



HALDIA INSTITUTE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION UNDER MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL)

Paper Code: PCC-CS 502

Paper Name: Operating Systems

Time Allotted: 3 Hours

Full Marks: 70

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)

Choose the correct alternatives from the followings:

15 x 1 = 15

1. (i) The number of processes completed per unit time is known as
a) Output b) Throughput c) Efficiency d) Capacity [CO2]
- (ii) Physical memory is broken down into fixed-sized blocks called
a) frames b) pages c) backing store d) none of the above [CO4]
- (iii) The technique of gradually increasing the priority of a process that wait in a system for a long time is known as
a) blocking b) ageing c) starvation d) convoy effect [CO2]
- (iv) An address generated by the CPU is commonly referred to as
a) logical address b) physical address c) relational address d) virtual address [CO4]
- (v) Which of the following schemes suffers from External Fragmentation?
a) Segmentation b) Paging c) Paged segmentation d) All of these [CO4]
- (vi) Main function of linker is
a) Relocation b) Linking c) (a) & (b) d) Loading. [CO4]
- (vii) Moving process from main memory to disk is called
a) Caching b) Termination c) Swapping d) Interruption [CO5]
- (viii) The state of a process after it encounters an I/O instruction is
a) Ready b) Blocked/Waiting c) Idle d) Running. [CO6]
- (ix) Which of the following scheduling algorithm does give minimum average waiting time? [CO2]
a) FCFS b) SJF c) Round-Robin d) Priority
- (x) Which of the flowing is false?
a) Segmentation suffers from external fragmentation b) Paging suffers from internal fragmentation
c) Virtual memory is used only in multi-user system d) Segmented memory can be pages [CO4]
- (xi) Which scheduling policy is most suitable for the time-sharing operating system?
a) SJF b) Round Robin c) FCFS d) multilevel queue [CO2]
- (xii) The address of the next instruction to be executed by the current process is provided by the
a) CPU registers b) program counter c) process stack d) pipe [CO1]
- (xiii) provides an interface to the operating system for the user
a) kernel b) micro-kernel c) shell d) none of these [CO1]

(xiv) Part of the program where the shared memory accessed and which should be executed invisibly is called

- a) semaphores b) directory c) critical section d) mutual exclusion [CO4]

(xv) Swap space generally resides on

- a) main memory b) files c) programs d) disk [CO5]

Group – B

(Short Answer Type Questions)

Attempt any three from the followings:

3 x 5 = 15

2. (i) What are operations of semaphores? [CO2]
(ii) How to implement a solution to the Readers-Writers problem with the use of semaphores? [CO2] 1+4
3. (i) What is the optimistic assumption made in the deadlock detection algorithm? [CO3]
(ii) How can this assumption be violated? [CO3] 2+3
4. (i) What do you mean by real time system? [CO1]
(ii) Differentiate between soft and hard real time system. [CO1] 2+3
5. (i) What is Race condition? [CO2]
(ii) Explain Peterson solution for race condition. [CO2] 2+3
6. (i) What is program probability? [CO5]
(ii) What is the difference between static and dynamic relocation? [CO5] 2+3

Group – C

(Long Answer Type Questions)

Attempt any four from the followings:

4 x 10 = 40

7. (i) Write down the merits and demerits of a virtual memory system. [CO4]
(ii) Consider a virtual memory system with combined implementation, segmentation and paging. Describe the address translation scheme along with necessary data structures. [CO4] 5+5
8. (i) Consider a paged memory system. Specify what information will be stored in PCB to support memory management. [CO4]
(ii) What is the difference between content switching and mode switching? [CO4]
(iii) Compare best fit and first fit algorithm for memory allocation. [CO4] 3+3+4
9. (i) On a simple paged system, if references satisfied by the associative registers take 100 ns and references through the main memory page table take 180 ns, what must the hit ratio be to achieve an effective access time of 125 ns? [CO4]
(ii) How is paging implemented in hardware? [CO4]
(iii) What is internal fragmentation? [CO4] 6+2+2
10. (i) Consider the following page reference string : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 How many page faults would occur for the following replacement algorithms ? Assuming 3 frames are available. [CO4]
Also assume that initially none of pages in main memory. i) Optimal replacement ii) FIFO replacement.
(ii) What is thrashing? [CO2] 8+2
11. (i) Explain the difference between internal fragmentation and external fragmentation. Which one occurs in paging system? How can the problem of external fragmentation be solved? [CO4]
(ii) Why are segmentation and paging sometimes combined into one scheme? [CO4] 7+3
12. (i) What is a thread? Explain different types of threads with example. What advantages do threads have over multiple processes? [CO2]

(ii) Explain critical section problem.

[CO2]

(1+2+2)+5