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**SD—03—2025**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (Second Year) (Third Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-301**

**(Object Oriented Programming)**

**(Wednesday, 2-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :—* (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Assume suitable data, if required.

1. Attempt any *five* of the following (3 marks each) : 15

(a) Explain the data abstract and encapsulation.

(b) Explain the Basic Input/Output Statements.

(c) Explain the Visibility modes in C++.

(d) Rules for virtual function.

(e) Explain the C++ Streams.

P.T.O.

- (f) Explain the file modes in C++.
- (g) Explain the specifying a class and object in C++.

2. Attempt any *three* of the following (5 marks each) : 15

- (a) Explain in detail call by reference with example.
- (b) Explain in detail Function Overloading with example.
- (c) Explain in detail Structure of a C++ program.
- (d) Explain in detail Object Oriented Programming.
- (e) WAP in C++ to demonstrate on scope resolution operator.

3. Attempt any *three* of the following (5 marks each) : 15

- (a) Explain in detail `getline()` and `write()` with example.
- (b) Explain in detail Virtual functions with example.
- (c) Explain in detail opening and closing file.
- (d) WAP in C++ to copy a file from `nanded.txt` into `nanded.txt`.
- (e) WAP in C++ to demonstrate on multiple inheritance.

4. Attempt any *three* of the following (5 marks each) : 15

- (a) Explain in detail Static member function with example.
- (b) What is Constructor ? Explain in detail any *two* constructors.

- (c) Explain in detail Friend Function with example.
  - (d) WAP in C++ to demonstrate on destructor.
  - (e) WAP in C++ to demonstrate on Pointer to objects.
5. Attempt any *three* of the following (5 marks each) : 15
- (a) What is Inheritance ? Explain multilevel inheritance with example.
  - (b) Explain in detail Polymorphism with example.
  - (c) Explain in detail Pure Virtual functions with example.
  - (d) WAP in C++ to demonstrate on unary operator ++.
  - (e) WAP in C++ to demonstrate on virtual Base Classes.

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**SD—17—2025**

**FACULTY OF COMPUTER SCIENCE**

**B.Sc. (CS) (Second Year) (Third Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-302**

**(Computer Network)**

**(Monday, 7-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :—* (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Assume suitable data, if necessary.

1. Attempt any *five* of the following (3 marks each) : 15

- (a) What is IP address ?
- (b) Explain NIC cards.
- (c) Explain HTTP in detail.
- (d) Explain Circuit Switching.
- (e) Explain 10Base2.

P.T.O.

- (f) Explain any Network device.
- (g) Explain Connection oriented services.
2. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain LAN network.
- (b) Explain Message switching.
- (c) Explain Ring Topology.
- (d) Explain OSI reference model.
- (e) Explain types of signals.
3. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain application of Computer Network.
- (b) Explain FDDI in detail.
- (c) Explain Service Primitives.
- (d) Explain Hub and Switch.
- (e) Explain TCP/IP model in detail.
4. Attempt any *three* of the following (5 marks each) : 15
- (a) What are the design issues for layers ?
- (b) Explain Protocol stack design issues of the layer.

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- (c) Explain SMTP in detail.
  - (d) Explain ISP.
  - (e) Explain time division multiplexing.
5. Write short notes on any *three* of the following (5 marks each) : 15
- (a) Fiber optic cables
  - (b) Microwaves
  - (c) Internet versus Intranet
  - (d) Parallel transmission mode
  - (e) Ethernet.

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**SD—25—2025**

**FACULTY OF COMPUTER SCIENCE**

**B.Sc. (CS) (Second Year) (Third Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-303**

**(Data Structure and Algorithms)**

**(Wednesday, 9-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :— (i) All questions are compulsory.*

*(ii) Figures to the right indicate full marks.*

*(iii) Assume suitable data, if necessary.*

1. Write short notes on any *five* of the following (3 marks each) : 15

(a) Elementary data organization.

(b) POP operation.

(c) Two-way Linked List.

(d) Recursion.

(e) D-Queue.

P.T.O.

- (f) Threads.
- (g) Insertion sort.
2. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain Data structure operation.
- (b) Explain basic terminology of data structure.
- (c) Explain Algorithm complexity.
- (d) Explain types of Binary tree.
- (e) Explain Linked Representation of Queue.
3. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain Representation of linear array in memory.
- (b) Explain Searching methods.
- (c) Explain Insertion operation in linear array.
- (d) Explain Header Nodes.
- (e) Explain evaluation of Postfix Expression.
4. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain Representation of Linked list in memory.
- (b) Explain Insertion operation into Linked List.
- (c) Explain the Algorithm on Deletion Operation in Queue.
- (d) Explain Graph theory terminology.
- (e) Explain the concept of binary tree.

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5. Attempt any *three* of the following (5 marks each) :

15

- (a) Explain Arithmetic expression.
- (b) Explain traversing of binary tree.
- (c) Explain PUSH and POP operations.
- (d) Explain Garbage Collection in brief.
- (e) Explain Priority Queue.

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**SD—09—2025**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (CS) (Second Year) (Third Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**DISCRETE MATHEMATICS**

**(Friday, 4-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

- N.B. :—*
- (i) All questions are compulsory.
  - (ii) Figures to the right indicate full marks.
  - (iii) Assume suitable data, if required.
  - (iv) Each question carries equal marks.

1. Attempt any *five* of the following : 15
- (a) Explain degree of vertices.
  - (b) What is the distance between two points A and B whose coordinates are (7, 5) and (–2, 8) respectively ?
  - (c) Explain slope of line.
  - (d) Construct a  $2 \times 2$  matrix whose elements are given by  $a_{ij} = |5i + 3j|$ .

P.T.O.

- (e) Describe equal sets.
- (f) Explain propositions.
- (g) Solve  $|2x - 7| \leq 5$ .

2. Attempt any *three* of the following :

15

- (a) Explain complete and null graph.
- (b) If  $A = \begin{bmatrix} 4 & 3 \\ 5 & 1 \end{bmatrix}$ , then find  $A^2 - 2A + 1$ .
- (c) Describe truth tables of all logical connectives.
- (d) Find the equation of line passing through (2, -3) and (3, 5).
- (e) If  $A = \{a, b, c\}$  and  $B = \{x, y, z\}$ , find  $A \times B$ ,  $B \times A$ . Show that  $A \times B \neq B \times A$ .

3. Attempt any *three* of the following :

15

- (a) Prove that the given compound proposition is tautology using the truth table :

$$p \wedge (q \vee r) \leftrightarrow (p \wedge q) \vee (p \wedge r)$$

- (b) Verify, whether points P(3, -4), Q(2, -3) and R(5, 4) are collinear.
- (c) Explain relation, its domain and range.

- (d) Find adjoint of matrix :

$$A = \begin{bmatrix} -1 & 2 & 1 \\ 1 & -1 & 3 \\ 3 & -2 & 3 \end{bmatrix}$$

- (e) Let  $A = \{2, 3, 4, 7, 8\}$ ,  $B = \{0, 1, 2, 3, 4, 5, 6\}$  and  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ , then verify that :

- (i)  $(A \cup B)' = A' \cap B'$   
(ii)  $(A \cap B)' = A' \cup B'$ .

4. Answer any *three* of the following :

15

- (a) Explain function.  
(b) Write the following set in a set-builder form :  
(i)  $\{2, 3, 5, 7, 11, 13, 17\}$   
(ii)  $\{a, e, i, o, u\}$   
(iii)  $\{0, -1, 2, -3, 4, -5, 6, \dots\}$ .

- (c) Find  $\frac{\text{adj } A}{|A|}$  for  $A = \begin{bmatrix} 2 & -2 \\ -1 & 5 \end{bmatrix}$ .

- (d) If  $A(4, 3)$ ,  $B(5, -6)$  and point Q divides seg AB in the ratio 3 : 2, then find co-ordinates of point Q.

- (e) Construct the truth table :

$$(p \rightarrow q) \vee (r \rightarrow p)$$

P.T.O.

5. Attempt any *three* of the following :

15

- (a) Explain set operations in brief.
- (b) Describe isomorphism of graphs.
- (c) Explain types of graphs.
- (d) Construct the truth table of the following statement pattern :

$$\sim(p \rightarrow q) \vee (\sim p \wedge q).$$

- (e) Describe tree and centre of tree.

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**SD—10—2025**

**FACULTY OF COMPUTER SCIENCE**

**B.Sc. (CS) (Second Year) (Third Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-304 B**

**(Mathematical Techniques in Computer Science)**

**(Friday, 4-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

- N.B. :-*
- (i) All questions are compulsory.
  - (ii) Figures to the right indicate full marks.
  - (iii) Assume suitable data, if required.

1. Attempt any *five* of the following (3 marks each) : 15
- (a) Explain Sets.
  - (b) Define matrix with its any *two* types.
  - (c) Describe Relation.
  - (d) Find the L.C.M. of 108, 288 and 360.
  - (e) Explain Probability.

P.T.O.

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- (f) Explain DIVISIBILITY of 4 and 16 with suitable example.
- (g) Describe Graphs.

2. Attempt any *three* of the following (5 marks each) : 15

- (a) Explain set operation in detail.
- (b) Describe types of relation.
- (c) Find the following terms in geometric progression :

3, 6, 12, ..... 384.

- (d) Describe sample space with example.
- (e) Explain isomorphism graph in detail.
- (f) Find inverse of matrix :

$$L = \begin{pmatrix} 1 & 2 \\ 3 & 7 \end{pmatrix}.$$

3. Attempt any *three* of the following (5 marks each) : 15

- (a) Define event. Explain its types.
- (b) Describe Arithmetic Progression.
- (c) Explain Graph types in detail.
- (d) How many natural numbers between 17 and 80 are divisible by 6 ?
- (e) Find the HCF and LCM of the following :

0.63, 1.05, 2.1

4. Attempt any *three* of the following (5 marks each) : 15

- (a) Explain properties of Sets.
- (b) A car moves at the speed 40 km/hr. Find the speed of the car in meter per second.
- (c) If  $A = \{1, 2, 3, 4\}$ ,  $B = \{3, 4, 5, 6\}$ ,  $C = \{5, 6, 7, 8\}$  and  $A \cup B$ ,  $A \cup B \cup C$ .
- (d) A bag contains 6 red and 4 white balls. Two balls are drawn at random. Find the probability that both the balls are red.
- (e) Find AB, where :

$$A = \begin{pmatrix} 1 & 2 \\ 0 & 4 \end{pmatrix}$$

$$B = \begin{pmatrix} 1 & 2 & 3 \\ -1 & 4 & 2 \end{pmatrix}$$

5. Write short notes on any *three* of the following (5 marks each) : 15

- (a) Two dice are thrown together. What is the probability that the sum of the numbers on the two faces is divisible by 4 or 6.
- (b) Explain walks, paths and circuit.
- (c) Find the 9th term of the arithmetic progression 1, 3.5, 6, 8.5, .....
- (d) A person crosses a 600 m long street in 5 minutes. What is his speed in km per hour ?
- (e) Write the set  $A = \{1, 4, 9, 16, 25, \dots\}$  in set-builder form.

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**SD—05—2025**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (Second Year) (Fourth Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**(Principle of Compiler Design)**

**(Thursday, 3-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :— (i) All questions are compulsory.*

*(ii) Figures to the right indicate full marks.*

*(iii) Assume suitable data, if required.*

*(iv) Use of any electronic media such as mobile phone, digital diary and electronic calculator is not permitted.*

1. Attempt any *five* of the following (3 marks each) :

15

(a) Define compiler in detail.

(b) Explain operator in detail.

P.T.O.

- (c) What are finite automata ? Explain in detail.
- (d) What is operator precedence parsing ? Explain in detail.
- (e) Explain context free grammar.
- (f) What are lexical base errors ? Explain in detail.
- (g) Explain data elements.

2. Attempt any *three* of the following (5 marks each) : 15

- (a) What is regular expression ? Explain conversion of regular expression to finite automata.
- (b) Explain top down parsing in detail.
- (c) Explain evaluation of postfix notation.
- (d) What is boot strapping ? Explain in detail.
- (e) Explain statements in detail.

3. Attempt any *three* of the following (5 marks each) : 15

- (a) Explain role of lexical analyzer in detail.
- (b) Explain LR passes in detail.
- (c) Describe implementation of syntax directed translator.
- (d) Which are sources of optimization ? Explain in detail.
- (e) Explain phases of compiler.

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4. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain one pass and multi pass compiler in detail.
  - (b) Explain logical and syntactic structure in detail.
  - (c) Explain language specifying lexical analyzer.
  - (d) Explain parse tree and syntax tree in detail.
  - (e) Explain NFA in detail.
5. Write short notes on any *three* of the following (5 marks each) : 15
- (a) Loop optimization
  - (b) DFA
  - (c) Shift reduce parsing
  - (d) High level programming language
  - (e) Cross compiler.

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**SD—13—2025**

**FACULTY OF COMPUTER SCIENCE**

**B.Sc. (Second Year) (Fourth Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-401**

**(Programming in Java)**

**(Saturday, 5-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :—* (i) *All questions are compulsory.*

(ii) *Figures to the right indicate full marks.*

(iii) *Assume suitable data, if required.*

1. Attempt any *five* of the following (3 marks each) : 15

- (a) Explain the Java and Internet.
- (b) Explain the final variable with example.
- (c) Explain the use of “super” Keyword in Java.
- (d) Explain the creating a package.
- (e) Explain the Regular Expression.

P.T.O.

- (f) Defining a class and object.
- (g) Explain the finally clause.
2. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain in detail types of error with example.
- (b) Write a java program to copy a file form latur.txt into nanded.txt.
- (c) Explain Multiple Catch Statement in detail.
- (d) Write a java program to demonstrate on display database records from nanded.accdb file.
- (e) How to defining and implementing interface with examples.
3. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain the String Class methods.
- (b) Explain how to define and implement interface.
- (c) Explain in detail Java Programming structure with example.
- (d) Discuss how to create User Defined Exception.
- (e) What is Inheritance ? Explain any *two* types.
4. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain the Creating User defined Exception with example.

- (b) Explain how to create and access package.
  - (c) Explain in detail Constructor Overloading with example.
  - (d) Explain in detail Method Overriding with example.
  - (e) Explain in detail Finalizer() method with example.
5. Write short notes on any *three* of the following (5 marks each) : 15
- (a) Explain in detail Method Overloading with example.
  - (b) Explain in detail Inner Classes.
  - (c) What is Data Type ? Explain its type.
  - (d) Explain in detail Abstract Methods with example.
  - (e) Explain in detail JDBC drivers.

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**SD—20—2025**

**FACULTY OF COMPUTER SCIENCE**

**B.Sc. (CS) (Second Year) (Fourth Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-402**

**(Software Engineering)**

**(Tuesday, 8-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :—* (i) *All questions are compulsory.*

(ii) *Figures to the right indicate full marks.*

(iii) *Assume suitable data, if required.*

1. Attempt any *five* of the following (3 marks each) : 15

(a) Define Software. Enlist any *two* softwares.

(b) What is Agility ? Explain.

(c) Explain Feature Driven Development in short.

(d) Discuss Software Process.

(e) Discuss The Essence of Software Engineering Practice.

P.T.O.

- (f) Explain Process Framework.
- (g) Explain System Simulation in short.
2. Attempt any *three* of the following (5 marks each) : 15
- (a) Discuss Software Engineering Practice.
- (b) Explain the System Engineering Hierarchy.
- (c) Discuss Software Engineering—A Layered Technology.
- (d) Explain Software Myths.
- (e) Discuss System Modeling.
3. Attempt any *three* of the following (5 marks each) : 15
- (a) Discuss designing Modeling Principles.
- (b) Discuss Agile Process Models.
- (c) Explain the Evolving Role in Software.
- (d) Discuss the Waterfall Model.
- (e) Explain Team Software Process (TSP).
4. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain Computer-Based Systems.
- (b) Core Principles of software engineering practice.
- (c) Discuss System Simulation.

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- (d) What is an Agile Process ? Discuss the politics of Agile Development.
- (e) Explain Incremental Process Models.

5. Write short notes on any *three* of the following (5 marks each) : 15

- (a) Software Characteristics.
- (b) Spiral Model.
- (c) Personal Software Process (PSP).
- (d) Communication Practices.
- (e) Software Crisis and Horizon.

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**SD—29—2025**

**FACULTY OF COMPUTER SCIENCE**

**B.Sc. (CS) (Second Year) (Fourth Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-403**

**(Relational Database Management System)**

**(Friday, 11-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

- N.B. :—*
- (i) All questions are compulsory.
  - (ii) Figures to the right indicate full marks.
  - (iii) Assume suitable data, if required.

1. Attempt any *five* of the following (3 marks each) : 15
- (a) DQL
  - (b) Single Row Number
  - (c) Unique
  - (d) GROUP By
  - (e) Views

P.T.O.

- (f) Subqueries
- (g) Non Equi join.
2. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain Data types of SQL.
- (b) Explain the structure of DBMS.
- (c) Explain the Users of DBMS.
- (d) Explain Relational Database.
- (e) Explain the declaration section in PL/SQL.
3. Attempt any *three* of the following (5 marks each) : 15
- (a) Explain in brief the disadvantages of DBMS.
- (b) What is SQL ? Explain SQL Commands.
- (c) Explain DISTINCT Clause.
- (d) Explain Data Constraints in brief.
- (e) Explain Sorting in detail.
4. Attempt any *three* of the following (5 marks each) : 15
- (a) What is operator ? Explain Arithmetic operators in detail.
- (b) Explain SQL Functions in detail.
- (c) Explain Multiple row functions.

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- (d) Differentiate between Primary Key and Foreign Key.
- (e) Explain Relational Operators in brief.
5. Write short notes on any *three* of the following (5 marks each) : 15
- (a) Explain Exception Handling Section.
- (b) Explain Triggers with its types.
- (c) Explain Join and its types.
- (d) Explain % ROWTYPE Variable.
- (e) Explain Relational and their schemes.

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**SD—06—2025**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (Fourth Semester) EXAMINATION**

**APRIL/MAY, 2025**

**(Revised/CBCS Pattern)**

**COMPUTER SCIENCE**

**Paper—BCS-404B**

**(Essentials of Computer Security)**

**(Thursday, 3-4-2025)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :— (i) All questions are compulsory.*

*(ii) Figures to the right indicate full marks.*

*(iii) Assume suitable data, if required.*

1. Attempt any *five* of the following : 15

(a) What do you mean by DBMS Security ?

(b) Explain asymmetric encryption.

(c) Explain model for computer security.

(d) Analysis Approaches.

P.T.O.

- (e) Database encryption.
- (f) Vulnerability of password.
- (g) Threats and attacks.

2. Attempt any *three* of the following : 15

- (a) Explain access control principles.
- (b) Definition of Computer Security.
- (c) Fundamental Security Design Principles.
- (d) Means of Authentication.
- (e) Explain physical characteristics used in biometric applications.

3. Attempt any *three* of the following : 15

- (a) Explain computer security.
- (b) Explain relational database.
- (c) Explain digital envelopes.
- (d) Explain symmetric encryption.
- (e) Explain subjects and objects in access rights.

4. Attempt any *three* of the following : 15

- (a) Explain the challenges of computer security.
- (b) Explain means of encryption.

- (c) Explain intrusion detection.
  - (d) Explain role-based access control.
  - (e) Explain an access control policies in detail.
5. Write short notes on any *three* of the following : 15
- (a) Public-Key Encryption Structure.
  - (b) What is Intruder behavior ?
  - (c) Explain Digital signature.
  - (d) What are the password selection strategies ?
  - (e) The need for database security.