This question paper contains 6 printed pages.]

1756 *Your Roll No. .....*

PGDCA / II Sem. **A**

Paper–CS–2.1

OPERATING SYSTEM

(Admissions of 1998 and onwards)

Time : 3 Hours *Maximum Marks : 100*

(Write your Roll No. on the top immediately on receipt of this question paper.)

*Attempt **all** questions. Parts of a question should be answered together.*

1. (a) What are the major functions of an operating system with respect to file management ? 3

(b) What are privileged instructions ? In which mode of the operating system are they executed ? Justify your answer. 2+2

(c) Describe the action taken by an operating system to switch context between Kernel level threads. 3

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(d) What is a process ? How is it different from a program ? What are the different states of a process and the cause of transition from one state into another ? 1+1+3

(e) Distinguish between asynchronous and deferred cancellation of threads. 3

(f) Which of the following instruction are privileged ? 1

(i) Set value of timer

(ii) Clear memory

(iii) Turn off interrupts

(iv) Read the clock

2. (a) Differentiate between the following : 6

(i) Long-term and short-term scheduler

(ii) Preemptive and Non-preemptive scheduling

(b) Is it necessary that a time sharing system must have multiprogramming ? 2

(c) Describe the action taken by Kernel to context switch 5

(i) Among threads

(ii) Among processes

(d) What are the advantages of acyclic graph directory ? 2

(e) What is multilevel paging ? How is it implemented ? Is it beneficial to have different levels of paging? 1+1+2

(f) In what situations would using memory as a RAM DISR be more useful than using it as cache? 2

3. (a) List the costs and benefits of implementing virtual memory. Under what conditions the costs can exceed benefits ? 5

(b) The concurrent processes P_1 and P_2 execute the following code segments in an uniprocessor environment.

$P_1 : v = v + 1$

$P_2 : v = v - 1$

Where v is a shared variable? What would be the problem of such concurrent execution ? 5

(c) What is round-robin scheduling ? Which of the following operating system use round-robin scheduling : 2+1+2

(i) Real time O/S

(ii) Time-shared operating system ?

What is context switch of round-robin scheduling ?

(d) What is Translation Look-aside Buffer (TLB) ? How the logical to physical address translation is done in both paging and TLB? 1+2+2

4. (a) Suppose that the following processes arrive for execution at the time indicated :

Process	Burst Time	Arrival Time
P_0	5	0
P_1	4	1
P_2	3	1
P_3	5	2
P_5	3	3

(i) Draw Gantt charts illustrating the execution of these processes using FCFS, SJF, RR (time quantum = 2). 3

(ii) What is the waiting time for process P_0, P_2 in each scheduling algorithms? 2

(b) Specify features of Kernel and user mode routines regarding windows NT system. 3

(c) Discuss in detail various components of windows subsystem with diagram. 6

(d) Differentiate between the following : 2×2

(i) Rights and Privileges

(ii) Swapping and Overlays

(c) Write short notes on : 2×3

(i) Handheld Systems

(ii) Command Interpreter

(iii) Swapper

5. (a) Describe the actions an operating system must take when page fault interrupt occurs. 5

(b) The producer-consumer algorithm for bounded buffer allows only n-1 buffers to be full at any time. Why ? 2

(c) Discuss the different protocols supported by WINDOWS NT. 5

(d) What are differences between an interrupt and exception ? When is an exception generated ? Give suitable examples. 2+1+1