



Name: Roll No.:

Branch: Signature of Invigilator:

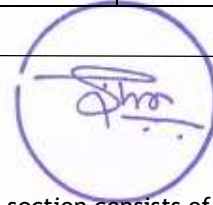
Semester: IVth / VIth

Date: 02/05/2022 (MORNING)

Subject with Code: CS211_CS303 OPERATING SYSTEM

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B. Tech

BRANCH: CSE/IT/I.MSc

SEMESTER: IV

SESSION: SP/22

CENTRE: [MPJD]

SUBJECT: CS211/CS303 OPERATING SYSTEM

TIME: 2 Hours

Set-1

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains two sections SECTION A and SECTION B.
2. SECTION A contains 30 MCQ questions each of 1 marks and total of 30 marks.
3. SECTION B contains 5 subjective questions each of 5 marks and total of 25 marks.
4. Attempt all questions of SECTION A and attempt any four questions from SECTION B.
5. The missing data, if any, may be assumed suitably.

SECTION-A

Q-1) To access the services of operating system, the interface is provided by the _____

- a) System calls
- b) API
- c) Library
- d) Assembly instructions

Q-2) For real time operating systems, interrupt latency should be _____

- a) zero
- b) minimal
- c) maximum
- d) dependent on the scheduling

Q-3) If the process is running currently executing, it is in the running

- a) Mode
- b) Process
- c) State
- d) Program

Q-4) Process Control Block (PCB) is the most important

- a) Data Access Type
- b) Data Algorithm
- c) Data Structure
- d) Data Block

Q-5) Program Counter is the address of the next instruction in the program to be

- a) Terminate
- b) Control
- c) Executed
- d) Access

Q-6) Multiple Threads within the same process may be allocated to separate

- a) Applications
- b) Processors
- c) Programs
- d) Processes

Q-7) Consider a set of n tasks with known runtimes r_1, r_2, \dots, r_n to be run on a uniprocessor machine. Which of the following processor scheduling algorithms will result in the maximum throughput?

- a) Round Robin
- b) FCFS
- c) Priority scheduling
- d) Shortest Job First

Q-8) "Round robin algorithm is similar to First Come First Serve scheduling but pre-emption is added to switch between processes". Is this statement being true

- a) Yes
- b) No

Q-9) The real difficulty with the shortest job first algorithm is knowing the _____ of the next CPU burst time and it is used frequently in _____

- a) Length, Short Term Scheduling
- b) Length, Long Term Scheduling
- c) Length, Medium Term Scheduling
- d) None

Q-10) If there are " n " processes in the ready queue and the time quantum is " q ", then each process gets _____ of the CPU time in chunks of at most _____ time units

- a) $1/n, q$
- b) $1/n, (q-1)$
- c) $n, 1/q$
- d) $(n-1), 1/q$

Q-11) The time it takes to save one job and start another job is called as

- a) Dispatch latency
- b) Context Switching
- c) Swap time
- d) None

Q-12) If we have a Process Time=10 and the time quantum = 6 then how many context switches are there

- a) 0
- b) 1
- c) 2
- d) None

Q-13) To enforcetwo functions are provided enter-critical and exit-critical, where each function takes as an argument the name of the resource that is the subject of competition

- a) Mutual Exclusion
- b) Synchronization
- c) Deadlock
- d) Starvation

Q-14) A is a software module consisting of one or more procedures, an initialization sequence, and local data

- a) Monitor
- b) message passing
- c) strong semaphore
- d) binary semaphore

Q-15) Using Semaphores, each process has a critical section used to access the

- a) Computers
- b) Processors
- c) Resources
- d) Users

Q-16) Banker's Algorithm for resource allocation deals with

- a) Deadlock Prevention
- b) Deadlock Avoidance
- c) Deadlock Detection
- d) Circular Wait

Q-17) With Deadlock Detection, requested resources are granted to

- a) Resources
- b) Programs
- c) Processes
- d) Users

Q-18) A System has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then

- a) Deadlock can never occur
- b) Deadlock may occur
- c) Deadlock has to occur
- d) None of these

Q-19) In fixed sized partition the degree of multiprogramming is bounded by

- a) The number of partitions
- b) The CPU utilization
- c) The memory size
- d) All of the mentioned

Q-20) If the size of logical address space is 2 to the power of m and a page size is 2 to the power of n addressing units then the high order _____bits of a logical address designate the page number and the _____ low order bits designate the page offset

- a) m, n
- b) n, m
- c) $m-n, m$
- d) $m-n, n$

Q-21) In segmentation technique, segment base contains the

- a) Starting logical address of the process
- b) Starting physical address of the segment in memory
- c) Segment length
- d) None of the mentioned

Q-22) In an Optimal page replacement algorithm when a page is to be replaced which of the following pages is chosen

- a) Oldest page
- b) Newest page
- c) Frequently occurred page in the future
- d) Not frequently occurred page in the future

Q-23) In the working set model, for: 2 6 1 5 7 7 7 7 5 1 6 2 3 4 1 2 3 4 4 4 3 4 3 4 4 4 1 3 2 3 if DELTA = 10, then the working set at time t_1 (...7 5 1) is?

- a) {1, 2, 4, 5, 6}
- b) {2, 1, 6, 7, 3}
- c) {1, 6, 5, 7, 2}
- d) {1, 2, 3, 4, 5}

Q-24) A process is thrashing if

- a) It is spending more time paging than executing
- b) It is spending less time paging than executing
- c) Page faults occurs
- d) Swapping cannot take place

Q-25) The heads of the magnetic disk are attached to a _____ that moves all the heads as a unit
 a) spindle
 b) disk arm
 c) track
 d) none of the mentioned

Q-26) The number of resources requested by a process _____
 a) must always be less than the total number of resources available in the system
 b) must always be equal to the total number of resources available in the system
 c) must not exceed the total number of resources available in the system
 d) must exceed the total number of resources available in the system

Q-27) Binding of instructions and data to memory addresses can be done at _____
 a) Compile time
 b) Load time
 c) Execution time
 d) All of the mentioned

Q-28) The processes that are residing in main memory and are ready and waiting to execute are kept on a list called _____
 a) Job queue
 b) Ready queue
 c) Execution queue
 d) Process queue

Q-29) When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called _____
 a) Dynamic condition
 b) Race condition
 c) Essential condition
 d) Critical condition

Q-30) The signal operation of the semaphore basically works on the basic _____ system call.
 a) continue ()
 b) wakeup ()
 c) getup ()
 d) start ()

SECTION-B (Attempt Any Four Questions)

Q-1) What are the differences between user level threads and kernel supported threads? Under what circumstances is one type “better” than the other? [5]

Q-2) Consider the following set of processes with length of CPU burst time given in milliseconds and arrival time is given for each process [5]

Process	Arrival Time	CPU Burst Time
P1	2	2
P2	0	1
P3	2	3
P4	3	5
P5	4	4

- (a) Draw the Gantt charts, illustrating the execution of these processes using FCFS, SJF (non-pre-emptive), SJF (pre-emptive i.e., Shortest Remaining Time First (SRTF)).
- (b) Calculate the turnaround time, waiting time and response time of each process for each of the scheduling algorithms as mention in (a).

Q-3) Consider the following snapshot of a system with four resources, A=3, B=14, C=12, D=12

Process	Allocation				Max_Need			
	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2
P1	1	0	0	0	1	7	5	0
P2	1	3	5	4	2	3	5	6
P3	0	6	3	2	0	6	5	2
P4	0	0	1	4	0	6	5	6

Answers the following questions using the banker's algorithm

[5]

(a) What is the content of the matrix *Need and Available*?

(b) Check, Is the system in a safe state?

Q-4) When do page faults occur? Describe the actions taken by the operating system when a page fault occurs? [5]

Q-5) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests in FIFO order is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

Starting from the current head position, what is the total distance (in Cylinders) that the disk arm moves to satisfy all the pending requests, for the following disk scheduling algorithms? [5]

a) FCFS (First Come First Serve)

b) SSTF (Shortest Seek Time First)

Exam: 02-05-2022** (Time: 10:00 A.M to 12:00 NOON (P.M))***



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