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Sub Code: RCS401
Roll No.

B.TECH
(SEM IV) THEORY EXAMINATION 2017-18
Operating System

Time: 3 Hours *Total Marks: 70*

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. Define Operating System. List the objectives of an operating system
b. What are the various scheduling criteria for CPU scheduling?
c. What is the use of inter process communication and context switching?
d. Write the difference between internal and external fragmentation.
e. What are the disadvantages of single contiguous memory allocation?
f. Discuss the usage of wait-for graph method.
g. Define Busy Waiting? How to overcome busy waiting using Semaphore operations.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. Explain briefly Layered Operating system structure with neat sketch. Also explain protection and security.
b. What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.
c. Consider the following snapshot of a system:

	Allocated			Maximum			Available		
Process	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8	7	7	10
P2	2	0	3	4	3	3			
P3	1	2	4	3	4	4			

Answer the following questions using the banker's algorithm:
1) What is the content of the matrix need?
2) Is the system in a safe state?

d. Consider the following page reference string:
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
How many page faults would occur for the optimal page replacement algorithm, assuming three frames and all frames are initially empty.
e. Is it possible to have a deadlock involving only a single process? Explain.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Enumerate various Operating System components with their functions in brief.
(b) Differentiate between (with one suitable example):
(i) Interactive and Batch processing System.
(ii) Multiprogramming and Time Sharing System.

4. Attempt any *one* part of the following: **7 x 1 = 7**

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(a) Discuss Mutual-exclusion implementation with test and set() instruction.

(b) State the Critical Section problem. Illustrate the software based solution to the Critical Section problem.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) Consider the following process:

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Draw Gantt chart and find the average waiting time and average turnaround time:

(i) FCFS Scheduling

(ii) SRTF Scheduling\

(b) Consider the following process:

Process	Arrival Time	Burst Time	Priority
P1	0	6	3
P2	1	4	1
P3	2	5	2
P4	3	8	4

Draw Gantt chart and find the average waiting time and average turnaround time:

(i) SRTF Scheduling

(ii) Round robin (time quantum:3)

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) What do you mean by Belady's anomaly? Which algorithm suffers from Belady,s anomaly and how can it be rectified?

(b) What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Discuss the Linked, Contiguous and Index and multilevel Indexing file allocation schemes. Which allocation scheme will minimize the amount of space required in directory structure and why?

(b) Write short notes on :

i) I/O Buffering

ii) Disk storage and scheduling

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