

Code: 20CS3401

**II B.Tech - II Semester – Regular Examinations – JULY 2022**

**OPERATING SYSTEMS  
(COMPUTER SCIENCE & ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.  
2. All parts of Question must be answered in one place.

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**UNIT – I**

1. a) Define Operating System. Explain the components of an operating system. 7 M
- b) Write short notes on Functions and services provide by OS. 7 M

OR

2. a) Explain the purpose of all types of system calls and discuss the calls related to Process Control, device management and communications in detail. 10 M
- b) Explain about OS structure with neat diagram. 4 M

**UNIT – II**

3. a) Explain about Inter process communication in detail with Examples. 7 M
- b) Discuss the following CPU scheduling algorithms with an example: (i) Round Robin (ii) Priority. 7 M

OR

4. Consider the following set of processes with the length of the CPU burst time given in milliseconds processes are assumed to have arrived in the order A,B,C,D,E .

Process	Burst Time	Priority	Arrival Time
A	10	5	0
B	6	2	0
C	7	4	1
D	4	1	1
E	5	3	2

- a) Draw four Gantt charts illustrating the execution of these processes using FCFS, Non-Preemptive SJF, priority (Preemptive, Non-Preemptive) and RR (quantum=5)scheduling.
- b) Calculate the turnaround time of each process for each of the scheduling algorithms in part a.
- c) Calculate the waiting time of each process for each of the scheduling algorithms in part a.
- d) Which of the scheduling algorithm gives results in the minimal average waiting time? 14 M

### UNIT-III

5. Show how wait () and signal () semaphore operations could be implemented in multiprocessor environment using Test () and set () instruction. The solution should exhibit minimal busy waiting. Develop pseudocode for the operations. 14 M

OR

6. a) Explain the Resource Allocation Graph Algorithm with an example. How to determine safe state system? 7 M
- b) What is deadlock recovery? Explain various methods of deadlock recovery. 7 M

#### UNIT – IV

7. a) Illustrate the importance of Demand paging in memory management? Take any example for illustration. 7 M
- b) Explain external fragmentation. In which memory management technique it occurs? Explain the solution for it. 7 M

OR

8. a) Define page table? Explain  
i) Hashed page table. ii) Inverted page table. 8 M
- b) Consider a swapping system in which memory consists of the following hole sizes in order: 10 KB, 4 KB, 20 KB, 18 KB, 7 KB, 9 KB, 12 KB, and 15 KB. Identify which hole is taken for successive segment requests of 12 KB, 10 KB and 9 KB processes for:  
i) First fit. ii) Best fit. iii) Next fit. 6 M

#### UNIT – V

9. a) Write in detail about file attributes, operations, types and structures. 7 M
- b) Briefly discuss about the various directory structures. 7 M

OR

10. a) A Work Queue is as: 23, 89, 132, 42, 187. There are 200 cylinders numbered from 0 – 199. The disk head starts at number 100 and moves forward. Calculate the total head movement for the following algorithms:
- i) FCFS   ii) SSTF   iii) SCAN   iv) LOOK   v) C-SCAN   10 M
- b) Distinguish between sequential and direct file access methods.   4 M