PAPER ID-410510

Roll No: | | | | | | | | | | | | | |

MCA
(SEM. III) THEORY EXAMINATION 2021-22
OPERATING SYSTEM

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

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a. Define seek latency and rotational latency
b. Define SCAN and C-SCAN scheduling algorithms.
c. What is a safe state and an unsafe state?
d. Explain the logical address space and physical address space diagrammatically.
e. Outline the methods to avoid mutual exclusion?
f. Illustrate an example to show the race condition.
g. Explain the terms Sector, block, track and cylinder

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. Using semaphore show the solution of Reader- Writer problem.
b. Explain why do page fault occurs? Describe in detail the action taken by operating system when a page fault occurs?
c. classify various techniques used for free space management of disk.
d. What is real time Operating Systems? Discuss their utilities.
e. Illustrate the page-replacement algorithms (i) FIFO (ii) Optimal Page Replacement use the reference string 7, 0,1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2,1, 2, 0, 1, 7, 0,1 for a memory with three frames.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) Classify various disk-scheduling algorithms with suitable diagram.
(b) Illustrate various disk allocation techniques.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a) Justify the use of semaphore to overcome busy waiting problem.
(b) Discuss the mechanism of deadlock avoidance and deadlock prevention?

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) Consider dynamic partitioning scheme is being used and the following is the memory configuration at a given point in time (the shaded area represents allocated blocks and white area represents free blocks):

25K	10K	5K	10K	25K	5K	25K	20K	30K	12K

The next memory requests are 5K, 15K and 25K. Would any of the First-fit, Best-Fit and Worst-Fit algorithms service all the three requests? Explain. Also give memory loss due to fragmentation in the all the cases.

(b) Calculate the number of page faults that would occur in case of optimal page replacement algorithm for the following reference string? Assuming the demand paging technique is used by OS
2,3,4,3,4,1,6,7,8,7,1,8,9,8,9,5,4,2,1

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Give some benefits of multithreaded programming.

(b) What do you mean by deadlock? Discuss various conditions for occurring of deadlock. Also differentiate between deadlock detection and avoidance

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Discuss the terms with example:
   i. Multitasking
   ii. Time Sharing

(b) Write short notes on:
   i. SPOOLING
   ii. Batch processing