

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 51835**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Information Technology

15UIT305 - OPERATING SYSTEMS

(Regulation 2015)

(Common to Computer Science and Engineering branch)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- The user view of operating system is designed mostly for
  - resource utilization
  - ease of use
  - controlled program
  - command mode
- \_\_\_\_\_ is the task of terminating a thread before it has completed.
  - Target thread
  - Thread creation
  - Thread cancellation
  - Signal
- Paging suffers from \_\_\_\_\_ and segmentation suffers from \_\_\_\_\_.
  - internal and external fragmentation
  - internal and internal fragmentation
  - external and external fragmentation
  - external and Internal fragmentation
- A page fault occurs
  - when the page is not in the memory
  - when the page is in the memory
  - when the process enters the blocked state
  - when the process is in the ready state

5. Consider a disk where blocks 0, 2, 3, 4, 5, 8, 9, 10, 11, 12 and 15 are free and the rest of the blocks are allocated. The free-space bit map would be

(a) 0100001100000110

(b) 1011110011111001

(c) 1001100011100111

(d) 1010101010101010

PART - B (5 x 3 = 15 Marks)

6. When a system is said to have fault tolerance capability?

7. Define semaphore. Give the code for semaphore operation.

8. Given five 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 (inorder)? Which algorithm makes the most efficient use of memory?

9. Consider a paging system with the page table stored in memory.

(a) If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?

(b) If we add TLBs, and 75 percent of all page-table references are found in the TLBs, what is the effective memory reference time? (Assume that finding a page-table entry in the TLBs takes zero time, if the entry is there.)

10. Illustrate the various operations that can be performed on a file.

PART - C (5 x 16 = 80 Marks)

11. (a) Write short note on

(i) Clustered system

(ii) Main frame system

(iii) Handheld system

(iv) Real time system

(16)

Or

(b) (i) Explain with suitable diagram, how memory is protected by user. (8)

(ii) Illustrate with suitable pseudo code, how synchronized communication is carried between producer and consumer with a fixed buffer size. (8)

12. (a) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
$P_1$	10	3
$P_2$	12	2
$P_3$	3	3
$P_4$	7	1
$P_5$	12	4

The processes are assumed to have arrived in the order  $P_1, P_2, P_3, P_4, P_5$  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 = 5).
- (ii) What is the average turnaround time of each process for each of the scheduling algorithms?
- (iii) What is the average waiting time of each process for each of the scheduling algorithms?
- (iv) Which of the algorithms results in the minimum average waiting time? (16)

Or

- (b) (i) Considered the problem of readers-writers problem. Design a code using semaphore to allocate several resources among several processes in a deadlock-free manner. (8)
- (ii) Justify Peterson's solution satisfies the requirements of critical section problem. (8)

13. (a) (i) List the necessary conditions under which deadlock condition may arise. (6)
- (ii) Illustrate how bankers algorithm ensure deadlock free environment for multiple instance of a resource type. (10)

Or

- (b) With suitable diagram how segmentation and paging can be incorporated into a single system. (16)

14. (a) (i) List the causes of thrashing. Illustrate a method to overcome high paging activity. (6)

(ii) Illustrate with suitable diagram the steps involved in demand paging. (10)

Or

(b) Consider the following page reference string:

1, 2, 3, 2, 5, 6, 3, 4, 6, 3, 7, 3, 1, 5, 3, 6, 3, 4, 2, 4, 3, 4, 5, 1. How many page faults would occur for the following page replacement algorithm, assuming an allocation of 5 frames?

(i) FIFO replacement

(ii) Optimal replacement

(iii) LRU replacement (16)

15. (a) Briefly explain the various file allocation methods along with its advantages and disadvantages. (16)

Or

(b) Explain the various disk scheduling algorithm with neat diagram. (16)

---