Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING) END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT: OPERATING SYSTEMS [CSE 3102]

REVISED CREDIT SYSTEM (28/11/2018)

Time: 3 Hours

MAX. MARKS: 50

3M

4M

3M

Instructions to Candidates:

- ✤ Answer ALL FIVE questions.
- ✤ Missing data may be suitable assumed.
- 1A. With neat diagram explain the abstract view of various components of computer system.3M
- **1B.** Write a note on virtual machine. Explain any two benefits of virtual machine. **3M**
- **1C.** Differentiate between direct communication and indirect communication. Mention all the properties of communication link in both type of communication. **4M**
- **2A.** Explain all multithreading models with neat diagrams.
- **2B.** Define Turnaround time and Waiting time. With the help of a Gantt Chart (Use the data shown in Table Q.2B), calculate Average Waiting Time and Turnaround Time for pre-emptive SJF scheduler.

Table Q.2B.

Processes	Arrival Time(msec)	Burst Time (msec)
P1	0	6
P2	0.5	4
P3	1.0	2

2C. Explain the terms: Dispatcher and Dispatch Latency.

3A. Give the definition of TestAndSet() instruction and the pseudocode for mutual exclusion implementation with TestAndSet(). How can this algorithm be modified to satisfy all the critical section requirements? Also prove that the solution meets all the critical section requirements.

	Allocation	Max	Available
Processes	ABCD	ABCD	ABCD
P0	2 0 0 1	4 2 1 2	3 3 2 1
P1	3 1 2 1	5 2 5 2	
P2	2 1 0 3	2 3 1 6	
P3	1 3 1 2	1 4 2 4	
P4	1 4 3 2	3 6 6 5	

3B. Consider the following snapshot of a system:

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Apply Banker's algorithm to check whether the system is in safe state. If so, give the safe sequence. If not, justify your answer. Show all the steps clearly.

- **3C.** Give the definition of the semaphore that eliminates busy waiting along with its wait and signal operations. Also explain how the busy waiting is eliminated.
- **4A.** Consider the following processes arrive at the times indicated for contiguous memory allocation

Process	Required Memory(kb)	Required Processing Time(msec)	Arrival Time(msec)
P1	600	5	0
P2	700	15	0
P3	300	20	6
P4	700	10	11
P5	200	10	12
P6	500	15	15

If the size of the memory, initially available for allocation, is a single block of 1700 kb, trace the change in memory structure(free and occupied partitions) during allocation / deallocation of memory to different processes, by using

(i)first-fit

(ii)worst-fit

algorithms for the time period 0 to 15 msec. Each allocated process reside in memory only for specified processing time and when the allocated hole is more than the required size, its upper part is occupied by the process.

4B. Kernel memory is often allotted from a free-memory pool. Why? Discuss the strategies, Buddy system and Slab allocation, for managing free memory that is assigned to kernel processes.

3M

3M

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4C.	Consider the following page reference string: 4, 3, 2, 1, 2, 1, 5, 4, 6, 7, 2, 3, 1, 6, 4, 3, 1, 3, 4, 6 How many page faults would occur for the following replacement algorithms, with four page frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each. (i) LRU replacement (ii) Second-Chance Algorithm	4M
5A.	Give at least 6 different file Types along and their extensions with respect to file system.	3M
5B.	Explain how the access matrix is implemented using(i) Access Lists.(ii) Capability lists.Also bring out a comparison between the two.	4 M
5C.	Discuss Process Scheduling implementation in Linux to support(i) Routine time-sharing tasks.(ii) Real-time tasks.	3M