END SEMESTER EXAMINATIONS (DECEMBER 2021/JANUARY 2022) - QUESTION PAPER - PART A

COURSE CODE : CSE3153
COURSE NAME : OPERATING SYSTEMS
SEMESTER : V
DATE OF EXAM : 30/12/2021
DURATION : 45 + 5 minutes

Instructions for Students:
(1) ANSWER ALL THE QUESTIONS.
(2) EACH QUESTION CARRIES 1 MARK.
(3) YOU ARE INSTRUCTED TO INFORM THE INVIGILATOR AFTER SUBMISSION OF THIS FORM IN THE CHAT SECTION.

* Required

* This form will record your name, please fill your name.

1

STUDENT NAME *

2

REGiSTRATION NUMBER *

3

Section *

4

Roll No *

5

Which of the following information about he process not stored in PCB ?
(1 Point)

- memory limits
- process state
- program counter
- Partition information

6

Choose the CORRECT match for the following.

i) Heavy-weight	a) concurrency
ii) remote procedure call	b) parallelism
iii) running more than one task	c) inter-process communication
iv) progressing more than one task simultaneously	d) single-threaded process

(1 Point)

- i-c, ii-d, iii-a, iv-b
- i-a, ii-b, iii-c, iv-d
- i-b, ii-a, iii-d, iv-c
- i-d, ii-c, iii-b, iv-a

7

To ensure the integrity of the data being shared, operating systems often provide system calls allowing a process to _____shared data. Then, no other process can access the data until the _____is released
(1 Point)

- LOCK,LOCK
- KEY, KEY
- LOCK,KEY
- KEY, LOCK

8

The multilevel queue scheduling algorithm does not consist queue of_____
(1 Point)

- system processes
- interactive processes
- Student Processes
- sequential process

9

Turnaround time is not the best criterion for the selection of scheduling algorithms in _____.
(1 Point)

- Interactive systems
- neither batch nor interactive systems
- both batch and interactive systems
- batch systems

10

Where does the swap space reside?
(1 Point)

- Register
- Cache
- Disk
- RAM

11

(1 Point)

How many pages are obtained from the logical address space of size 2^7 bytes and page size 2^3 bytes?

- 8
- 4
- 128
- 16

12

In non preemptive CPU scheduling, which of the following statement is true
i. Process may preempt when higher priority process comes
ii. Process is preempted if process with lower burst time arrives than current process's remaining burst time
iii. none of processes get chance any time when a process grabs the CPU
iv. Process will keep the CPU until its completion and gives CPU to other process , if any process is waiting
(1 Point)

- iv only
- ii only
- iii only
- i and ii

13

1. Match the following with respect to file operations

i).	Read	a. read from the file.
ii).	Write	b. Write new information at the end of the file
iii)	Execute	c. Write or rewrite the file.
iv)	Append	d. Load the file into memory and execute it

(1 Point)

- i-c ii-a iii-b iv-d
- i-a ii-b iii-c iv-d
- i-b ii-a iii-c iv-d
- i-a ii-c iii- d iv-b

14

A paging scheme uses a TLB. A TLB access takes 10ns and main memory access takes 50ns. What is the effective access time (in ns) if the TLB hit ratio is 90%?
(1 Point)

- 50
- 65
- 70
- 55

15

What is the waiting time of process P0 for the following snapshot of processes , using FCFS CPU scheduling algorithm

Processes	Arrival Time (ms)	Burst Time(ms)
P0	1	3
P1	2	8
P2	0	9
P3	3	12
P4	4	19

(1 Point)

- 8
- 5
- 1
- 3

16

Choose the CORRECT answer from the following
i) concurrency without parallelism is possible

ii) parallelism without concurrency is not possible

iii) concurrency without parallelism is not possible

iv) parallelism without concurrency is possible

(1 Point)

- Only iv) is correct
- Only i) is correct
- Both i) and ii) are correct
- Both iii) and iv) are correct

17

What is the number of page faults if the page reference string is 4,5,4,5,4,5,5,4 using FCFS with 1 frame which is initially empty?
(1 Point)

- 5
- 4
- 8
- 7

18

Gesture is a best example for _____
(1 Point)

- command-line interface
- shell-script
- graphical user interface
- system call

19

_____specifies group of functions that are available to an application programmer, including the parameters that are passed to each function and the return values the programmer can expect.
(1 Point)

- Utility software
- Application Programming Interface
- Kernel
- Shell-script

20

Which among the following does not belong to critical section of process synchronization?
(1 Point)

- kernel section
- remainder section
- exit section
- entry section

21

The resulting list for each object consists of ordered pairs <domain, access-rigth> , which define all domains with a nonempty set of access rights for that object. This statement is **TRUE** with respect to which of the following methods of access matrix implementation.
(1 Point)

- Global Table
- Access list for objects
- Capability list for domains
- lock-key scheme

22

1. Select the statements among the following that are true.

i) Duplicate directory entries, however, make the original and the copy indistinguishable
ii) A major problem with duplicate directory entries is maintaining consistency when a file is modified
iii) A simple tree structure is more flexible than a simple acyclic-graph directory structure
iv) An acyclic graph —that is, a graph with no cycles—allows directories to share subdirectories and files
(1 Point)

- ii & iii
- i & ii
- i,ii and iv
- i, ii and iii

23

Choose the one that is not a file attribute from the following.
(1 Point)

- Protection
- Size
- Name
- bytes in file

24

Which among the following is not a necessary condition for the occurrence of deadlock
(1 Point)

- Hold and wait
- Mutual exclusion
- Cirrcular wait
- full Preemption

1. Match the following bits to the different purposes given below.

Bits	Purpose
i)Dirty	a) Page number
ii)Valid	b) Write-back policy
iii)Higher m-n bits of logical address	c) Page offset
iv)Lower n bits of logical address	d) Page in main memory

(1 Point)

- i)-d, ii)-a, iii)-b, iv)-c
- i)-b, ii)-d, iii)-a, iv)-c
- i)-b, ii)-c, iii)-a, iv)-d
- i)-c, ii)-d, iii)-a, iv)-b

26

Which one of the following is a visual way to determine the deadlock occurrence?
(1 Point)

- access matrix
- resource allocation graph
- Acyclic graph
- Process state diagram

27

The logical address space is directly shared by _____.
(1 Point)

- cooperating Processes
- both cooperating and Independent
- Independent processes
- neither cooperating nor Independent processes

28

In critical section problem, _____limits number of times that other processes are allowed to enter their critical sections after a process has made a request to enter its critical section and before that request is granted.
(1 Point)

- unbounded waiting
- mutual exclusion
- progress
- bounded waiting

29

Which of the page replacement algorithm sometimes leads to more page faults when the number of frames in main memory increases ?
(1 Point)

- FIFO
- LRU
- Both LRU and Optimal
- Optimal

30

A counting semaphore has a value of 5 at a given time. On this semaphore, 11 wait operations and 9 signal operations were completed. What is the semaphore's resultant value?
(1 Point)

- 5
- 3
- 9
- 25

31

_____ provides a unique value for each process in the system
(1 Point)

- process identifier
- process descriptor
- file identifier
- file descriptor

32

Choose the CORRECT statement/statements from the following.

i) degree of multiprogramming will be controlled by long-term scheduler

ii) CPU-scheduler is also called as long-term scheduler

iii) CPU-bound process invests less I/O time

iv) removing a process from main memory and reintroducing into main memory is called swapping
(1 Point)

- Both i) and iii) are correct
- i), iii) and iv) are correct
- Both i) and ii) are correct
- Only iii) is correct

33

If a resource-allocation graph contains a cycle, then the system _____.
(1 Point)

- is deadlock free
- never enter into deadlock
- may or may not be deadlocked
- always deadlocked

34

The disk scheduling algorithm that suffers from starvation is
(1 Point)

- SCAN
- LOOK
- FCFS
- SSTF

Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

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V SEMESTER B.TECH. (COMPUTER SCIENCE AND ENGINEERING)

END SEMESTER EXAMINATIONS, DEC 2021/JAN 2022

SUBJECT: OPERATING SYSTEMS [CSE 3153]

REVISED CREDIT SYSTEM

(30/12/2021)

Time: 2.20 PM – 3.35 PM MAX. MARKS: 20

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Describe the **FOUR** events in which CPU-scheduling decisions may take place. **5M**

Consider the following set of processes, arriving at the given times and having the following CPU burst time and priorities:

Process	Arrival Time(ms)	Burst Time (ms)	Priority
A	0	8	3
B	3	4	1
C	5	7	4
D	8	3	2

Draw a Gantt chart and calculate average waiting time and turn-around time of each process using SJF, Priority and Round Robin (quantum 3 ms) CPU scheduling algorithms. Assume pre-emptive scheduling policy for SJF and Priority scheduling. Consider higher the priority value, lower the priority of the process

1B. Suppose that a disk drive has 200 cylinders, numbered from 0 to 199. The drive is currently serving a request at cylinder 60 and the queue of pending requests is: 86, 159, 39, 139, 35, 71, 65, and 14. Starting from current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk-scheduling algorithms? **3M**

Show clearly all the steps.

i. FCFS
ii. SSTF
iii. LOOK

1C. Compare and contrast the differences between shared memory model and message-passing model **2M**

2A. Apply **FIFO** , **LRU** and **OPTIMAL** page replacement algorithms for following page reference string **3,4,2,3,4,3,4,5,7,6,4,3,2,3,4,5,4** . Assume 3 frames and all frames are initially empty. Show all the steps. **5M**

2B. A system has 12 resources of A type, 14 resources of B type and 15 resources of C type. Apply Banker's algorithm and check whether the system is safe using Bankers algorithm. Also write the safe sequence if the system is deadlock free. **3M**

Processes	MAX			Allocation			Available		
	A	B	C	A	B	C	A	B	C
P1	8	7	5	2	3	4	?	?	?
P2	7	4	4	4	2	3			
P3	2	5	5	1	4	4			
P4	5	5	4	3	3	4			

2C. Discuss any two file access methods and mention their advantages and disadvantages. **2M**

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