**20CS304/20CB304/20DS304/20IT304**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **February,2023** | **Common to CB/CS/DS & IT Branches** | | |
| **Third Semester** | **Operating Systems** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X14=56 Marks) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. | a) | Which Scheduler selects the process that is ready to execute on CPU? | CO1 | L2 | 1M |
|  | b) | Name different types of Operating Systems | CO1 | L1 | 1M |
|  | c) | Differentiate program and process. | CO1 | L1 | 1M |
|  | d) | List out semaphore operation. | CO2 | L2 | 1M |
|  | e) | To avoid the race condition, how many number of processes that may be simultaneously inside their critical section? | CO2 | L2 | 1M |
|  | f) | A counting Semaphore was initialized to 10. Then 6 P(wait) Operations and 4 V(signal) Operations were completed on this Semaphore. The resulting value of the Semaphore is? | CO2 | L3 | 1M |
|  | g) | Define Semaphore. | CO2 | L2 | 1M |
|  | h) | What are the necessary conditions for deadlock? | CO3 | L2 | 1M |
|  | i) | Check whether the given system is deadlock or not.  image | CO3 | L3 | 1M |
|  | j) | In which contiguous memory allocation External fragmentation will not occur? | CO3 | L2 | 1M |
|  | k) | Consider a system consisting of n resources of same type being shared by 4 processes, two of which need at most 2 resources each and other two need at most 3 resources each. The minimum value of n so that the system is deadlock free is? | CO3 | L3 | 1M |
|  | l) | List out file attributes. | CO4 | L2 | 1M |
|  | m) | Define internal fragmentation. | CO4 | L2 | 1M |
|  | n) | List out various directory structures | CO4 | L3 | 1M |
| **Unit -I** | | | | | |
| 2. | a) | Explain the concept of process along with its states. | CO1 | L1 | 8M |
|  | b) | Differentiate long-term scheduler, short-term scheduler and middle-term scheduler. | CO1 | L3 | 6M |
|  |  | **(OR)** |  |  |  |
| 3. | a) | Compare the types of Operating systems with respect to their features, advantages, disadvantages and examples. | CO1 | L2 | 7M |
|  | b) | Define a process and Explain PCB. | CO1 | L1 | 7M |
| **Unit -II** | | | | | |
| 4. | a) | Consider the following set of processes (P), with the length of the CPU-burst time (BT), Arrival time (AT) and Time Quantum (TQ) of 6 milliseconds.   |  |  |  | | --- | --- | --- | | Processes | Arrival Time | Burst Time | | P1 | 4 | 12 | | P2 | 2 | 14 | | P3 | 1 | 13 | | P4 | 6 | 25 | | P5 | 5 | 06 |   Calculate waiting time and turnaround time for the following scheduling algorithm with explanation.  (i) SJF (Non- Preemptive) (ii) SJF (Preemptive) (iii) Round Robin | CO2 | L4 | 8M |
|  | b) | List out the criteria’s for comparing CPU scheduling algorithms. | CO2 | L2 | 6M |
|  |  | **(OR)**  **P.T.O**  **20CS304/20CB304/20DS304/20IT304** | | | |
| 5. | a) | Race conditions are possible in many computer systems. Consider a banking system that maintains an account balance with two functions: deposit(amount) and withdraw(amount). These two functions are passed the amount that is to be deposited or withdrawn from the bank account balance. Assume that a husband and wife share a bank account. Concurrently, the husband calls the withdraw() function and the wife calls deposit(). Describe how a race condition is possible and what might be done to prevent the race condition from occurring. | CO2 | L4 | 7M |
|  | b) | Design an algorithm for monitor that makes deadlock free in dinning philosopher’s problem. | CO2 | L3 | 7M |
|  |  | **Unit -III** | |  |  |
| 6. | a) | Consider the following snapshot of a system   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Process** | **Allocation** | | | | **Max** | | | | **Available** | | | | | A | B | C | D | A | B | C | D | A | B | C | D | | P0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 1 | 5 | 2 | 0 | | P1 | 1 | 0 | 0 | 0 | 1 | 7 | 5 | 0 |  |  |  |  | | P2 | 1 | 3 | 5 | 4 | 2 | 3 | 5 | 6 |  |  |  |  | | P3 | 0 | 6 | 3 | 2 | 0 | 6 | 5 | 2 |  |  |  |  | | P4 | 0 | 0 | 1 | 4 | 0 | 6 | 5 | 6 |  |  |  |  |   Answers the following questions using bankers algorithm (Evaluating)   1. What is the content of matrix Need 2. Is the system is in safe state 3. If a request from Process P1 arrives for(0,4,2,0) can the request be granted immediately | CO3 | L4 | 8M |
|  | b) | Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Which algorithm makes the most efficient use of memory? | CO3 | L4 | 6M |
|  |  | **(OR)** |  |  |  |
| 7. | a) | Consider the following page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Compare optimal page replacement algorithm and FIFO based on number of page faults, assuming three frames and all frames are initially empty. | CO3 | L4 | 8M |
|  | b) | Explain the techniques used to prevent the Deadlock. | CO3 | L2 | 6M |
|  |  | **Unit -IV** |  |  |  |
| 8. | a) | On a disk with 1000 cylinders, numbers 0 to 999, compute the number of tracks the disk arm must move to satisfy all the requests in the disk queue. Assume the last request serviced was at track 345 and head is moving to track 0. The queue in FIFO order contains requests for the following tracks: 123, 774, 692, 475, 105, 476. Perform the computation for the following disk scheduling algorithms.  i. FIFO ii. SSTF iii. SCAN iv. LOOK | CO4 | L4 | 8M |
|  | b) | Write a short note on i) Overview of mass-storage structure ii) Disk structure | CO4 | L2 | 6M |
|  |  | **(OR)** |  |  |  |
| 9. | a) | Discuss advantages and disadvantages of file allocation methods. | CO4 | L2 | 7M |
|  | b) | Explain the various methods for free-space management. | CO4 | L2 | 7M |

****