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M.C.A DEGREE EXAMINATIONS

THIRD SEMESTER

Paper - IV : OPERATING SYSTEMS

(2016-17,2017-18 & 2018-19 Admitted Batches)

Time : 3 Hours

Maximum: 75 Marks

 $(4 \times 15 = 60)$

SECTION - A

Answer ALL the questions.

- **1.** a) What is a process? Explain about various fields of Process Control Block.
 - b) What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain?

(**OR**)

- c) What are the various components of operating system structure and explain the simple and layered approach of operating system in detail.
- d) In a multi programming and time sharing environment, several users share the system simultaneously, This situation can result in various security problem:
 - i) What are two such problem?
 - ii) Can be ensure the same degree of security in a time-shared machine as in a dedicated machine? Justify your answer.
- **2.** a) What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy.
 - b) Explain the Resource-Allocation-Graph algorithm for deadlock avoidance.

(**OR**)

- c) What are the semaphores? How do they implement mutual exclusion? Explain.
- d) What is a deadlock? Consider the deadlock situation that could occur in the dining philosopher's problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. What are the solutions for this problem?

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- **3.** a) What is a Virtual Memory? Discuss the benefits of virtual memory technique.
 - b) What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?

(**OR**)

- c) Write short notes on:
 - i) FCFS and
 - ii) SSTF Disk Scheduling schemes.
- d) What are the objectives of file management systems? Explain the file system architecture.
- **4.** a) What are the goals and principles of protection in OS? Discuss the problems encountered during protection in OS.

(**OR**)

b) Write a detailed note on the Windows Operating systems.

SECTION - B

Answer any FIVE questions.

- 5. a) Explain any three main functions of an Operating System.
 - b) With a neat diagram, explain various states of a process.
 - c) Differentiate Semaphore and Counting Semaphore.
 - d) Write the difference between internal and external fragmentation.
 - e) Describe the Safe, unsafe, and deadlock state spaces.
 - f) Explain various ways to handle a page fault.
 - g) Define Busy Waiting? How to overcome busy waiting using Semaphore operations?
 - h) Discuss various issues involved in selecting appropriate disk scheduling algorithm.

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(5×3=15)