

BRAC University (Department of Computer Science and Engineering)
CSE 321 (Operating Systems) for Spring 2025 Semester
Quiz 5 (Set A)

Student ID:

Section:

Name:

Full Marks: 20

Duration: 30 minutes

1. A large university has a complex file management system used by different types of users: **Students, Professors, Teaching Assistants (TAs), and Administrators**. These users interact with various resources like **Course Materials, Student Records, and Administrative Documents**. The system uses an **Access Matrix** to control user permissions on these resources. 10

However, there are specific constraints and complications:

- **Course Materials** are divided into two categories: **Public Course Materials** (e.g., syllabus, open assignments) and **Private Course Materials** (e.g., graded assignments, exam papers).
 - Admins can see, update and execute everything. Admins can also change other user's access rights.
 - **Course Materials:** Everyone can read the public materials but only professors can write them. Besides, Profs have access to the private materials of those courses which he is assigned in.
 - **Student Records:** Students can see only their own records. Professors can see and update the students' records.
 - **Administrative Documents:** are managed by **Administrators**, but certain documents (like staff payroll) are highly confidential. Professors also can see some of the documents.
 - Additionally, the university has a policy that allows **Professors** to delegate the rights he has in the **Private Course Materials** to a **TA**, but only if the **TA** is assigned to a specific course.
- a. Now, show the access matrix which reflects the above specification.

2. In a machine the logical address space is 32 bits, page size is 4KB, Physical address space is 20 bits. Now show,

- no of pages, no of frames and page table size.
- Is it possible to keep it in one level paging? If not, then propose a solution. Show with calculation that your proposed solution is working properly.