



**MANIPAL INSTITUTE OF TECHNOLOGY**  
**MANIPAL**  
(A constituent unit of MAHE, Manipal)

**SCHOOL OF COMPUTER ENGINEERING**  
**I SEMESTER M.TECH. (CSE) MIDSEMESTER EXAMINATION**  
**SUBJECT: CSS 5102 ADVANCED SYSTEM SOFTWARE**

Time: 02:15 PM – 03:45 PM

Date: 15/09/2025

MAX.MARKS: 30

**Note:**

- Answer all the questions
- Missing data may be assumed suitably

	Marks
1A. A module is an object file whose code can be linked and unlinked to the kernel at runtime. Justify the statement with a proper illustration.	3M
1B. Explain the register used to speed up the translation of logical addresses into linear addresses. Support your answer with the help of a neat diagram.	4M
1C. Outline the reasons when the three-level paging model is applied to the Pentium, which uses only two types of page tables.	3M
2A. Explain in brief – i) identifying a process and the data structure used iii) The process list iv) The pidhash table and chained lists v) The list of task-free entries	4M
2B. Analyze the quantum duration of a process in relation to system performance. Discuss the values permitted in the policy field of the scheduling class.	4M
2C. Illustrate the working of hardware cache synchronization and distributed interrupt handling in the SMP kernel architecture.	2M
3A. Design a pseudo-code for implementing different functions when a process wishes to acquire a kernel semaphore lock.	4M
3B. Illustrate the relationships among the application program that invokes a system call, the corresponding wrapper routine, the system call handler, and the system call service routine with a neat diagram.	3M
3C. Given a scenario where a process tries to pass an invalid memory address as a parameter, demonstrate how the kernel would handle this situation.	3M