Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

END SEMESTER MAKEUP EXAMINATIONS, NOV/DEC 2017

SUBJECT: OPERATING SYSTEMS [CSE 3102]

REVISED CREDIT SYSTEM
(29/12/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. Explain layered approach of operating system structure along with its advantages and disadvantages **3M**

1B. Explain dual mode operation with neat diagram. **3M**

1C. Differentiate between cooperating processes and independent processes. Define various reasons for providing an environment that allows process cooperation. With pictorial representation, give 2 communication models that support inter-process-communication. **4M**

2A. What are the various benefits of threads? Explain any two multi-threaded models with their advantages and disadvantages. **3M**

2B. Use Preemptive SJF process scheduling algorithm to schedule the following set of processes **3M**

Processes	Arrival Time(msec)	Burst Time(msec)
P0	4	2
P1	5	3
P2	3	5
P3	0	8
P4	1	1

Draw Gantt chart and find waiting time and turnaround time of all processes and hence find our average waiting time and average turnaround time.

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2C. What is critical section problem? Define 3 requirements for solution to any critical section problem. Explain Peterson's solution in solving critical section problem, along with structure of process Pi **4M**

3A. For the following snapshot of the system shown in table 3A, find the safe sequence using Banker's algorithm. **4M**

i. Calculate the need of each process

ii. Find the safe sequence (show the application of Banker's algorithm step-by-step)

Table 3A

Process	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	0	1	0	7	5	3	3	3	2
P2	2	0	0	3	2	2			
P3	3	0	2	9	0	2			
P4	2	1	1	2	2	2			
P5	0	0	2	4	3	2			

3B. What is dining philosopher's problem for synchronization? Give pseudocode for monitor solution to dining philosopher problem **4M**

3C. Explain deadlock situation of incorrect use of wait() and signal() by 2 processes on 2 resources A and B. Show complete structure of processes P1 and P2 with appropriate wait() and signal() call sequences on resources A and B causing deadlock among P1 and P2. Justify your answer **2M**

4A. What is demand paging? List the steps involved in handling a page fault with neat diagram **3M**

4B. Consider a disk queue with I/O requests on the following cylinders in their arriving order: **3M**

54, 97, 73, 128, 15, 44, 110, 34, 45

The disk head is assumed to be at Cylinder 23.

(i) Calculate and show with diagram the disk head movement using FCFS-scheduling algorithm.

(ii) Calculate and show with diagram the disk -head movement using SSTF-scheduling algorithm.

4C. Differentiate between single level directory and Two-level directory with neat diagram **4M**

5A. What is Belady's anomaly? Check Belady's anomaly exists for following page reference string or not with 3 frames and 4 frames. Justify your answer. Consider a, b, c, d, e are pages. **4M**

Page reference string : d, c, b, a, d, c, e, d, c, b, a, e

Show page loaded and page removed during each reference.

5B. Explain domain switching in MULTICS with neat diagram. **4M**

5C. Explain the working of Linux scheduler in Linux scheduling. **2M**