

Roll No



**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING  
END TERM EXAMINATION - JUN 2023**

**Semester :** Semester IV - 2021

**Course Code :** CSE2010

**Course Name :** Sem IV - CSE2010 - Operating System

**Program :** CAI,CBC,CCS,CDS,CEI,CIT,COM&CSE

**Date :** 9-JUN-2023

**Time :** 9.30AM - 12.30PM

**Max Marks :** 100

**Weightage :** 50%

**Instructions:**

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

**PART A**

**ANSWER ALL THE QUESTIONS**

**(10 X 2 = 20M)**

1. Operating system is an intermediary between \_\_\_\_\_ and \_\_\_\_\_  
(CO1) [Knowledge]
2. System calls are built on top of \_\_\_\_\_ and interact with the \_\_\_\_\_ of operating system  
(CO1) [Knowledge]
3. In layered approach of OS design, each layer uses the services and functions of \_\_\_\_\_ layers.  
(CO1) [Knowledge]
4. Logical memory is divided into fixed-sized partitions called \_\_\_\_\_ and physical memory is divided into fixed-sized partitions called \_\_\_\_\_  
(CO4) [Knowledge]
5. In swapping, programs are stored in memory in contiguous fashion. State True or False  
(CO4) [Knowledge]
6. Mention the necessary conditions for deadlock to occur  
(CO3) [Knowledge]
7. List the two standard atomic operations which are used to access the semaphores.  
(CO3) [Knowledge]
8. In pure demand paging, CPU can start executing a process with \_\_\_\_\_ number of pages in the main memory  
(CO4) [Knowledge]
9. In PCB \_\_\_\_\_ provides the information of next instruction and \_\_\_\_\_ provides the unique id of process.  
(CO2) [Knowledge]
10. When a process is using CPU time, it is referred as \_\_\_\_\_ burst and When a process is using I/O, it is referred as \_\_\_\_\_ burst  
(CO2) [Knowledge]

## PART B

### ANSWER ALL THE QUESTIONS

(5 X 10 = 50M)

11. Consider the reference string 6, 1, 1, 2, 0, 3, 4, 6, 0, 2, 1, 2, 1, 2, 0, 3, 2, 1, 4, 0 for a memory with three frames and calculate number of page faults by using OPTIMAL and LRU  
(CO4) [Comprehension]
12. List six different threading issues and explain any four in brief.  
(CO2) [Comprehension]
13. Consider a user program of logical address of size 6 pages and page size is 4 bytes. The physical address contains 300 frames. The user program consists of 22 instructions a, b, c . . . u, v. Each instruction takes 1 byte. Assume at that time the free frames are 7, 26, 52, 20, 55, 6, 18, 21, 70, and 90. Find the following.  
a. Draw the logical and physical maps and page tables?  
b. Allocate each page in the corresponding frame?  
c. Find the physical addresses for the instructions m, d, v, r?  
d. Calculate the fragmentation if exist?  
(CO5) [Comprehension]
14. Assume you are in a team developing synchronization solution for the operating systems. Your manager has asked to check the feasibility of using Test and Set instruction for implementing synchronization. Prepare a brief report on the working of the Test and Set instruction and also its Pros and Cons to be submitted to your manager for review.  
(CO3) [Comprehension]
15. What is the purpose of system programs/system calls? With neat sketch, discuss the two different models used by processes in order to communicate with each other when  
a. both processes within the same system  
b. processes in different systems  
(CO1) [Comprehension]

## PART C

### ANSWER ALL THE QUESTIONS

(2 X 15 = 30M)

16. A system has four processes and five allocatable resources. The current allocation and maximum needs are as follows
- |   | Allocated   | Maximum |
|---|-------------|---------|
| A | 1 0 2 1 1 1 | 1 2 1 3 |
| B | 2 0 1 1 0 2 | 2 2 1 0 |
| C | 1 1 0 1 1 2 | 1 3 1 1 |
| D | 1 1 1 1 0 1 | 1 2 2 0 |
- if available = [ 0 0 X 1 1 ], what is the smallest value of X for which this is a safe state?  
(CO3) [Application]
17. Consider 4 processes P, Q, R, S scheduled on a CPU as per Round Robin (time slice=4ms) and Priority Scheduling Algorithms. The processes arrive in the order P, Q, R, S, all at time t=0. The CPU burst times (in time units) are P=4, Q=12, R=5 and S=4 and Priority of each process is P(4), Q(2), R(3), S(1) respectively.  
For both Priority and RR scheduling algorithms,  
a. Draw the Gantt Chart of the system.  
b. Find the completion time of process R.  
c. Compute the difference between average turnaround times and average waiting times  
d. Find the no of context switches between S to Q, R to Q, Q to R, S to P and P to S.  
(CO2) [Application]