K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)
Semester: **August – November 2020**
In-Semester Examination

Class: TY B. Tech
Branch: Computer   **Semester : V**
Full name of the course: Operating System and System Software
Course Code: 2UCC503
Duration: 1hr.15 min (attempting questions) +15 min (uploading)   **Max. Marks: 30**

Q. No	Questions	Marks	CO Mapped	BT Level
Q1) 1.1	Which of the following process scheduling algorithms is non-preemptive? a. Round Robin b. First-In First-Out c. Multilevel Queue Scheduling d. Multilevel Queue Scheduling with Feedback	1	CO2	Understanding
1.2	Which of the following is False with respect to monitors a. Internal variables of Monitors are accessible only by code within the procedure b. Procedure defined within the monitor can access only those variables declared locally within the monitor and its formal parameters. c. Only one process at a time can execute code inside monitors. d. The processes running outside the monitor can access the internal variable of the monitor but cannot call procedures of the monitor.	1	CO3	Understanding
1.3	Threads are not independent of one another like processes. Which of the following is shared between threads belonging to the same process? a. Program Counter b. Registers c. Stack space d. Data section	1	CO2	Understanding
1.4	Which of the following is False with respect to Round Robin Scheduling algorithm? a. The Time Quantum must be large with respect to context switch, otherwise overhead is too high b. If Time Quantum is large, Round Robin is same as FIFO c. Round Robin has smaller average turnaround than	1	CO2	Understanding

	SJF, but poor response time d. The ATT can be improved if most processes finish their next CPU burst in single TQ			

1.5	Which of the following is False with respect to User and Kernel threads?
	    a. User Threads are implemented by a thread library at the user level
	    b. Kernel is unaware of user level threads.
	    c. If the Kernel is single threaded, then any user level thread performing a blocking system call will cause the entire process to block, even if other threads are available to run within the application
	    d. If a kernel thread performs a blocking system call, the kernel cannot schedule another thread in the application for execution
		1	CO3	Understanding

1.6	Which of the following operating system services is not to assist users of the system?
	    a. User Interface
	    b. I/O operations
	    c. Resource allocation
	    d. Error detection
		1	CO1	Understanding

1.7	System calls are not usually written in-
	    a. C
	    b. C++
	    c. JAVA
	    d. Assembly Language
		1	CO1	Understanding

1.8	Which of the following is true with respect to short term scheduler?
	    a. It selects from among the process waiting in ready queue and allocates the CPU to it.
	    b. It selects from among the process waiting in device queue and allocates the CPU to it.
	    c. The short scheduler executes much less frequently.
	    d. The short term scheduler can take more amount of time to decide for which process to select next for execution.
		1	CO2	Remembering

1.9	There are n processes. All the processes share semaphore variable mutex, which is initialized to 1. Every processes execute wait(mutex) before signal(mutex). Suppose a process replaces signal(mutex) with wait(mutex), such as wait(mutex)…. Critical section…. Wait(mutex). Which of the following is true in this case?
	    a. A deadlock will occur
	    b. Processes will starve to enter in critical section
	    c. Several processes may execute in critical section
	    d. Mutual execution will not be guaranteed
		1	CO3	Understanding

1.10	Consider a system with 9 tape drives: 	Process	Allocated tape drives	Maximum Need of tape drives
---	---	---
A	1	3
B	2	5

C	5	7	
			
			State what is true with respect to the above given system state?
			    a. System is in safe state
			    b. System is in unsafe state
			    c. Insufficient information
			    d. System may or may not be in safe state.
				1	CO3	Applying

Q2	Consider a set of 4 processes whose arrival time, CPU time needed are given below: 	Process	Arrival Time	Burst Time
---	---	---
P1	0	5
P2	2	2
P3	4	5
P4	7	7	 If the CPU scheduling policy is Shortest Remaining Time First. Calculate the waiting time, turn around time for each process and the average waiting time also. Illustrate the scheduling policy with the help of Gant chart.	10 marks	CO2	Applying

Q3	Consider a system with the following resources:
	
	    • 5 tape drives
	    • 2 graphic displays
	    • 4 printers
	    • 3 disks
	
	Resources have already allocated among four processes as below:
	
		Process Name	Tape Drives	Graphics	Printers	Disk Drives

Process A	2	0	1	1
Process B	0	1	0	0
Process C	1	0	1	1
Process D	1	1	0	1		5 marks	CO3	Evaluating

The maximum need of the resources of each process is given as below:

Process Name	Tape Drives	Graphics	Printers	Disk Drives
Process A	3	1	1	1
Process B	0	2	1	2
Process C	4	1	1	1
Process D	1	1	1	1

Answer the following questions using the banker's algorithm:
   a. What is the content of the "Need" matrix? (1 mark)
   b. Is the system in a safe state? If yes, find the safe sequence. If no, Justify your answer. (4 marks)

OR

With respect to Hardware Synchronization, Illustrate Mutual Exclusion Implementation with Test & Set instruction using 2 processes. Also provide definition of the instruction.

Q4	Explain the following OS Structures with the help of Diagram.
	   a. Layered Approach
	   b. Microkernels
	
	OR
	
	Describe the Operating System Design Considerations for Multiprocessor and Multicore architectures.
		5 marks	CO1	Understanding