentiate between the following 2+2

i) wait( ) and signal ( ) operation
ii) Logical and Physical Address

g) Compare Round Robin and FCFS algorithms of CPU scheduling with a small example. 3

h) List four necessary conditions for deadlock to occur in the system. 2

i) Consider a logical address space of 64 pages of 1,024 words each, mapped onto a physical memory of 32 frames. 2

i) How many bits are there in the logical address?

ii) How many bits are there in the physical address?

j) Describe the actions taken by operating system when a page fault occurs. 3

k) Explain Sequential and Direct Access Methods for reading a file with suitable examples. 4

l) Consider a disk where blocks 2,3,4,5,7,9,11,18,19,20,21 are free blocks and rest are allocated. Constitute a free space bit vector to show this scheme. 2

m) What are the components of positioning time for reading the data from a disk. 2

n) Explain any two program threats. 2

SECTION B

2. a) Consider the following set of processes, with the length of CPU burst time given in milliseconds.

Process	Arrival Time	Burst Time	Priority
P1	0	8	4
P2	1	2	2
P3	2	6	1 (Highest)
P4	3	10	3
P5	4	3	5

i) Draw Gantt charts illustrating the execution of these processes using

a) Priority based (preemptive)

b) Shortest job first

ii) What is the waiting time for P1 and P2 for each of the above algorithms?

iii) What is the turnaround time for P3 and P4 for each of the above algorithms? 2+2+2

b) What is a dispatcher? List the actions taken by the dispatcher. 4

3. a) Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use Memory. 4

b) Consider the following segment table

Segment	Base	Length
0	200	600
1	1000	200
2	90	100
3	1500	500

What are the physical addresses for the following logical addresses? Justify your answer.

i) 0, 500 ii) 2, 110

iii) 3, 50 iv) 1, 100 4

c) Explain the difference between external and internal fragmentation. 2

4. a) What are race conditions? Explain with an example. 4

b) Consider the following page reference string.

0, 0, 1, 2, 4, 3, 4, 2, 1,4, 5, 6, 2, 1, 2, 3, 7, 7, 6, 3, 2, 1, 2, 3, 6

Determine the number of page faults for

i) Optimal page replacement algorithm

ii) FIFO page replacement algorithm

Assume that there are three frames and all of them are initially empty. 3+3

5. a) Suppose that a disk drive has 500 cylinders, numbered 0 to 499. The drive is currently serving a request at cylinder 215, and the previous request was at cylinder 180. The queue of pending requests, in FIFO order, is: 206, 121, 229, 280, 54, 161, 35, 152, 496, 368 .
Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

a. FCFS

b. SCAN 3+3

b) Explain any two Multithreading models in detail. 4

6. a) Differentiate between virus and worm. 4

b) Explain the performance of the three techniques for allocating disk blocks (contiguous, linked, and indexed) for both sequential and random file access. 6