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University Examinations 2020/2021

SECOND YEAR SECOND SEMESTER EXAMINATIONS FOR BACHELOR OF SCIENCE IN COMPUTER SECURITY AND FORENSICS

CCF 3251: DATABASE SECURITY

DATE: JULY 2021 **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other Two questions.

QUESTION ONE (30 MARKS)

a) List five roles of uneducated users in compromising database security (5 Marks)

b) Availability is a key database security issue. State five security measures that a database administrator can put in place to ensure that databases are maximally available for the systems that require them. (5 Marks)

c) Highlight the roles of monitoring in ensuring database security (4 Marks)

d) State two common audit issues each with respect to the following aspects of database management and use

i. Password management (2 Marks)

ii. Ownership of database objects (2 Marks)

iii. Segregation of duties (2 Marks)

e) Define the following terms as used in database security (5 Marks)

i. Database

ii. Database Security

iii. Data Warehouse

iv. Data Mining

v. Data Mart

f) Outline five roles of a database administrator (DBA) in database security (5 Marks)

QUESTION TWO (20 MARKS)

a) Consider the following database security vulnerabilities

i) Unsecured remote access

ii) File privileges to all users

iii) Unrestricted access to data directories

iv) Unrestricted access to log files

Required:

Briefly explain the security vulnerability listed above (4 Marks)

b) Discuss the impact of an exploit that takes advantage of each of the vulnerabilities listed above (8 Marks)

c) Describe ways in which the above vulnerabilities can be addressed (8 Marks)

QUESTION THREE (20 MARKS)

a) Briefly outline the access control process for the following database access and utilization actions

i. Connection verification (5 Marks)

ii. Request verification (5 Marks)

b) Describe the role of the following grant tables in database security

i. db table (2 Marks)

ii. tables_priv (2 Marks)

iii. procs_priv (2 Marks)

iv. proxies_priv (2 Marks)

v. columns_priv (2 Marks)

QUESTION FOUR (20 MARKS)

a) Describe how the 'least privilege' approach works to ensure database security (5 Marks)

b) Briefly explain CIA as the main aspects of database security (3 Marks)

c) Explain how the following third party security tools may be used to supplement RDBMS in provision of database security

i. Database activity monitoring (2 Marks)

ii. Database Firewalls (2 Marks)

iii. Database assessment (2 Marks)

iv. Encryption (2 Marks)

v. Tokenization (2 Marks)

vi. Data Masking (2 Marks)

QUESTION FIVE (20 MARKS)

a) Briefly explain how the following measures help to secure database servers

i. Firewalls (2 Marks)

ii. Using socket based connections (2 Marks)

iii. Using the Secure Sockets Layer (2 Marks)

iv. Changing the database default port (2 Marks)

v. Disabling DNS (2 Marks)

b) Vendors such as Oracle, Microsoft and IBM know that security is a big concern for database systems. They create built in solutions such as: Password Controls, Data access based on roles and profiles, IP restrictions for offsite access, auditing capabilities of who has to run what reports and Security logging. State three Pros and three Cons of built in database security solutions. (6 Marks)

c) Briefly describe any two major dimensions of a database audit (4 Marks)