

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MCA DEGREE EXAMINATION DECEMBER 2022  
(First Semester)

Branch – COMPUTER APPLICATIONS

**HYBRID DATABASE MANAGEMENT SYSTEM**

Time: Three Hours

Maximum: 50 Marks

**SECTION-A (5 Marks)**

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 Identify the major role of the Database Administrator.  
(i) Schema and physical-organization modification  
(ii) Schema definition  
(iii) Integrity-constraint specification  
(iv) All of these
- 2 Which among the following SQL statements is used for Transaction Control?  
(a) Commit (b) Roll Back (c) Save Point (d) Set Transaction.  
(i) (a) & (d) (ii) (a) (b) & (d)  
(iii) (a) (c) & (d) (iv) (a) (b) (c) & (d)
- 3 Which among the following is an example of machine-generated unstructured data?  
(i) Sensor Data (ii) Web Log Data  
(iii) Radar or Sonar Data (iv) Financial Data
- 4 In MongoDB, object ID for the given string 4c291856238d3b19b2000001, the first 8 bit numbers such as 4c291856 represents \_\_\_\_\_.  
(i) Process ID (ii) Machine ID  
(iii) 4-byte Timestamp (iv) Counter
- 5 In MongoDB, the \$inc operator is used to perform \_\_\_\_\_ operation over a numeric value.  
(i) increment (ii) decrement  
(iii) add (iv) All of these

**SECTION - B (15 Marks)**

Answer ALL Questions

ALL questions carry EQUAL marks

(5 x 3 = 15)

- 6 a With a proper diagram, describe the three levels of data abstraction that exist in the database system.  
OR  
b Elaborate on the usage of the referential integrity constraint concept in detail by considering customer billing applications.
- 7 a Tabulate any three differences between the primary key and foreign key.  
OR  
b State the two main components of SQL Triggers. Write the appropriate syntax for creating a trigger.
- 8 a Elaborate any three important characteristics of the HBase columnar database.  
OR  
b Highlight any three contemporary applications of spatial data.
- 9 a Briefly deliberate any three MongoDB command-line utility tools.  
OR  
b Create two documents representing two users, Smith and Jones. Write a query to verify that the documents have been saved.

Cont...

- 10 a List out the various update operator and array operators available in MongoDB.  
OR  
b Illustrate the various steps required to perform the map-reduce process available in the aggregation method.

**SECTION -C (30 Marks)**

Answer ALL questions

ALL questions carry EQUAL marks (5 x 6 = 30)

- 11 a List out the components of ER diagram and describe the purpose of each symbol used in the ER diagram. Construct an ER diagram to store data in your college's library.  
OR  
b Elucidate the basic system architecture of a database management system using a neat block diagram.
- 12 a Consider two tables Employee table and Salary table, perform outer join operations over these two tables and present the appropriate input and output table for the same.  
OR  
b Illustrate how BCNF (Boyce- Codd normal form) could be implemented over an Employee database. Construct the table with the required fields to portray the BCNF concept.
- 13 a Briefly explore the two major categories for sources of big structured data in detail.  
OR  
b If you need real-time capabilities, what are the requirements of the infrastructure to support the system's capability to ingest data, process it, and analyze it in real-time?
- 14 a Discuss about the dramatic difference in query response by listing, while you run the query with explain() method of MongoDB.  
OR  
b With a proper block diagram, describe MongoDB's key features such as horizontal and vertical scaling techniques of argumenting.
- 15 a Draw the order state transition of atomic document processing. Using the findAndModify() method, write a piece of code to prepare the order of checkout.  
OR  
b With a proper block diagram explain the aggregation framework pipeline and list out the various Aggregation pipeline operations.

Z-Z-Z

END