



**MAULANA ABUL KALAM AZAD UNIVERSITY OF  
TECHNOLOGY, WEST BENGAL**

Paper Code : BCAN-301

PUID : 03494 (To be mentioned in the main answer script)

**OPERATING SYSTEMS**

Full Marks : 70

Time Allotted : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

**GROUP - A**  
**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any ten of the following :  $10 \times 1 = 10$

- i) A processor
  - a) is a device that performs a sequence of operations specified by instructions in memory
  - b) is the device where information is stored
  - c) is a sequence of instructions
  - d) is typically characterized by interactive processing and time of the CPU's time to allow quick response to each user.

[ Turn over

ii) Paging

- a) is a method of memory allocation by which the program is subdivided into equal portions, or pages and core is subdivided into equal portions or blocks
- b) consists of those addresses that may be generated by a processor during execution of a computation
- c) is a method of allocating processor time
- d) allows multiple programs to reside in separate areas of core at the time.

iii) Semaphores

- a) synchronize critical resources to prevent deadlock
- b) synchronize critical resources to prevent contention
- c) are used to do I/O
- d) are used for memory management.

iv) A disk scheduling algorithm in an operating system causes the disk arm to move back and forth across the disk surface in order to service all requests in its path. This is a

- a) First come first served
- b) Shortest Seek Time First (SSTE)
- c) Scan
- d) FIFO.

- v) Which one of the following is the address generated by CPU ?
- a) Physical address
  - b) Absolute address
  - c) Logical address
  - d) None of these.
- vi) In contiguous memory allocation
- a) each process is contained in a single contiguous section of memory
  - b) all processes are contained in a single contiguous section of memory
  - c) the memory space is contiguous
  - d) none of these.
- vii) A solution to the problem of external fragmentation is
- a) compaction
  - b) larger memory space
  - c) smaller memory space
  - d) none of these.
- viii) Scheduling is
- a) allowing a job to use the processor
  - b) making proper use of processor
  - c) all of these
  - d) none of these.

- ix) Which of the following does not form an OS layer ?
- a) Kernel
  - b) Shell
  - c) Application Programs
  - d) Critical Section.
- x) The strategy of making processes that are logically runnable to be temporarily suspended is called
- a) Non-preemptive scheduling
  - b) Preemptive scheduling
  - c) Shortest job first
  - d) First come First serve.
- xi) The basic types of OS are
- a) batch and time sharing
  - b) sequential and real time
  - c) direct and interactive
  - d) batch and interactive.
- xii) An SJF algorithm is simply a priority algorithm where the priority is
- a) the predicted next CPU burst
  - b) the inverse of the predicted next CPU burst
  - c) the current CPU burst
  - d) anything the user wants.

**GROUP - B**

**( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

2. Differentiate the following :
  - a) Logical and physical address space.
  - b) Process and thread.
3. What is the purpose of interrupts ? What are the differences between a trap and an interrupt ?  $2 + 3$
4. Describe Banker's algorithm. Describe the following data structure : Need, Allocation, Max, Available.  $3 + 2$
5. What is a thread ? Write three points to differentiate it from process.  $2 + 3$
6. Explain the difference between internal and external fragmentation.

**GROUP - C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) What is mutual exclusion problem concerning to concurrent process ? Explain with example.  
b) State the producer-consumer problem.  
c) Describe critical section problem.  $5 + 5 + 5$

8. Write short notes on the following :  $3 \times 5$

- a) Digital Signature
- b) Thrashing
- c) Page replacement algorithm.

9. a) Explain the difference between process and program. Briefly discuss about process creation and termination.  $3 + 4$

b)

Process	CPU burst time	Priority	Arrival Time
P1	8	3	0.0
P2	4	1	0.4
P3	1	2	1.0

Draw the Gantt chart for priority scheduling and SRTF scheduling. Calculate average waiting time.

10. Consider the following page reference string :

10 11 104 170 173 73 309 185 245 246 434 498 364

Calculate page fault rate for following algorithms :

- a) FIFO
- b) LRU
- c) Optimal

( Memory size 3 frames)

$5 + 5 + 5$

1. a) Write and explain the logic of 'Bully algorithm' in a distributed system.
- b) Briefly describe the common failures in distributed system.
- c) What are the necessary conditions for deadlock ?

6 + 5 + 4

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