Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –Ist SEMESTER–EXAMINATION – JULY- 2012

Subject code: 715102N Date: 07/07/2012

Subject Name: Advanced Operating System & Management

Time: 2:30 pm – 05:00 pm Total Marks: 70

Instructions:

1. **Attempt question 1, which is compulsory and answer any five from the rest questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right hand indicate the marks.**

Q. No. 1 Explain the following terms [2 Marks X 10 = 20 Marks]

a. Threading
b. Multi-Processing
c. Distributed System
d. Virtual Memory
e. Critical section problem
f. Paging
g. Kernel of an operating system
h. Boot Loader
i. System Calls
j. Inter Process Communication

Q. No. 2 [4+6 Marks]

a. Explain the output of the given programme below?

```
# include <sys/types.h>
# include < stdio.h>
# include < unistd.h>

int value = 5;
int main ( )
{
pid_t pid;
 pid = fork ( );
if ( pid = = 0) { /* child process */ value += 15; }
        else if (pid > 0 ) { /* parent process * /  wait (NULL) ;
printf ("PARENT: value = %d", value) ; /* LINE A*/ exit (0); }
}
```

b. What is the typical function of an Operating System? What is multi-programming operating system? How multi-programming increases CPU utilization?

Q. No. 3 [4+6 Marks]

a. How multi- threading provides better performance than a single threading?
b. Explain I/O bound term and CPU bound term? Why it is important for the scheduler to distinguish these two?

Q. No. 4 [7+3 Marks]

a. Explain different scheduling algorithm. Which scheduling algorithm could result in starvation?
b. Consider the following set of processes, with the length of CPU brust given in Milliseconds

Process	Brust Time	Priority
p1	10	3
p2	1	1
p3	2	3
p4	1	4
p5	5	2

The processes are assumed to have arrived in the order p1, p2, p3, p4 p5 all at time 0.

i. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum =1)
ii. What is turnaround time of each process for each of the scheduling algorithms in part i?
iii. What is the waiting time of each process for each of the scheduling algorithms?
iv. Which of the algorithms result in the minimum average waiting time (over all processes)

Q. No. 5 [5+5 Marks]

a. Write a programme to demonstrate use of signal.
b. Explain Semaphore with suitable example.

Q. No. 6 [5+5 Marks]

a. Explain difference between internal and external fragmentation.
b. What is the difference between Paging and Segmentation?

Q.No. 7 [4+6 Marks]

a. Consider logical address a space of 64 pages of 1024 words each mapped onto a physical memory of 32 frames?
    i) How many bits are there in the logical address?
    ii) How many bits are there in physical address?

b. Under what circumstances page faults occur? Describe the action taken by the operating system when a page fault occurs.

Q.No.8 [5+2.5+2.5 Marks]

a. Explain the uses of the following commands in Linux?
    i. tar
    ii. grep
    iii. tty
    iv. tee
    v. find

b. Write a shell script which copies contents of multiple files in one file given at the command line.
c. Write a shell script which will print all the words starting with vowels from a given file.

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