Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

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

MAKEUP EXAMINATIONS, DECEMBER 2019

SUBJECT: OPERATING SYSTEMS [CSE 3102]

REVISED CREDIT SYSTEM
(30/12/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. What is operating system? "An operating system as a resource allocator" Justify your answer. **3M**

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

1C. Differentiate between direct and indirect communication. Mention the communication link properties in both. **4M**

2A. With the help of a Gantt Chart for the following data in Table 2A, calculate Average Waiting Time and Average Turnaround Time (ATT) for FCFS and non- preemptive SJF. **5M**

Table 2A.

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

2B. Explain the many-to-many and two level threading models with diagrams. Explain any two challenges in case of multicore programming. **3M**

2C. Suppose that a disk drive has 3000 cylinders, numbered 0 to 2999. The drive is currently serving a request at cylinder 143. The queue of pending requests, in FIFO order, is: 85, 1469, 912, 1773, 947, 1508, 1021, 1749, 129. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for C-LOOK algorithm? (initially moving from lower values to higher values) **2M**

3A Consider the following snapshot of a system

	Allocation	*Max*	*Available*
	A B C D	*A B C D*	*A B C D*
P_0	2 0 0 1	4 2 1 2	3 3 2 1
P_1	3 1 2 1	5 2 5 2	
P_2	2 1 0 3	2 3 1 6	
P_3	1 3 1 2	1 4 2 4	
P_4	1 4 3 2	3 6 6 5	

Answer the following questions using the banker's algorithm:

(i) How many instances of resources are present in the system under each type of a resource?
(ii) Compute the Need matrix for the given snapshot of a system.
(iii) Illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.
(iv) If a request from process P1 arrives for (1, 1, 0, 0), can the request be granted immediately?
(v) Find if the system is in a deadlock state otherwise find a safe sequence. **5M**

3B. Show a deadlock using semaphores**.** Give the program for each process which causes deadlock while accessing semaphore. **2M**

3C. Explain the following

(i) Counting semaphores
(ii) Write a note on access matrix with owner rights
(iii) Spinlock **3M**

4A. Design a Two-level Page-table scheme architecture diagram for a system of 32-bit logical address space and a page size of 4 KB with the below information:
Both the outer and inner page number is made up of 10-bits i.e. logical address is divided into a page number of 20-bits. Compute the page offset required and label the blocks in the diagram, show the edges and number the bits appropriately. **3M**

4B. Paging uses Page table associated with each process. Each entry refers to a page and processes reference pages through the pages' virtual addresses. One case is that this leads to each table may consist of millions of entries and consume large amounts of physical memory. **(i)** Provide a solution to the problem of large amounts of physical memory for page tables. **(ii)** With the help of a labelled diagram show how this could be done for a 32-bit logical address space of 4-KB page size and 10 bit page number. **5M**

4C. Explain the four possible classes for reference bit and modify bit is considered as a pair. **2M**

5A. Explain any four file operations. **4M**

5B. Explain any two implementation of access matrix. **4M**

5C Explain the Linux Page out policy. **2M**