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

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **March, 2022** | |  | | --- | | **Common to CSE, CB, DS and IT** | | | |
| |  | | --- | | **Third Semester** | | **OPERATING SYSTEMS** | | |
| **Time:** Three Hours | | **Maximum:7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |
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| 1. | a) | | What is the main purpose of an operating system? | CO1 |  |
|  | b) | | Write the objective of multiprogramming. | CO1 |  |
|  | c) | | List the types of System calls. | CO1 |  |
|  | d) | | Define Starvation. | CO2 |  |
|  | e) | | What is the difference between pre-emptive and non-pre-emptive CPU scheduling? | CO2 |  |
|  | f) | | Define Race Condition. | CO2 |  |
|  | g) | | What is mutual exclusion. | CO2 |  |
|  | h) | | What do you mean by Swapping? | CO3 |  |
|  | i) | | What are the algorithms to avoid Deadlock? | CO3 |  |
|  | j) | | Define Thrashing. | CO3 |  |
|  | k) | | Differentiate Paging and Segmentation | CO3 |  |
|  | l) | | List various Disk-Scheduling Algorithms. | CO4 |  |
|  | m) | | What are the common attributes of a file? | CO4 |  |
|  | n) | | Define Access Matrix. | CO4 |  |
| **Unit - I** | | | | | |
| 2. | a) | Discuss the OS structure and operations with diagram | | CO1 | 7M |
|  | b) | Describe various types of schedulers in Operating System. | | CO1 | 7M |
| **(OR)** | | | | | |
| 3. | a) | Explain about Shared Memory Model in Inter Process Communication (IPC). | | CO1 | 10M |
|  | b) | Explain various Multi Threading Models. | | CO1 | 4M |
| **Unit – II** | | | | | |
| 4. |  | Consider the following Processes, with the length of the CPU Burst given in milliseconds.   |  |  |  | | --- | --- | --- | | **Process** | **Burst Time** | **Priority** | | P1 | 5 | 5 | | P2 | 6 | 4 | | P3 | 7 | 3 | | P4 | 9 | 1 | | P5 | 2 | 2 | | P6 | 3 | 6 |   Six jobs to be executed on a single processor system arrive at time 0.  a. Draw the Gantt chart that illustrates the execution of these processes using the following scheduling algorithms: FCFS, SJF, Non-Preemptive Priority(a larger priority number implies a higher priority), and Round Robin(Time Quantum : 2) .  b. Calculate Average Turn Around Time for each of these scheduling algorithms.  c. Calculate Waiting time for each of these scheduling algorithms. | | CO2 | 14M |
| **(OR)** | | | | | |
| 5. | a) | Describe the dining-philosophers Problem in detail. | | CO2 | 7M |
|  | b) | Explain the syntax and semantics of monitor. | | CO2 | 7M |
| **Unit - III** | | | | | |
| 6. | a) | What are the necessary conditions for deadlock? How can you detect a deadlock when each resource is having single instance? | | CO3 | 7M |
|  | b) | **20CS304/20IT304/20CB304/20DS304**  Let Assume that 5 processes P0 through P4; and 3 resource types:  A (10 instances), B (5instances), and C (7 instances)  Snapshot at time T0:  Allocation Max Available  A B C A B C A B C  P0 0 1 0 7 5 3 3 3 2  P1 2 0 0 3 2 2  P2 3 0 2 9 0 2  P3 2 1 1 2 2 2  P4 0 0 2 4 3 3  Using the banker’s algorithm, explain the sequence of the process to be executed so that system will be in Safe State. | | CO3 | P.T.O  7M |
| **(OR)** | | | | | |
| 7. | a) | Define page fault. Explain the steps involved in handling page fault with a neat diagram. | | CO3 | 7M |
|  | b) | Consider the Page Frame as 3 and Find the count of Page Faults for the given string below using FIFO and LRU Page Replacement Techniques.  1, 2, 1, 3, 6, 2, 7, 9, 2, 0, 4, 7, 0, 8, 3, 6, 2, 1, 9, 3 | | CO3 | 7M |
| **Unit - IV** | | | | | |
| 8. | a) | Explain about file allocation methods | | CO4 | 7M |
|  | b) | Discuss different File Operations in OS. | | CO4 | 7M |
| **(OR)** | | | | | |
| 9. | a) | Consider the disk queue with requests for I/O to Blocks on Cylinders 98, 183, 41, 122, 14, 124, 65, 90, 67, 100. The Head is initially at Cylinder No 50. The Cylinders are numbered from 0 to 199. Find the total head Movements while serving the requests using the following disk scheduling algorithms.  i. ) FCFS ii.) SSTS iii.) SCAN(towards lower end) iv) C-SCAN(towards lower end)  v) LOOK(towards lower end) vi). C-LOOK(towards lower end) | | CO4 | 14M |
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