1. What is a Real-Time Operating System (RTOS)?
2. What are the key characteristics of an RTOS?
3. Differentiate between a hard real-time and soft real-time system.
4. What is the purpose of a real-time scheduler in an RTOS?
5. What is task scheduling in an RTOS?
6. Explain the concepts of preemptive and non-preemptive scheduling in an RTOS.
7. What is task prioritization in an RTOS?
8. How is context switching handled in an RTOS?
9. What is the role of interrupt handling in an RTOS?
10. What is the difference between a task and an interrupt in an RTOS?
11. Explain the concepts of task synchronization and communication in an RTOS.
12. What are the different methods of inter-task communication in an RTOS?
13. What is a semaphore in an RTOS, and how does it work?
14. What is a mutex in an RTOS, and when should it be used?
15. What is a message queue in an RTOS, and how is it utilized?
16. What is a mailbox in an RTOS, and when is it useful?
17. Describe the concept of priority inversion and how it can be prevented in an RTOS.
18. What is a watchdog timer, and how does it ensure system reliability in an RTOS?
19. How does memory management work in an RTOS?
20. What are the different memory allocation schemes used in RTOS?
21. Explain the concepts of stack size and stack overflow in an RTOS.
22. How is power management handled in an RTOS?
23. What are the different power-saving modes available in an RTOS?
24. What is the role of an idle task in an RTOS?
25. How does an RTOS handle time management and synchronization?
26. Explain the concepts of tick-based and tickless schedulers in an RTOS.
27. What is the concept of a critical section in an RTOS, and how is it protected?
28. How does an RTOS handle system clock synchronization?
29. What is round-robin scheduling in an RTOS?
30. What is the concept of task suspension in an RTOS?
31. Explain the difference between a cooperative multitasking and preemptive multitasking in an RTOS.
32. How does an RTOS handle task priorities and priority inversion?
33. What are the advantages and disadvantages of using an RTOS?
34. How does an RTOS handle system boot-up and initialization?
35. What is the role of an RTOS kernel in the system?
36. Explain the concepts of time slicing and time division multiplexing in an RTOS.
37. How does an RTOS handle inter-task communication in a distributed system?
38. What is the role of a device driver in an RTOS?
39. Explain the concepts of blocking and non-blocking I/O in an RTOS.
40. How is memory protection implemented in an RTOS?
41. What are the different types of system calls available in an RTOS?
42. How does an RTOS handle system faults and exceptions?
43. What is the role of an interrupt service routine (ISR) in an RTOS?
44. How does an RTOS handle priority inversion and priority inheritance?
45. What is the concept of a real-time clock (RTC) in an RTOS?
46. Explain the concepts of early deadline first (EDF) and rate monotonic scheduling (RMS) in an RTOS.
47. How does an RTOS handle task synchronization in a distributed system?
48. What is the role of a context switch in an RTOS?
49. Explain the concepts of stack usage and stack monitoring in an RTOS.
50. How does an RTOS handle inter-task communication between processes?
51. What is the concept of inter-processor communication (IPC) in an RTOS?
52. How does an RTOS handle task migration and load balancing?
53. Explain the concepts of resource sharing and resource management in an RTOS.
54. What is the role of a memory protection unit (MPU) in an RTOS?
55. How does an RTOS handle software timers and time-triggered tasks?
56. What is the role of a real-time executive (RTE) in an RTOS?
57. Explain the concepts of multi-core scheduling and affinity in an RTOS.
58. How does an RTOS handle priority inversion and priority ceiling emulation?
59. What is the concept of a system clock tick in an RTOS?
60. How does an RTOS handle task suspension and resumption?
61. Explain the concepts of distributed real-time systems and networked RTOS.
62. What is the role of a memory pool in an RTOS?
63. How does an RTOS handle interrupt latency and response time?
64. What is the concept of an idle task hook in an RTOS?
65. How does an RTOS handle power management in a battery-operated system?
66. Explain the concepts of deadline monotonic scheduling (DMS) and earliest deadline first (EDF) in an RTOS.
67. What is the role of a system tick timer in an RTOS?
68. How does an RTOS handle inter-process communication (IPC) in a multi-tasking environment?
69. What is the concept of a periodic task in an RTOS?
70. How does an RTOS handle dynamic memory allocation and deallocation?
71. Explain the concepts of synchronous and asynchronous communication in an RTOS.
72. What is the role of a scheduler tick in an RTOS?
73. How does an RTOS handle system clock drift and synchronization?
74. What is the concept of a critical section in an RTOS, and how is it protected?
75. How does an RTOS handle system-wide synchronization and deadlock avoidance?
76. Explain the concepts of global and local scheduling in an RTOS.
77. What is the role of a system tick handler in an RTOS?
78. How does an RTOS handle task priority inheritance and priority ceiling protocol?
79. What is the concept of an event flag in an RTOS, and how is it utilized?
80. How does an RTOS handle inter-processor communication (IPC) in a multi-core system?
81. Explain the concepts of resource reservation and fixed-priority scheduling in an RTOS.
82. What is the role of a tickless idle mode in an RTOS?
83. How does an RTOS handle task synchronization and mutual exclusion?
84. What is the concept of a time-slicing scheduler in an RTOS?
85. How does an RTOS handle software interrupts and traps?
86. What is the role of a system clock tick handler in an RTOS?
87. Explain the concepts of priority-based and event-driven scheduling in an RTOS.
88. How does an RTOS handle task synchronization and communication in a distributed system?
89. What is the concept of a context switch time in an RTOS?
90. How does an RTOS handle inter-task communication in a multi-tasking system?
91. What is the role of a task control block (TCB) in an RTOS?
92. Explain the concepts of preemption and non-preemption in an RTOS.
93. How does an RTOS handle memory fragmentation and memory leaks?
94. What is the concept of an interrupt vector table (IVT) in an RTOS