** DHANEKULA INSTITUTE OF ENGINEERING & TECHNOLOGY**

**(Approved by AICTE, Affiliated by JNTU, Kakinada)**

**GANGURU::VIJAYAWADA – 521 139**

**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering **SET-I**

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-II

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :21 /09/202

Name of the Faculty : Mrs N. Sri Lakshmi/Mr. K. Srikanth

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**Assessment No: 01**

1. With a neat sketch, Explain in detail about the interrelation between various services provided by the operating system

**[BTL2,Understanding, PO1/PSO 1,2 --- 10M]**

1. Write the difference between the function and system call. Briefly explain the six major categories of system calls.

**[BTL2,Understanding,PO1/PSO 1,2 --- 10M]**

1. List out and discuss the Operating system structure with neat diagrams.

**[BTL2, Understanding, PO1/PSO 1,2 --- 10M]**

**Scheme of Evaluation**

1. Diagram of Operating System Services - 3M

Explanation of Services - 7M

2. Definition of System calls - 2 M

Difference between System calls & Function - 2 M

Explanation About Categories of System calls -6 M

3. Diagram of Operating System Structure -3M

Explanation of Operating System Structure - 7M

**Set 2**

1. Define the essential properties of the following types of operating systems:i) Batch ii) Interactive iii) Time sharingiv) Real time v) Parallelvi) Distributed**[BTL2, Understanding, PO1/PSO 1,2 --- 10M]**
2. Explain about Storage management with neat diagram?[**BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**
3. List out Operating system Operations in detail?

**[BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**

**Scheme of Evaluation**

**1.** Define the essential properties of the following types of operating systems:

(i) Batch -1 M

(ii) Interactive ( iii) Time sharing - 2+ 2 =4 M

(iv) Real time (v) Parallel - 2 + 1 =3 M

(vi) Distributed - 2 M

2. Diagram of Storage Management -3M

Explanation of Storage Management - 7M

3. Operations of Operating Systems -7 M

Examples -3M

**Set 3**

1. Explain about Operating system Services in detail?

**[BTL2, Understanding, PO1/PSO 1,2 --- 10M]**

1. Explain about any 3 computing Environments in detail?

**[BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**

1. Define system call and list out different system calls.

**[BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**

**Scheme of Evaluation**

1. Diagram of Operating System Services - 3M

Explanation of Services - 7M

**2.**List of 3 Computing Environments - 2 M

Explanation of 3 Computing Environments - 8M

3. Definition of System calls - 2 M

Explanation About Categories of System calls - 8 M

**Set 4**

1. What is an operating system, Explain about different operating systems?

**[BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**

1. Explain about Open source operating systems in detail?.

**[BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**

1. Define Operating system structure with neat diagrams.

**[BTL2, Understanding, PO1/PSO 1, 2 --- 10M]**

**Scheme of Evaluation**

1.Definition of Operating System -2 M

Explanation of Different Operating Systems - 8 M

2. Definition of Open source operating systems - 2 M

Explanation of different Open source operating systems -8 M

3. Diagram of Operating System Structure -3M

Explanation of Operating System Structure - 7M

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Name of the Course : Operating Systems

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Academic year : 2023-24 Subject Code : R20C203

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Duration : 70 Min Date :21 /09/2023

Name of the Faculty : Mrs N. Sri Lakshmi/Mr. K. Srikanth

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|  |  |  |
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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.2 | Apply scheduling algorithms, multithreaded programming and inter-process communication through examples.. | Applying(L3) |

1. What is critical section problem? Write and explain Peterson’s solution for it.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 -- 10M]**

2.How to prevent necessary and sufficient conditions of deadlock? Explain.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 -- 10M]**

3.Consider the following four processes represented as (Process, Arrival Time, Burst Time) with the length of CPU burst in

milliseconds. { ( P1, 0, 10), (P2, 1, 7), (P3, 2, 13), (P4, 3, 11) }. Using preemptive SJF scheduling:

i) Draw Gantt chart. ii) Calculate average waiting time.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 -- 10M]**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All The Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of Valuation**

1. Critical section problem with Peterson’s solution for it-----10M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

2. Deadlock necessary conditions-------5M

Deadlock prevention conditions------5M

.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2]**

3.SJF Scheduling Algorithm steps----5M

i) Draw Gantt chart. ii) Calculate average waiting time-------5M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2]**

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**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering **SET-II**

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-II

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :21 /09/2023

Name of the Faculty : Mrs N. Sri Lakshmi/Mr. K. Srkanth

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|  |  |  |
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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.2 | Apply scheduling algorithms, multithreaded programming and inter-process communication through examples.. | Applying(L3) |

1.a)Explain the usage and structure of monitors with an example.

b)Define short-term, medium-term, and long-term scheduling.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ---10M]**

2Explain different process states with neat sketch.

b)Explain how multiprogramming increases the utilization of CPU?

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ---10M]**

3. Explain the Round Robin scheduling algorithm with a suitable example.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All The Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of Valuation**

1.a) Structure of monitors with an example-----5M.

b) Short-term, medium-term, and long-term scheduling definitions----5M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

2.a)Process states with neat sketch-------5M.

b) Multiprogramming steps to increases the utilization of CPU-----5M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

3. Round Robin scheduling algorithm with a suitable example------10M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

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**GANGURU::VIJAYAWADA – 521 139**

**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering **SET-III**

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-II

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :21/09/2023

Name of the Faculty : Mrs N.Sri Laksmi/ Mr.K. Srikanth

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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.2 | Apply scheduling algorithms, multithreaded programming and inter-process communication through examples.. | Applying(L3) |

1. a) Define dead locks with example.

b) Discuss how the following pairs of scheduling criteria conflict in a certain settings.

i) CPU utilization and response time, ii) Average turnaround time and maximum waiting time

iii) I/O device utilization and CPU utilization.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

2.Explain about Priority Scheduling algorithm with an Example?

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

3.a) Define process and Process Control Block ?

b)Explain about Process Synchronization in detail?

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All The Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of Valuation**

1. a) Dead locks with example-----5M

b) Definitions and examples of

i) CPU utilization and response time,

ii) Average turnaround time and maximum waiting time

iii) I/O device utilization and CPU utilization. -----------5M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

2. Priority Scheduling algorithm with an Example-----10M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

3.a)Process and Process Control Block------5M

b) Process Synchronization with Example----5M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

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**GANGURU::VIJAYAWADA – 521 139**

**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering **SET-IV**

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-II

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :21/09/2023

Name of the Faculty : Mrs N. Sri Lakshmi/Mr. K. Srikanth

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|  |  |  |
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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.2 | Apply scheduling algorithms, multithreaded programming and inter-process communication through examples. | Applying(L3) |

1.Assume the following workload in a system. All jobs arrive at time 0 in the order given.

**Process Burst Time Priority**

P1 30 High

P2 28 High

P3 04 Low

P4 16 Medium

Draw a Gantt chart illustrating the execution of these jobs using Priority CPU scheduling algorithm

and also Calculate the average waiting time and average turnaround time.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

2. What is a Critical Section problem? Give the conditions that a solution to the critical section

problem must satisfy.

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

3.Explain about Inter Process Communication indetail?

. **[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2---10M ]**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All The Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of Valuation**

1. Priority scheduling algorithm with example-------7M

Example-------3M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

1. Critical Section problem -----3M

Conditions that a solution to the critical section problem must satisfy -----7M

**[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

1. Inter Process Communication ----5M

Inter Process Communication with types----5M

. **[R20C203.2, BTL3,** Applying**,PO1,PSO 1,2 ]**

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**GANGURU::VIJAYAWADA – 521 139**

**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam: Class Test-III

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :30/09/23

Name of the Faculty : Mrs N.Srilakshmi/K.Srikanth

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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.3 | Solve various memory management strategies such as paging and segmentation, virtual memory,  swapping and page replacement algorithms. | Applying(L3) |

1. Explain about Swapping in detail **?**

**[R20C203.3, BTL3, Applying, PO1, PSO 1,2 -- 10M]**

2**.** Explain about Memory management techniques in detail

**[R20C203.3, BTL3, Applying, PO1, PSO 1,2 -- 10M]**

3. Explain about Contiguous Memory Allocation with an example?

**[R20C203.3, BTL3, Applying, PO1, PSO 1,2 -- 10M]**

**Scheme of Valuation**

1. Swapping Process-------5M

Swapping technique with example----5M

**[R20C203.3, BTL3, Applying, PO1, PSO 1,2]**

1. Memory management techniques----8M

Address binding with example---2M

**[R20C203.3, BTL3, Applying, PO1, PSO 1,2]**

1. Contiguous Memory Allocation Techniques----8M

Contiguous Memory Allocation Types------2M

**[R20C203.3, BTL3, Applying, PO1, PSO 1,2 ]**

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**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-IV

Academic year : 2022-23 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min

Name of the Faculty : Mrs.N.SriLakshmi

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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.3 | Summarize scheduling algorithms &Process Synchronization & Classic IPC Problems handled by operating system with Examples.. | Applying (L2) |

1. Explain about LRU page replacement algorithms with an Example?

**[R20C203.3, BTL 3,Applying, PO1 , PSO 1,2-- 5+5M]**

2 . How does the system detect Thrashing ? What can the system do to eliminate this Problem?

**[R20C203.3, BTL 3,Applying /PO1 , PSO 1,2-- 10 M]**

3. What is Demand Paging ? Explain the Performance of Demand Paging?

**[R20C203.3, BTL 3,Applying /PO1 , PSO 1,2-- 10M]**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All the Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of Evaluation**

1. Solution for LRU Page Replacement algorithm and Example - 5+ 5 M

2. Definition of Thrashing - 2M

Detect & Eliminate the Problem of Thrashing - 3+ 5 M

3. Definition of Demand Paging -3 M

Performance of Demand paging in detail - 7 M

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**Department of Computer Science & Engineering**

Name of the program : B.Tech in Computer Science &Engineering **SET-I**

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-V

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :08 /11/2023

Name of the Faculty : Mrs. N. Sri Lakshmi/Mr. K. Srikanth

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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.4 | Identify deadlock detection, recovery, prevention and avoidance algorithms along with the disk structure, disk scheduling and storage implementations. | Applying(L3) |

1. Solve the following snapshot of a system:

**Processes Max. Allocation Available**

**A B C D A B C D A B C D**

P0 0 0 1 3 0 0 1 2 1 5 2 0

P1 1 7 6 0 1 0 0 0

P2 2 4 5 6 1 4 5 4

P3 0 6 5 2 0 6 3 0

P4 0 8 5 6 0 0 1 4

Answer the following questions using the banker’s algorithm:

a. What is the content of the matrix Need?   
 b. Is the system in a safe state? [R20C203.4, BTL3, Applying, PSO 1,2 – 10M]

1. Define resource allocation graph? Draw an example resource allocation graph which shows the

deadlock and explain the necessary conditions.

[R20C203.4, BTL3, Applying, PSO 1,2 – 10M]

1. Explain in detail about file attributes, operations, types.

[R20C203.4, BTL3, Applying, PSO 1,2 – 10M]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All The Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of valuation**

1 a. Problem solving using Banker’s algorithm----7M

b. Importance of Need Matrix-----2M  
 c. Safe state description----1M

2. Resource allocation graph-----5M

Necessary conditions for Deadlock----5M

3 . File attributes------------5M

Operations ----3M

Types-----2M

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Name of the program : B.Tech in Computer Science &Engineering **SET-II**

Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-V

Academic year : 2023-24 Subject Code : R20C203

JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min Date :08/11/2023

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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.4 | Identify deadlock detection, recovery, prevention and avoidance algorithms along with the disk structure, disk scheduling and storage implementations. | Applying(L3) |

1.Explain Banker's deadlock-avoidance algorithm with an illustration and example.

[R20C203.4, BTL3, Applying, PSO 1,2 – 10M]

2. Define deadlock and Explain about Deadlock Recovery Algorithm?

[R20C203.4, BTL3, Applying /PSO 1,2 -- 10M]

3. What is a directory? Explain in detail about implementation of directory?

[R20C203.4, BTL3, Applying /PSO 1,2 -- 10M]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*All The Best\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Scheme of valuation**

1. Banker's deadlock-avoidance algorithm------8M

Example----2M

1. Deadlock Recovery Algorithm-----8M

Example----2M

1. Directory Defnition-------2M

Implementation of directory-----8M

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Name of the Course : Operating Systems

Year &Semester : II-I Name of the Exam : Class Test-VI

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JNTUK Subject Code : R2021052 Exam Weightage : 100%

Duration : 70 Min

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| Course Outcome Number | Course Outcome | Blooms Taxonomy Levels |
| R20C203.5 | List various security measures and  system protection techniques | Analyzing (L4) |

1. What is meant by Access Matrix? Explain in detail about Access Matrix?

**[ R20C203.5, BTL4,** **Analyzing,PO2,PSO 1,2 -- 10M]**

1. Explain about Different types of Threats in detail?

**[ R20C203.5, BTL4,** **Analyzing,PO2,PSO 1,2 -- 10M]**

1. Explain about Cryptography and different tools for authentication?

**[ R20C203.5, BTL4,** **Analyzing,PO2,PSO 1,2 -- 10M]**

**Scheme of Evaluation**

1.Definition of Access Matrix - 2M

Explanation of Access Matrix - 8 M

2. Definition of Threats - 2 M

Explanation of Different Types of Threats - 8 M

3. Cryptography Definition - 2M

Explanation about Different tools for authentication – 8M