Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec-2023
CA5CO35 Modern Operating System

Programme: MCA / BCA-MCA (Integrated) Branch/Specialisation: Computer Application

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. To access the services of the operating system, the interface is provided by the _____. **1**

(a) Library (b) System calls
(c) Assembly instructions (d) API

ii. In operating systems, which of the following is/are CPU scheduling algorithms? **1**

(a) Priority (b) Round robin
(c) Shortest job first (d) All of these

iii. Which CPU scheduling algorithm has starvation problem? **1**

(a) Priority (b) Round robin
(c) Shortest job first (d) All of these

iv. A thread called as- **1**

(a) Heavy weight process (b) Light weight process
(c) Part of I/O (d) None of these

v. The two kinds of semaphores are- **1**

(a) Mutex & counting (b) Binary & counting
(c) Counting & decimal (d) Decimal & binary

vi. Which of the following conditions must be satisfied to solve the critical section problem? **1**

(a) Mutual exclusion (b) Progress
(c) Bounded waiting (d) All of these

vii. What are the characteristics of distributed operating system? **1**

(a) Economics (b) Reliability
(c) Data sharing (d) All of these

viii. In distributed system, each processor has its own _____. **1**
(a) Local memory (b) Clock
(c) Both (a) and (b) (d) None of these

ix. What are the characteristics of distributed file system? **1**
(a) Transparency (b) User mobility
(c) Heterogeneity (d) All of these

x. In a distributed computing environment, distributed shared memory is used which is _____. **1**
(a) Logical combination of virtual memories on the nodes
(b) Logical combination of physical memories on the nodes
(c) Logical combination of secondary memories on all the nodes
(d) All of these

Q.2 i. What is operating system? **2**

ii. Define structure of operating system. **3**

iii. Explain different types of operating system. **5**

OR iv. Explain different generation of operating system. **5**

Q.3 i. What is a process? **2**

ii. Consider the following set of processes, with the length of the CPU burst given in millisecond: **8**

Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

The process are assumed to have arrived in the order P1, P2, P3, P4, P5 all the time 0.

(a) Draw four gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a longer number implies a higher priority), and RR (quantum =2).
(b) What is the turnaround time of each process for each of the scheduling algorithms in parts of (a).
(c) What is waiting time of each process for each of these scheduling algorithms?
(d) Which of the algorithms results in the minimum average waiting time (over all process)?

OR iii. Write short notes on- **8**
(a) Scheduling criteria (b) Threads and its type

Q.4 i. Define critical section problems. **3**

ii. Explain reader – writer problem? Design algorithm to solve the problem. **7**

OR iii. Write short notes on- **7**
(a) Race condition with example (b) Semaphore and their types

Q.5 i. What is distributed operating system? What are the advantages of distributed operating system? **4**

ii. Explain the token ring and bully algorithm. **6**

OR iii. What is multiprocessor operating systems? What are the different architecture of multiprocessor operating system? **6**

Q.6 Attempt any two:

i. Define distributed file systems along with its features. **5**

ii. Explain distributed shared memory in detail. **5**

iii. What are the different design issue involved in distributed operating system? **5**

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Marking Scheme

CA5CO35 - Modern Operating System

Q.1	i)	To access the services of the operating system, the interface is provided by the _____ (b) System calls		**1**
	ii)	In Operating Systems, which of the following is/are CPU scheduling algorithms? (d) All of the mentioned		**1**
	iii)	Which CPU scheduling algorithm has starvation problem a) Priority		**1**
	iv)	A thread called as (b) Light weight process		**1**
	v)	The two kinds of semaphores are : (b) binary & counting		**1**
	vi)	Which of the following conditions must be satisfied to solve the critical section problem: (d) All of the mentioned		**1**
	vii)	What are the characteristics of distributed operating system? (d) All of the mentioned		**1**
	viii)	In distributed system, each processor has its own ____ (c)both local memory and clock		**1**
	ix)	What are the characteristics of Distributed File System (d) All of the mentioned		**1**
	x)	In a distributed computing environment , distributed shared memory is used which is _____ (a)Logical combination of memories on the nodes (b) virtual		**1**
Q.2	i.	Definition	1 marks	**2**
		Diagram	1 marks	
	ii.	Diagram	1 marks	**3**
		Define each layer	2 marks	
	iii.	Type of name	1 marks	**5**
		Explain	2 marks	
		Diagram	2 marks	
OR	iv.	Definition	1 marks	**5**
		Explain each generation	4 marks	
Q.3	i.	Definition	1 mark	**2**
		Type of process state	1 marks	
	ii.	Gantt chart for each process	3marks	**8**
		Turnaround time for each process	2 marks	
		Waiting time for each process	2 marks	
		Minimum average time	1 marks	
OR	iii.	(a) Different system scheduling criteria	4 marks	**8**
		(b) definition thread	1 mark	
		Types of thread	2 mark	
		Diagram	1 mark	
Q.4	i.	Definition	1 mark	**3**
		Diagram	1 mark	
		Critical section Problem	1marks	
	ii.	Problem definition	2 marks	**7**
		Design algorithm	5 marks	
OR	iii.	(a) definition & Example with algorithm	3.5 marks	**7**
		(b) definition, Application, Types	3.5 marks	
Q.5	i.	Definition	1 mark	**4**
		Diagram	1 mark	
		Feature		
		Advantages	2 marks	
	ii.	Definition	1 mark	**6**
		Diagram	2 marks	
		Explanation	3 marks	
OR	iii.	Definition	2 marks	**6**
		Architecture	4 marks	
Q.6				
	i.	Definition	2 marks	**5**
		Features	3 marks	
	ii.	Definition	1 marks	**5**
		Diagram	2 marks	
		Explanation	2 marks	
	iii.	Definition	1 marks	**5**
		Design issue in detail	4 marks	

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