

Instructions to candidates

Duration: Two (02) hours

Number of questions: Four (04)

Mark allocation: 100

Answer all the questions.

1.
 - a. List the data fields associated with the process control block. (4 mark)
 - b. What is meant by thrashing in paging activity? (4 mark)
 - c. Explain the importance of system calls in operating systems. (5 mark)
 - d. Discuss the functionality of system boot with respect to operating systems. (5 mark)

2.
 - a. List three (03) classic problems of process synchronization. (3 mark)
 - b. Explain critical section in process management. (5 mark)
 - c. Explain two (02) solutions of recovery from deadlock. (5 mark)
 - d. Construct a Resource Allocation Graph for the following scenario and check whether there will be a deadlock or not. Justify your answer.
At time t process P1 requests for a resource X, process P2 requests for a resource Y. Both the resources are available and they are allocated to the requesting process. At time t_1 both the processes are still holding the resources and process P1 requests for Y which is held by P2, process P2 request for X held by P1. (9 mark)

3.
 - a. Explain how logical address is translated into physical address using paging mechanism. (10 mark)
 - b.
 - i. Define first-fit, best-fit, and worst-fit algorithms. (6 mark)
 - ii. Compare the efficiency of the above three (03) algorithms for the given memory partitions of 500 KB, 100 KB, 300 KB, 200 KB and 600 KB respectively and explain how each of the algorithms would place the processes of size 418 KB, 202 KB, 506 KB, 112 KB, and 95 KB respectively. (10 mark)
 - c. Explain the RAID structure in disk management with various RAID levels of organization in detail. (8 mark)



4.

- a. Assume the head of a moving disk with 200 tracks numbered 0....199, is currently serving a request at track 92, and has just finished a request at track 85 and the queue request is kept in the FIFO order, 109, 148, 89, 72, 126, 142. What is the total head movements needed to satisfy these requests for the SCAN, C-SCAN, LOOK and C-LOOK disk scheduling algorithms? (16 mark)
- b. Give an example for an open source operating system and explain the concept behind the process, memory and storage management of that particular operating system. (10 mark)