

**K. J. Somaiya College of Engineering, Mumbai-77**  
(Autonomous College Affiliated to University of Mumbai)

**End Semester Exam**  
NOV-DEC 2021

**Max. Marks: 50**

**Duration: 1 Hr. 45 Min.**

Class: T.Y.B.Tech

Semester: V

Name of the Course: Operating System & System Software.

Branch: Computer Engineering.

Course Code: 2UCC503

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data if necessary.

Question No.		Max Marks
Q1 (A)	Attempt the following multiple choice questions:	10
1.1	The interface is provided by _____ to access the services of an operating system.  (a) Systems Calls. (b) API. (c) Library. (d) Assembly instructions.	01
1.2	A directory structure in an operating system is used for _____ ?  (a) For storing program in a file format. (b) For storing folders and files hierarchically. (c) For troubleshooting of network connection in operating system. (d) All of the mentioned.	01
1.3	_____ is not referred to as a locking mechanism.  (a) Semaphore. (b) Binary Semaphore. (c) PCB. (d) Mutex.	01
1.4	_____ is examined dynamically by deadlock avoidance algorithm to ensure the circular wait condition can never exist.  (a) System hardware. (b) Operating System. (c) System Storages. (d) Resource Allocation state.	01

1.5	Mapping of file is managed by _____ ?  (a) File metadata. (b) Page table. (c) Virtual memory (d) File system.	01												
1.6	A linker program does the following _____?  (a) Relocates the program to execute from the specific memory area allocated to it. (b) Links the program with other programs needed for its execution. (c) Interfaces the program with the entities generating its input data. (d) Places the program in the memory for the purpose of execution.	01												
1.7	Select the most appropriate statement from the following for shared memory in producer-consumer problem:  (a) A producer can consume one time while the producer is producing another item. (b) A buffer will reside in a region of memory that need not be shared by the producer and the consumer processes. (c) Buffer items should be available that can be filled by the producer and emptied by the consumer. (d) No synchronization required between the producer and the consumer, so that the consumer does not try to consume an item that has not yet been produced.	01												
1.8	The symbol table in a two-pass assembler is _____.  (a) Generated in first pass. (b) Generated in second pass. (c) Not generated at all. (d) Generated and used only in second pass.	01												
1.9	Following are the three processes in the FCFS: <table border="1" data-bbox="304 1496 1061 1653"> <thead> <tr> <th>Process id</th><th>Burst Time</th><th>Arrival Time</th></tr> </thead> <tbody> <tr> <td>P1</td><td>3</td><td>3</td></tr> <tr> <td>P2</td><td>6</td><td>6</td></tr> <tr> <td>P3</td><td>9</td><td>9</td></tr> </tbody> </table> The average waiting time is _____.  (a) 2. (b) 3. (c) 4. (d) 5.	Process id	Burst Time	Arrival Time	P1	3	3	P2	6	6	P3	9	9	02
Process id	Burst Time	Arrival Time												
P1	3	3												
P2	6	6												
P3	9	9												
Q1 (B)	Attempt <b>any FIVE</b> questions out of the following:	10												
	(a) Mention the role of a kernel and shell in an operating system.													

	<p>(b) Write any four points of difference between multicore and multiprocessor architectures.</p> <p>(c) How is the logical address space different from physical address space? Explain.</p> <p>(d) What do understand by dynamic binders?</p> <p>(e) Explain mutual exclusion with the help of an example.</p> <p>(f) List any four major services provided by the operating system.</p> <p>(g) How do you determine whether the system is in safe or unsafe state?</p>	
Q. 2	Attempt the following questions:	10
	<p>(a) What are the various allocation methods with reference to file systems?</p> <p>(b) Disk track request queue is : 27, 129, 110, 186, 147, 41, 10, 64, 120 Assume that the disk head is initially positioned over track 100 and total tracks on disk are 200. Represent the disk head movement graphically and calculate the number of tracks traversed and average seek length in SCAN, LOOK, C-SCAN, if disk head is moving in the direction of <i>decreasing</i> track numbers.</p>	
Q. 3	Attempt <i>any two</i> of the following:	10
	<p>(a) List the steps in the design of a two-pass Macro-processor.</p> <p>(b) Explain the functionality of process control block with a neat labeled diagram.</p> <p>(c) An Inventory manager issues following instructions to the store manager in regard to a particular item. Do not purchase the item if the no of items existing in the store exceeds N and hold any requisition until the number of items existing in the store is large enough to permit the issue of the item. Using a particular item, implement these instructions with the help of a monitor.</p>	
Q. 4	Write short notes on <i>any two</i> of the following:	10
	<p>(a) Critical section.</p> <p>(b) Linux Virtual File System.</p> <p>(c) Mobile Operating System.</p> <p>(d) Resource Allocation graph.</p>	