Roll No. : .....

Total No. of Questions : 9] [Total No. of Pages : 4

67058–N

M.C.A. 2nd Semester (2 Year Course) Examination, July-2021

(w.e.f. 2020-21)

OPERATING SYSTEMS AND SHELL PROGRAMMING

Paper-20MCA22C3

*Time : **Three** Hours]* *[Maximum Marks : **80***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :- Attempt *five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What are Race Conditions ?

   (b) Differentiate between Preemptive and Non-preemptive Scheduling.

   (c) What is the concept of a Virtual Machine ?

   (d) What do you mean by Interrupt Handler ?

   (e) What are Event Counters ?

   (f) What is Critical Section ?

   (g) What is a Device Controller ?

   (h) What are Process States ? 2×8=16

Unit-I

2. (a) What do you mean by an Operating System ? What are the main objectives and functions of an operating system ? Explain.

   (b) What is CPU Scheduling ? What is a process-scheduler ? Shown below is the workload for 5 jobs arriving at time zero in the order given below :

Job	Routine
1	12
2	25
3	9
4	4
5	11

Now considering FCFS, SJF and Round-Robin (RR) [quantum = 10] algorithms for this set of jobs, find out which algorithm would give the minimum average time and turn-around time. 7,9

3. Explain the following :
   (a) Multiprocessor scheduling and its types
   (b) Operating System Structures
   (c) Threads and its types 6,5,5

Unit–II

4. (a) What is 'Semaphore' ? What are the disadvantages of semaphore ? Implement the Producer-Consumer Problem using Semaphores.
   (b) What are deadlocks ? What is Banker's algorithm ? How is it significant in deadlocks ? Illustrate. 8,8

5. Explain the following :
   (a) Dinning Philosopher's problem and its solution
   (b) Deadlock Prevention and Recovery 8,8

Unit–III

6. (a) What is Segmentation ? Discuss its advantages and disadvantages.
   (b) What is a Page ? How a page size is decided ? Justify your answer.
   (c) What is PMT ? How physical memory address is determined from effective address ? 5,6,5

7. (a) What is a Filesystem ? What are the main responsibilities of a file-system ? Where is file-system located in layered organization of Operating System ?
   (b) What is Disk Scheduling ? State the desirable characteristics of disk scheduling policies and explain briefly the various seek optimization scheduling policies. 8,8

Unit–IV

8. (a) What is Linux ? What is Linux Architecture ? Chart its main features outlining their significance.
   (b) Outline the purpose and syntax of any two Linux commands belonging to the following categories :
      (i) Networking
      (ii) Disk Utilities
      (iii) Process Management
      (iv) System administration 8,8

9. Explain the following :
   (a) Linux Shell and its types
   (b) Shell Script and its example
   (c) Use of pipes and redirection 5,6,5