

Total No. of Questions : 10 ] [ Total No. of Printed Pages : 5

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## CS/EI/IT-502

**B. E. (Fifth Semester) EXAMINATION, June, 2009**

**(Common for CS, EI & IT Engg.)**

### OPERATING SYSTEM

*Time : Three Hours*

*Maximum Marks : 100*

*Minimum Pass Marks : 35*

**Note :** Attempt *one* question from each Unit. All questions carry equal marks. Assume suitable data wherever necessary.

#### Unit-I

1. (a) What is an operating system ? Discuss the difficulties involved in writing an operating system for a real-time environment. Give examples. 8
- (b) Explain the differences in the degree to which the following scheduling algorithms discriminate in favour of short processes : 12
  - (i) FCFS
  - (ii) Round Robin
  - (iii) Multilevel feedback queues

*Or*

2. (a) Describe three circumstances under which blocking I/O should be used. Describe three circumstances under which non-blocking I/O should be used. 8

(b) Consider the following jobs :

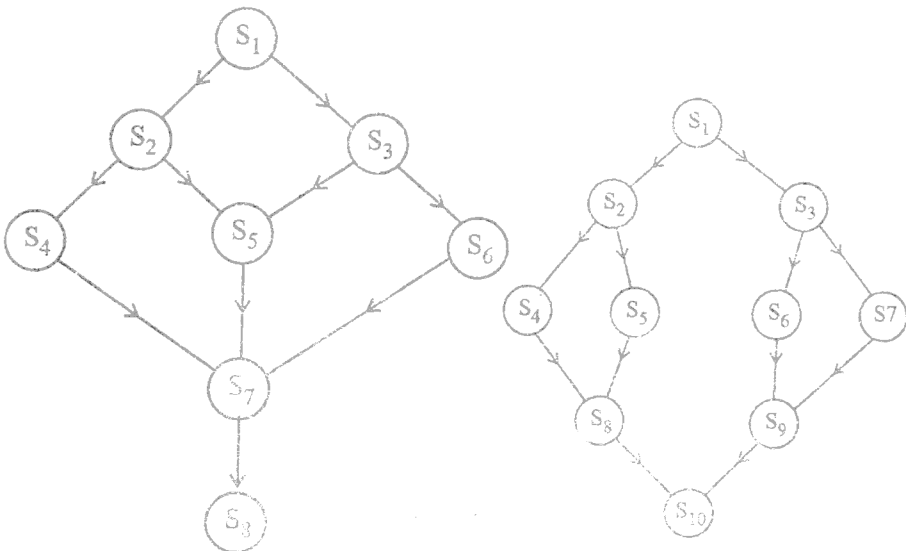
12

Job	Burst Time
1	10
2	29
3	3
4	7
5	12

Consider the FCFS, SJF and RR (quantum = 10) scheduling algorithms for this set of processes. Which algorithm would give the minimum average waiting time ?

### Unit-II

3. (a) What difficulties may arise when a process is rolled back as a result of Deadlock ? 6
- (b) What are the necessary conditions for concurrence ?  
Give a precedence graph. 14



Express the graph using concurrent statement and fork/join construct.

Or

4. (a) Explain scheduling queues with queuing diagram representation of process scheduling. 10
- (b) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most *two* resources. Show that the system is deadlock free. 10

### Unit—III

5. (a) Consider a logical address space of eight pages of 1024 words each, mapped on to a physical memory of 32 frames : 10
- (i) How many bits are in the logical address ?
- (ii) How many bits are in the physical address ?
- (b) Explain paged segmentation with its Hardware implementation. 10

Or

6. (a) Assume memory partitions of 100 kB, 500 kB, 200 kB, 300 kB and 600 kB (in order). How would each of the first fit, best fit and worst fit algorithms place processes of 212 kB, 417 kB, 112 kB and 426 kB. Which algorithm makes the most efficient use of memory ? 8
- (b) Consider a paging system with the page table stored in memory : 12
- (i) If a memory reference takes 1.2 microseconds, how long does a paged memory reference take ?
- (ii) If we add 8 associative registers and 75% of all page table reference are found in the associative

registers, what is the effective memory reference time?

(Assume that finding a page table entry in the associative registers takes zero time, if it is there).

#### Unit-IV

7. (a) Consider the following page reference strings : 12  
1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9

How many page faults would occur for the following replacement algorithms, assuming 2, 4 and 5 frames being made available?

(i) FIFO

(ii) LRU

- (b) What is the need to know principle? Why is it important for a protection system to adhere to this principle? 8

(c)

- (a) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? 10

- (b) Explain trusted system briefly. 10

#### Unit-V

9. (a) Compare the throughput of C-SCAN and SCAN assuming a uniform distribution of requests. 10

- (b) What problems could occur if a system allowed a file system to be mounted simultaneously at more than one location? 10

(c)

10. Consider a file system on a disk that has both logical and physical block sizes of 512 bytes. Assume that the

information about each file is already in memory. For each of three allocation strategies (contiguous, linked and indexed) answer these questions : 20

- (i) How is the logical to physical address mapping accomplished in this system ? (For the induced allocation, assume that a file is always less than 512 blocks long).
- (ii) If we are currently at logical block 10 (the last block accessed was block 10) and want to access logical block 4, how many physical blocks must be read from the disk ?

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