Semester: III	Department of Information Science and Engineering	AY: 2026-27
Course Code: IBCS304	Course Name: Operating System	

Question Bank

Q.	Module-01	M	L	C
1.	Define Operating System. Explain dual-mode of operating system.	8	L2	CO1
2.	Distinguish Between the following terms. • Multiprogramming and Multitasking. • Multiprocessor System and Clustered System.	8	L2	CO1
3.	Explain the layered approach of operating system structure with a supporting diagram.	8	L2	CO1
4.	What are system calls? Briefly point out its types with illustrations	6	L2	CO1
5.	Explain the services of the operating system that are helpful for the user and the system.	6	L2	CO1
6.	Define operating Systems. Explain the dual-mode operating system with a neat diagram.	7	L2	CO1
7.	Define Kernel? Differentiate between kernel mode and user mode operations in a computer system.	8	L2	CO1
8.	Explain System Programs? How do they differ from system calls and application programs?	8	L2	CO1
9.	Define Process? List the core activities undertaken by an operating system during process management.	8	L2	CO1
10.	Write a short note on secondary storage management and caching hierarchies in a computer architecture.	9	L2	CO1
	Module-02			
11.	With a neat diagram, explain the states of a process with a transition diagram and process control block.	9	L2	CO2
12.	What is inter-process communication? Discuss message passing and the shared memory concept of IPC.	9	L2	CO2
13.	Calculate average waiting and turnaround times by drawing the Gantt chart using FCFS and RR (q=2ms). Processes | Arrival Time | Burst Time P1 | 0 | 9 P2 | 1 | 4 P3 | 2 | 9 P4 | 3 | 5	9	L2	CO2
14.	Discuss in detail the multithreading model, its advantages and disadvantages with suitable illustration.	9	L2	CO2
16.	Calculate the average waiting time and the average turnaround time by drawing the Gantt chart using SRTF and the Priority scheduling algorithm.	L2	9	CO2

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<tr><th>Processes</th><th>Arrival Time</th><th>Burst Time</th><th>Priority</th></tr>
<tr><td>P1</td><td>0</td><td>8</td><td>3</td></tr>
<tr><td>P2</td><td>1</td><td>4</td><td>2</td></tr>
<tr><td>P3</td><td>2</td><td>9</td><td>1</td></tr>
<tr><td>P4</td><td>3</td><td>5</td><td>4</td></tr>
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<tr><td>17.</td><td>Explain Multithreading. Explain the types of the models.</td><td>L2</td><td>6</td><td>C02</td></tr>
<tr><td>18.</td><td>Explain Scheduling Algorithms.</td><td>L1</td><td>3</td><td>CO2</td></tr>
<tr><td>19.</td><td>Distinguish between process and thread; explain multithreading models.</td><td>L2</td><td>8</td><td>CO2</td></tr>
<tr><td>20.</td><td>Define a process and draw the process state transition diagram (New, Ready, Running, Waiting, Terminated).</td><td>L3</td><td>9</td><td>CO2</td></tr>
<tr><td colspan="5">Module-03</td></tr>
<tr><td>21.</td><td>Define deadlock. What are the necessary conditions for deadlock to occur?</td><td>L3</td><td>5</td><td>CO3</td></tr>
<tr><td>22.</td><td>Consider the following snapshot of the system:
<table>
<tr><th></th><th colspan="4">Allocation</th><th colspan="4">Max</th><th colspan="4">Available</th></tr>
<tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th><th>A</th><th>B</th><th>C</th><th>D</th><th>A</th><th>B</th><th>C</th><th>D</th></tr>
<tr><td>P_0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>0</td><td>0</td><td>1</td><td>2</td><td>1</td><td>5</td><td>2</td><td>0</td></tr>
<tr><td>P_1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>7</td><td>5</td><td>0</td><td></td><td></td><td></td><td></td></tr>
<tr><td>P_2</td><td>1</td><td>3</td><td>5</td><td>4</td><td>2</td><td>3</td><td>5</td><td>6</td><td></td><td></td><td></td><td></td></tr>
<tr><td>P_3</td><td>0</td><td>6</td><td>3</td><td>2</td><td>0</td><td>6</td><td>5</td><td>2</td><td></td><td></td><td></td><td></td></tr>
<tr><td>P_4</td><td>0</td><td>0</td><td>1</td><td>4</td><td>0</td><td>6</td><td>5</td><td>6</td><td></td><td></td><td></td><td></td></tr>
</table>
Answer the following questions using Banker's algorithm:
a. What is the content of the need matrix?
b. Is the system in a safe state? If yes, mention the safe sequence.
If a request from process P1 arrives for (0,4,2,0) can the request be granted immediately?</td><td>L3</td><td>9</td><td>C03</td></tr>
<tr><td>23.</td><td>a Explain different methods to recover from deadlocks.
b What is a resource allocation graph? Consider an example to explain how it is very useful in describing a deadly embrace.</td><td>L3</td><td>9</td><td>C03</td></tr>
<tr><td>24.</td><td>What is a semaphore? State a Dining Philosopher problem gives a solution using semaphore.</td><td>L3</td><td>8</td><td>CO3</td></tr>
<tr><td>25.</td><td>Illustrate Peterson's solution for the critical section problem.</td><td>L3</td><td>6</td><td>CO3</td></tr>
<tr><td>26.</td><td>Explain Synchronization problem and define the classical problem of synchronization.</td><td>L3</td><td>7</td><td>CO3</td></tr>
<tr><td>27.</td><td>State the four condition of the deadlock.</td><td>L2</td><td>6</td><td>CO3</td></tr>
<tr><td>28.</td><td>Explain Banker's Algorithm.</td><td>L1</td><td>3</td><td>CO3</td></tr>
<tr><td>29.</td><td>Explain the five scheduling criteria for comparing CPU-scheduling algorithms.</td><td>L3</td><td>7</td><td>CO3</td></tr>
<tr><td>30.</td><td>Write a short note on Contention Scope and Pthread Scheduling.</td><td>L3</td><td>7</td><td>CO3</td></tr>
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***Note:**

1. All modules should contain a minimum of **10** questions each and the total number of questions must be **50**.
2. Questions can carry marks of 06, 07, 08, 09, 10 and for problems: 04 or 05.
3. Follow the RBTL as per the keywords used to frame the questions.
4. Maintain the Course Outcomes (COs) as per the syllabus.
5. M: Marks, L: RBTL, C:COs.

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