

Sixth Semester Examination - 2007

OPERATING SYSTEM

Full Marks – 70

Time – 3 Hours

*Answer Question No. 1 which is compulsory  
and any **five** from the rest.*

*The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
- (a) What are the main advantage of multi-programming ?
  - (b) What is purpose of medium-term-scheduler and short-term-scheduler ?

P.T.O.

- (c) Define preemptable resource and non-preemptable resource; give examples.
- (d) What resources are used when a thread is created? How do they differ from those used when a process is created?
- (e) Define deadlock. List types of resources we might consider in deadlock problems on computers.
- (f) What do you mean by weight-for-graph?
- (g) What do you mean by safe state?
- (h) How does the operating system determine what mode it is in?
- (i) Why we say that modern operating systems are interrupt driven?
- (j) What is the nucleus or kernel of an operating system?

2. (a) A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given  $n$  processes to be scheduled on one processor, how many possible different schedules are there? Give a formula in terms of  $n$ . 5
- (b) Consider a variant of the RR scheduling algorithm where the entries in the ready queue are pointers to the PCB. What would be the major advantages and disadvantages of this scheme? 5
3. (a) State four conditions of deadlock and explain how each condition can be satisfied? 5
- (b) When do page faults occur? Describe the actions taken by the operating system, when a page fault occurs? 5

4. (a) Explain in a step-by-step manner and in detail how a context switching between a running process, P1, and the first process in the ready queue, P2 happens. 5
- (b) Give several reasons why demand paging is the conventional wisdom in page fetch strategies. 5
5. (a) What are the differences between user-level threads and kernel-supported threads? Under what circumstances is one type "better" than the other? 5
- (b) Explain the structure of a Process control Block. Explain how the process is created? 5
6. (a) Explain the difference between internal fragmentation and external fragmentation. 5

Which one occurs in paging systems?

Which one occurs in systems using pure segmentation? 5

- (b) What do you mean by inter-processor communication mechanism associated with an Operating system? Discuss the mechanism associated with pipe (). 5

7. Considering life cycle of an I/O request, explain the basic steps to transform I/O requests to hardware operation? 10

8. (a) Describe three circumstances under which non-blocking I/O should be used. Why not just implement non-blocking I/O and have processes busy-wait until their device is ready? 5

(b) Explain why SSTF scheduling tends to favor middle cylinders over the innermost and outermost cylinder. 5

IWL