

Total No. of printed pages = 6

CS 131403

Roll No. of candidate

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

2017

**B. Tech 4th Semester End-Term Examination**

**OPERATING SYSTEMS**

Full Marks-100 Pass Marks-35 Time-Three hours

The figures in the margin indicate full marks for the questions.

Answer *all* questions.

1. Answer any *six* of the following questions :  
2×6=12

- (a) What do you mean by a process ?
- (b) What is bootstrap program ?
- (c) What are the functions of the following system calls ?
  - (i) fork()
  - (ii) exec()
- (d) What is critical section ?

[Turn over

- (e) What do you mean by Belady's anomaly ?
- (f) What is monitor ?
- (g) What do you mean by thrashing ?

2. Answer any *six* of the following questions :  
3×6=18

- (a) What is race condition ? Give example.
- (b) What is semaphore ? What are the different types of semaphores ?
- (c) Mention the return values and associated meaning of 'fork()' system call.
- (d) Let a program of size 256 MB has to be executed in a single processor machine of page size of 512 bytes, how many entries will be there in the page table ?
- (e) Differentiate between absolute path and relative path of a directory / file with proper example.
- (f) What is External Fragmentation ? How External fragmentation can be reduced ?
- (g) What is compaction ? State with example.

3. Answer any *ten* of the following questions :  
4×10=40

- (a) What is thread ? What are the benefits of multithreaded programming ?
- (b) What are the services provided by the Operating System ?
- (c) What are the scheduling criteria ?
- (d) "Time quantum for Round Robin scheduling should not be too large or too small." Justify your answer.
- (e) Differentiate between short-term scheduler and long-term scheduler.
- (f) Explain the four necessary conditions for deadlock.
- (g) "For multiple instance of resource, cycle is not a necessary and sufficient condition for deadlock." Is it true ? Justify.
- (h) Differentiate between segmentation and paging scheme.
- (i) How Peterson's Solution solves the Mutual exclusion requirement of critical section problem ?

- (j) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder. The queue of pending requests in FIFO order is :  
98, 183, 37, 122, 14, 124, 65, 67.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests using FCFS disk-scheduling algorithm ?

- (k) Write short note on 'multilevel queue scheduling'.

4. Answer any *three* of the following questions :  
10×3=30

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

<u>Process</u>	<u>Burst time</u>	<u>Priority</u>
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.

PDFZilla - Unregistered

- (i) Draw Gantt charts that illustrate the execution of these processes using the scheduling algorithms : FCFS, SJF (non preemptive), Priority Scheduling and RR (quantum = 1).

- (ii) What is the turnaround time and waiting time of each process for each of these scheduling algorithm ?

- (iii) Which particular algorithm will you prefer for CPU Scheduling and why ?

- (b) Consider the following snap-shot of a system :

Process	Allocated	Max	Available
	A B C D	A B C D	A B C D
P <sub>1</sub>	0 0 1 2	0 0 1 2	2 1 0 0
P <sub>2</sub>	2 0 0 0	2 7 5 0	
P <sub>3</sub>	0 0 3 4	6 6 5 6	
P <sub>4</sub>	2 3 5 4	4 3 5 6	
P <sub>5</sub>	0 3 3 2	0 6 5 2	

PDFZilla - Unregistered

## PDFZilla – Unregistered

Answer the following questions using banker's algorithm :

- (i) What is the content of the matrix Need ?
- (ii) Is the system in a safe state ? Justify your answer.

## PDFZilla - Unregistered

- (iii) If a request from  $P_3$  arrives for (0, 1, 0, 0) can the request be granted immediately ? Justify your answer.
- (c) Given the page reference string :  
1,2,3,4,5, 3, 4,1,6, 7, 8,7,8, 9,7,8,9,5,4,5,4,2.  
Four frames allocated for the main memory.  
Determine the number of page fault using the following page replacement algorithm :
  - (i) FIFO
  - (ii) LRV
  - (iii) Optimal.
- (d) Discuss the Indexed allocation method for file allocation with proper block diagram.