

B3.4 - R4 : OPERATING SYSTEMS**NOTE :**

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time : 3 Hours**Total Marks : 100**

1. (a) Why is translation look aside buffer important in paging technique ?
 (b) What are the advantages of threads over processes ?
 (c) Explain the concept of Virtual Private Network (VPN) and Intranet.
 (d) What is a Distributed Operating System ? Write down its two main functionalities over a Stand-Alone Operating System.
 (e) Differentiate Internal and External Fragmentation.
 (f) What is an Access Control List ? How is it used for securing data from the malicious users ?
 (g) What are the four layers that Windows NT has in order to achieve Independence ? **(7x4)**

2. (a) Assume you have the following jobs to execute with one processor, with the jobs arriving in the order listed here :
 (i) Suppose a system uses RR scheduling with a quantum of 15. Create a Gantt Chart illustrating the execution of these processes.
 (ii) What is the turn around time for process p3 ?
 (iii) What is the average wait time for the processes ?
 (b) Differentiate between :
 (i) Worms, Virus and Trojan Horse
 (ii) User Mode and Kernel Mode
 (iii) Symmetric and Asymmetric Multiprocessing Systems **(9+9)**

3. (a) A system has four processes P1 through P4 and two resource types R1 and R2. It has 2 units of R1 and 3 units of R2. Given that :
 P1 requests 2 units of R2 and 1 unit of R1
 P2 holds 2 units of R1 and 1 unit of R2
 P3 holds 1 unit of R2
 P4 requests 1 unit of R1
 Show the Resource Graph for this state of the system. Is the system in deadlock, and if so, which Processes are involved ?
 (b) Explain architecture of UNIX Environment. **(9+9)**

4. (a) Consider the segment table :

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the Physical Address for the following Logical Addresses :

- (i) 0,430 (ii) 1,10 (iii) 1,11 (iv) 2,500

- (b) Explain different functionalities of an Operating System.
 (c) Consider the methods used by Processes P1 and P2 for accessing their critical sections whenever needed, as given below. The initial values of shared Boolean Variables S1 and S2 are randomly assigned. Check whether all four conditions to achieve mutual exclusion are satisfied or not ?

Method Used by P1	Method Used by P2
while (S1==S2);	while (S1 != S2);
Critical Section	Critical Section
S1=S2;	S2=not (S1);

(8+6+4)

5. (a) Differentiate between FAT and NTFS file system in detail.
 (b) Consider a Logical Address space of 8 pages of 1024 words mapped into memory of 32 frames.
 (i) How many bits are there in the Logical Address ?
 (ii) How many bits are there in Physical Address ?
 (c) Differentiate between Short Term, Medium Term and Long Term Scheduling. (8+4+6)
6. (a) Suppose that the head of a moving head disk with 200 tracks, 0 to 199, is currently serving a request at 143 and has just finished a request at track 125. The queue of request is kept in FIFO order 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total number of head movement needed to specify these requests for the following disk scheduling algorithms ?
 (i) FCFS (ii) SSTF (iii) SCAN (iv) LOOK
 (b) What features of Network Operating System make it suitable for use in network devices ? (9+9)
7. Write a short note on following topics :
 (a) Virtual Machines and Hypervisor
 (b) Direct Memory Access
 (c) User Account Controls (UAC) (6+6+6)

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