R2841

Sub. Code
546201

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Information Technology

DATABASE SYSTEMS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. Which file is a sequence of bytes organized into blocks understandable by the system's linker? (CO1, K2)

   (a) Text file (b) Source file

   (c) Executable file (d) Object file

2. Mapping of file is managed by ———— (CO1, K3)

   (a) File metadata (b) Page table

   (c) Virtual memory (d) File system

3. To include integrity constraint in an existing relation use : (CO2, K4)

   (a) Create table (b) Modify table

   (c) Alter table (d) Drop table

4. Domain constraints, functional dependency and referential integrity are special forms of ———— (CO2, K3)

   (a) Foreign key (b) Primary key

   (c) Assertion (d) Referential constraint

5. A recursive relationship is a relationship between an entity and ————————. (CO3, K2)

(a) Itself

(b) A subtype entity

(c) An archetype entity

(d) An instance entity

6. Mapping cardinalities are useful in describing ———————— (CO3, K5)

(a) Unary relationship

(b) Binary relationship

(c) Composite relationship

(d) Simple relationship

7. What is syntax for delete the view? (CO4, K2)

(a) DELETE VIEW view_name;

(b) DROP VIEW view_name/table_name;

(c) DROP VIEW view_name;

(d) DROP VIEW table_name;

8. ———————— views help to keep the database up-to-date. (CO4, K2)

(a) View isolation (b) View materialization

(c) View updating (d) View maintenance

9. Most backup and recovery commands in ———————— are executed by server sessions. (CO5, K5)

(a) Backup Manager

(b) Recovery Manager

(c) Backup and Recovery Manager

(d) Database Manager

10. Cascading rollbacks can be avoided by a modification of two-phase locking called the (CO5, K4)

(a) Growing phase

(b) Shrinking phase

(c) Strict two-phase locking protocol

(d) Two-phase locking protocol

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) What is a data dictionary give an example? (CO1, K2)

Or

(b) Explain the Record-Based Data Model data model. (CO1, K4)

12. (a) Define distributed systems. What are the significant issues and challenges of the distributed systems? (CO2, K5)

Or

(b) Explain briefly about Data Independence. (CO2, K4)

13. (a) Explain unpacking relations. (CO3, K3)

Or

(b) What are the types of multimedia applications based on data management characteristics? (CO3, K5)

14. (a) What is spatial data? Give examples. (CO4, K2)

Or

(b) What is a Spatial Database and Why Do We Need It? (CO4, K4)

15. (a) Explain data management issues specific to mobile databases. (CO5, K4)

Or

(b) Define Web databases. Express the advantages of using a web database. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Explain in detail about hierarchical and network data models. (CO1, K2)

Or

(b) Explain an entity-relationship model with an example. (CO1, K2)

17. (a) Explain about object-oriented data models. (CO2, K3)

Or

(b) What is Data Mart? Explain the structure and types of data marts. The difference between Data Mart and Data Warehouse. (CO2, K5)

18. (a) What is the use of presentation as an engine in multimedia databases? (CO3, K3)

Or

(b) Explain relational operators in detail with examples. (CO3, K2)

19. (a) Illustrate the architecture of spatial databases. (CO4, K5)

Or

(b) Explain the techniques of special database queries. (CO4, K2)

20. (a) Illustrate the architecture of mobile databases. (CO5, K5)

Or

(b) (i) Explain Requirements for Web-DBMS Integration.

(ii) Explain the benefits of the Web-DBMS Approach. (CO5, K6)

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R2842

Sub. Code
546202

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Information Technology

DATA MINING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. Identify the attribute type that represents categorical data. (CO1, K2)

   (a) Nominal (b) Ordinal

   (c) Interval (d) Ratio

2. Which of the following is a part of the knowledge discovery process? (CO1, K2)

   (a) Data Selection (b) Data Transformation

   (c) Data Mining (d) All of the above

3. Choose the component that is not a part of data warehouse. (CO2, K3)

   (a) Data Source Layer (b) Data Staging Layer

   (c) OLTP Layer (d) Data Presentation Layer

4. Which of the following architectures is commonly used for building a data warehouse? (CO2, K3)

(a) Three-tier architecture

(b) Four-tier architecture

(c) One-tier architecture

(d) Two-tier architecture

5. The most commonly used algorithm for mining frequent patterns in transactional databases? (CO3, K3)

(a) Decision Tree Algorithm

(b) Apriori Algorithm

(c) K-means Clustering

(d) Naive Bayes Algorithm

6. Which of the following is the primary goal of classification in data mining? (CO3, K2)

(a) Grouping similar data into clusters

(b) Finding patterns in data

(c) Predicting the category of unknown data

(d) Estimating numerical values

7. DBSCAN is a popular algorithm for which type of clustering method? (CO3, K4)

(a) Partitioning (b) Hierarchical

(c) Density-Based (d) Grid-Based

8. In clustering, what is the primary objective of Outlier Detection? (CO4, K4)

(a) To cluster similar data points

(b) To identify and remove anomalies

(c) To partition the data into equal groups

(d) To merge smaller clusters into larger ones

9. Choose the primary goal of Spatial Data Mining (SDM)? (CO5, K4)

(a) To analyze textual data

(b) To extract patterns from geographical and spatial data

(c) To classify web pages

(d) To process multimedia content

10. Which of the following is a key technique used in Web Mining for discovering patterns in web data? (CO5, K5)

(a) Web scraping

(b) Data warehousing

(c) Decision tree induction

(d) Cross-validation

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Briefly discuss the different types of attributes in data mining. (CO1, K3)

Or

(b) Elaborate on knowledge discovery process in data mining, and discuss the different stages involved in transforming raw data into useful information. (CO1, K3)

12. (a) Explain typical OLAP operations. (CO2, K3)

Or

(b) Analyze the concept of the multidimensional data model in OLAP. (CO2, K3)

13. (a) Interpret how the K-Nearest Neighbors (K-NN) algorithm works. (CO3, K3)

Or

(b) Explain the process of mining frequent patterns and associations. (CO3, K2)

14. (a) Compare and contrast the main characteristics and applications of partitioning methods Clustering. (CO4, K5)

Or

(b) Describe density-based clustering methods. (CO4, K4)

15. (a) Give brief note on applications and trends in data mining. (CO5, K5)

Or

(b) What is Multimedia Data Mining, and how is it applied in the context of audio, video and image data? (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Illustrate the importance of data preprocessing in data mining, including the steps involved in it. (CO1, K2)

Or

(b) Discus about the key data mining techniques and how do they differ in terms of their purpose and application? (CO1, K3)

17. (a) Classify the differences between OLAP and OLTP systems. (CO2, K4)

Or

(b) Elaborate the Architecture of data warehousing by discussing about ETL and data warehousing models. (CO3, K4)

18. (a) Explain how Apriori algorithm used for mining frequent patterns and associations. (CO3, K4)

Or

(b) Give detail note on Decision Tree Induction. (CO2, K4)

19. (a) Discuss the various clustering methods in detail. How do they differ from one another in terms of their approach and application? (CO4, K5)

Or

(b) Define outlier analysis and its importance in data mining. Describe various outlier detection methods. (CO4, K5)

20. (a) Discuss the concept of Spatial Data Mining (SDM). With its techniques and challenges. (CO5, K5)

Or

(b) Explain Text Mining. Discuss the challenges faced in processing large volumes of text and the techniques. (CO5, K5)

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R2843

Sub. Code
546203

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Information Technology

DIGITAL IMAGE PROCESSING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** the following objective questions by choosing the correct option.

1. What is the quantity that is used to measure the total amount of energy flowing from the light source? (CO1, K2)

   (a) Brightness (b) Intensity
   (c) Luminance (d) Radiance

2. A continuous image is digitized at _____ points. (CO1, K2)

   (a) random (b) vertex
   (c) contour (d) sampling

3. What is the maximum area of the cluster that can be eliminated by using an $n \times n$ median filter? (CO2, K2)

   (a) n^2 (b) $\frac{n^2}{2}$
   (c) $2 * n^2$ (d) n

4. _____ enhance Image Differentiation? (CO3, K3)

   (a) Pixel Density (b) Contours
   (c) Edges (d) None of the mentioned

5. What is the basis for numerous spatial domain processing techniques? (CO2, K2)

(a) Transformations (b) Scaling

(c) Histogram (d) None of the Mentioned

6. A spatial averaging filter having all the coefficients equal is termed _____. (CO3, K3)

(a) A box filter

(b) A weighted average filter

(c) A standard average filter

(d) A median filter

7. The function of filters in Image sharpening in frequency domain is to perform reverse operation of which of the following Lowpass filter? (CO4, K3)

(a) Gaussian Lowpass filter

(b) Butterworth Lowpass filter

(c) Ideal Lowpass filter

(d) None of the Mentioned

8. Which is not a type of mean filter? (CO4, K3)

(a) Harmonic mean filter

(b) Arithmetic mean filter

(c) Geometrical mean filter

(d) Sequence mean filter

9. Images usually gets corrupted during (CO4, K3)

(a) Restoration (b) Acquisition

(c) Transmission (d) Degradation

10. Information per source is called (CO5, K4)

(a) sampling (b) quantization

(c) entropy (d) normalization

Part B $(5 \times 5 = 25)$

Answer **all** the questions not more than 500 words each.

11. (a) Describe in detail about Psychovisual Model. (CO1, K2)

Or

(b) Discuss in detail about Image Sensing and Acquisition devices. (CO1, K2)

12. (a) Explain about intensity transformations and spatial filtering. (CO2, K2)

Or

(b) Explain Fourier transformation and its properties. (CO2, K2)

13. (a) Discuss the Density Slicing with an example. (CO3, K3)

Or

(b) Explain Histogram Modification and Specification with a suitable example. (CO3, K3)

14. (a) Explain the Linear, Position-Invariant Degradations with examples. (CO4, K3)

Or

(b) Illustrate Restoration in the Presence of Noise Only using Spatial Filtering. (CO4, K3)

15. (a) Explain the Wavelet Coding with an example. (CO5, K4)

Or

(b) Explain the LZW coding with a suitable example. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Explain the basic relationships between pixels in a digital image. (CO1, K2)

Or

(b) Discuss about digital image representation and resolution of a digital image. (CO1, K2)

17. (a) Explain about sharpening spatial filters. (CO2, K2)

Or

(b) Compare the Discrete Transformation and Discrete Wavelet Transformation Techniques. (CO2, K2)

18. (a) Discuss the following spatial enhancement techniques. (CO3, K3)

(i) Spatial averaging

(ii) Median Filter

Or

(b) Explain Point Operation in detail with a neat diagram. (CO3, K3)

19. (a) Describe Minimum Mean Square Error (Wiener) Filtering with an example. (CO4, K3)

Or

(b) Explain Constrained Least Squares Filtering with an example. (CO4, K3)

20. (a) Explain the Compression Standards with suitable examples. (CO5, K4)

Or

(b) Differentiate between lossless and lossy compression and explain the transform coding system with a neat diagram. (CO5, K4)

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R2844	Sub. Code
	546504

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Information Technology

Elective : VIRTUALIZATION AND CLOUD COMPUTING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. ———— as a Service is a cloud computing infrastructure that creates a development environment upon which applications may be build. (CO1, K2)

   (a) Infrastructure

   (b) Service

   (c) Platform

   (d) All of the mentioned

2. Which of the following correctly represents cloud computing ecosystem? (CO1, K2)

   (a) Business Process, Application Services, Platform Services, Infrastructure Services

   (b) Application Services, Business Process, Platform Services, Infrastructure Services

   (c) Application Services, Infrastructure Services, Business Process, Platform Services

   (d) Business Process, Application Services, Infrastructure Services, Platform Services

3. Which of the following can be considered PaaS offering? (CO3, K4)

(a) Google Maps

(b) Gmail

(c) Google Earth

(d) All of the mentioned

4. ————is the most refined and restrictive service model. (CO3, K4)

(a) IaaS

(b) CaaS

(c) PaaS

(d) All of the mentioned

5. Which of the following allows a virtual machine to run on two or more physical processors at the same time? (CO2, K3)

(a) Virtual SMP

(b) Distributed Resource Scheduler

(c) vNetwork Distributed Switch

(d) Storage VMotion

6. In a _____ scheme, the VM is installed as a Type 1 Hypervisor directly onto the hardware. (CO3, K2)

(a) Para-virtualization

(b) Full virtualization

(c) Emulation

(d) None of the mentioned

7. Which of the following is used to evaluate your own cloud application's network performance? (CO4, K5)

(a) Path Cloud

(b) Path View Cloud

(c) View Cloud

(d) All of the mentioned

8. Which of the following is Cloud Platform by Amazon? (CO5, K2)

(a) Azure

(b) AWS

(c) Cloudera

(d) All of the mentioned

9. Which of the following is an example of an IaaS Cloud service? (CO3, K5)

(a) Digital Ocean

(b) Linode

(c) Rackspace

(d) All of the above

10. Which of the following provides data authentication and authorization between client and service? (CO4, K3)

(a) SAML

(b) WS-Secure Conversion

(c) WS-Security

(d) All of the mentioned

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Explain the deployment models in cloud computing.

(CO1, K2)

Or

(b) Describe on demand provisioning in detail.

(CO1, K4)

12. (a) Explain the working principles of Hypervisors in virtualization. (CO2, K5)

Or

(b) Compare and Contrast cloud computing verus virtualization. (CO2, K6)

13. (a) Discuss in detail about design challenges in cloud.

(CO3, K5)

Or

(b) Illustrate between IaaS and PaaS. Which one would you recommend in certain Situations? (CO3, K5)

14. (a) Describe software security challenges in detail.

(CO4, K2)

Or

(b) Specify the components of VM Infrastructure.

(CO4, K2)

15. (a) Explain the AWS services provided by Amazon EC2 with cloud environments. (CO5, K3)

Or

(b) Illustrate the features of OpenStack in cloud computing. (CO5, K4)

Part C $(5 \times 8 = 40)$

Answer **all** the questions not more than 1000 words each.

16. (a) Express the architecture of Cloud computing with neat diagram. (CO1, K2)

Or

(b) Express the term elasticity in cloud computing with real time example. (CO1, K6)

17. (a) Explain any three tools and benefits of virtualization. (CO2, K5)

Or

(b) Explain the virtualization methods in detail. (CO2, K2)

18. (a) Illustrate the cloud storage and challenges one face during cloud services. (CO3, K4)

Or

(b) Illustrate the security laws which are implemented to secure data in a cloud. (CO3, K3)

19. (a) Explain mapping applications with suitable examples. (CO4, K2)

Or

(b) Describe the Security governance with suitable examples. (CO4, K2)

20. (a) Explain the inter cloud resource management with suitable example. (CO5, K6)

Or

(b) Discuss cloud software environment in detail. (CO5, K5)

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