



# Institute of Information Technology

Jahangirnagar University  
Professional Masters in IT

2nd Trimester Final Examination- Spring 2023

Duration: 3 Hours

Course Code: PMIT – 6104

Intake: Summer 2022, Fall 2022

Full Marks: 60

Course Title: Database Security

Do not write anything on the question paper.

There are 7 (Seven) questions. Answer any 5 (Five) of them.

1. a) Define “Discretionary Access Control” and illustrate its application through ‘privileges’. [2]  
b) A system security engineer is using methods to store user passwords in an information system, so what may be the best method to store user passwords and meeting the confidentiality security objective? [3]  
c) What are the difference between station separation of duty (SSD) and dynamic separation of duty (DSD) in RBAC? [4]  
d) Mention three well known security principles which are supported with RBAC. [3]
2. a) What is the differences between Bell-Lapadula model and Biba model for multilevel security? [4]  
b) What is meant by *Polyinstantiation*? How does *Polyinstantiation* occur in your database? [4]  
c) How do you differentiate between visible and invisible *Polyinstantiation*? [4]
3. a) What is *Trust Negotiation in Trust Management System*? [2]  
b) In the context of database security, what is an *inference attack*? Give an example of what this means, and list a few common techniques that are used to defend against them. [2]  
c) Consider the following *Student* table. Explain the procedure to encrypt the GPA column by using *Partition, Identification and Mapping function*. [4]

S ID	S Name	Marks Obtained	GPA
101	Asif	42	D
310	Kamal	66.5	B+
325	Abir	71	A-
425	Rahim	57.5	B-
475	Sabbir	82	A+
510	Sazid	64	B

- d) Consider the above mentioned *Student* table in question 7 (a). [4]  
Query: Retrieves all students’ name whose marks is greater than 65 and student ID is in between 320 to 450.  
Show the query processing by *multiple interactions between client and server*.
4. a) What is meant by “*Data compromise*”? How do you differentiate between positive and negative data compromise? [4]  
b) Consider the table “*Patient*” with the attributes (Age, Sex, Employer, Social Security Number, Diagnosis Type). If a malevolent user (who knows the age and employer of Mr. X) wants to obtain information about the diagnosis type of a given patient, Mr. X, how will he (malevolent user) infer the required information from the database? [4]  
c) How do you secure your database by using “query set size control”? [4]

5. a) What will happen if you watermark the watermarked image? Could this be regarded as a kind of attack? If so what is its effect? [5]  
b) How do you hide a message into an image LSB steganography method? [3]  
c) Can the steganography be used together with cryptography to enhance information hiding and obscuring? Explain. [3]
6. a) How does master slave architecture in the Hadoop? [4]  
b) Explain the WordCount implementation via Hadoop framework? [4]  
c) What is TF-IDF? How do you calculate TF-IDF? [4]
7. a) Consider the following facts: [3]  
*"Mary requests to identify the property information of a specific rectangular region represented by (50,60,10,10) from images of 1 meter resolution downloaded between 1 August 2001 and now".*  
Write down the corresponding access request.  
b) Write down the points/factors upon which the Access Control of a Geospatial database is designed? [3]  
c) How do you define *Vector data model* and *Raster data model* by using grid data structure? [3]  
d) What is meant by geo temporal permission? Explain the following two geo temporal permission. i) zoom-in ii) animate [3]