This question paper contains **3** printed pages]

VD—03—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

(Object Oriented Programming)

(Tuesday, 26-11-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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 : 15

(*a*) What is OOPs ?

(*b*) What are the different data types used in C++ ?

(*c*) Explain if statement with example.

(*d*) What are the different keywords used in C++ ?

(*e*) Write a program to display whether number is even or odd.

(*f*) What are the different visibility modes used in C++ ?

(*g*) Explain concept of constructor.

P.T.O.

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

(*a*) Explain nested for loop in detail.

(*b*) What is Inline function ? Explain with example.

(*c*) Write a program in C++ to describe if-else statement.

(*d*) How does while loop differ from do-while loop ?

(*e*) Explain structure of C++ Program.

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

(*a*) Explain friend function in detail.

(*b*) What is copy constructor ?

(*c*) Explain multiple inheritance in detail.

(*d*) Write a program in C++ to describe concept of pointer to object.

(*e*) Explain concept of call by value.

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

(*a*) What is Inheritance ? What are the different types of Inheritance.

(*b*) What do you mean by default argument ?

(*c*) Write a program to describe function overloading.

(*d*) What do you mean by nesting of member function ?

(*e*) Write a program in C++ to describe multiple inheritance.

5. Write short notes on any *three* of the following : 15

(*a*) STL

(*b*) Stream classes used for file handling

(*c*) Pure virtual function

(*d*) Destructor

(*e*) Static member function.

This question paper contains **3** printed pages]

VD—17—2024

FACULTY OF COMPUTER SCIENCE

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

Paper BCS-302

(Computer Network)

(Saturday, 30-11-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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*) Explain Bridges device.

(*b*) Explain NIC cards.

(*c*) Explain Connectionless services.

(*d*) What are the design issues for layers ?

P.T.O.

(*e*) Explain 10 Base 2.

(*f*) What is IP address ?

(*g*) Explain FTP in detail.

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

(*a*) Explain OSI reference model.

(*b*) Explain Analog and Digital Signals.

(*c*) Explain Circuit Switching.

(*d*) Explain Bus Topology.

(*e*) Explain protocol stack design issues of the layer.

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

(*a*) Explain Hub and Switch.

(*b*) Explain TCP/IP model in detail.

(*c*) Explain application of Computer Network.

(*d*) Explain Service Primitives.

(*e*) Explain FDDI in detail.

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

(*a*) Explain Serial transmission mode in detail.

(*b*) Differentiate between LAN and WAN.

(*c*) Explain frequency division multiplexing.

(*d*) Explain fiber optic cables.

(*e*) Explain internet *versus* Intranet in detail.

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

(*a*) Gigabyte Ethernet

(*b*) SMTP

(*c*) ISP

(*d*) Infrared

(*e*) Packet switching.

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VD—09—2024

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (C.S.) (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

(Discrete Mathematics)

(Thursday, 28-11-2024) **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 tree.

(*b*) What is the distance between two points A and B whose coordinates are (5, 4) and (– 3, 6), respectively ?

(*c*) Explain equations of straight line.

(*d*) Construct a 2 × 2 matrix whose elements are given by $a_{ij} = |5i - 3j|$.

(*e*) Describe representation of sets.

P.T.O.

(*f*) Explain truth values of the statements.

(*g*) Solve $|2x - 7| \leq 5$.

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

(*a*) Explain regular and null graph.

(*b*) Show that the matrix :

$$A = \begin{bmatrix} 4 & 3 \\ 5 & 1 \end{bmatrix} \text{ as } A^2 + 3A - 2I = 0.$$

(*c*) Describe logical connectives.

(*d*) Find the equation of line passing though (3, –4) and (5, 6).

(*e*) If A = {*a, b, c*} and B = {4, 7}, find A × B, B × A. Show that A × B ≠ B × A.

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

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

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

(*b*) Verify, whether points P (– 2, 4), Q (5, – 3) and R (1, 2) are collinear.

(*c*) Explain function and its types.

(*d*) Find adjoint of matrix :

$$A = \begin{bmatrix} 3 & -3 & 2 \\ 1 & -1 & 3 \\ 7 & -2 & 0 \end{bmatrix}$$

(*e*) Let A = {1, 3, 5, 7, 9}, B = {0, 1, 2, 3, 4, 5} and U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, then verify that :

(*i*) $(A \cup B)' = A' \cap B'$

(*ii*) $(A \cap B)' = A' \cap B'$

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

(*a*) Explain relation, domain and range of relation.

(*b*) Write the following set in a set-builder form :

(*i*) { 5 }

(*ii*) {6, 7, 8, 9, 10}

(*iii*) {0, –1, 2, –3, 4, –5, 6, ...}

(*c*) Find $\frac{\text{adj } A}{|A|}$ for $A = \begin{bmatrix} 3 & 5 \\ -4 & 2 \end{bmatrix}$.

(*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 :

$$(p \rightarrow q) \wedge (r \rightarrow p).$$

P.T.O.

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

(*a*) Explain set operations in brief.

(*b*) Describe degree of vertices.

(*c*) Explain equations of straight line.

(*d*) Using truth table prove that :

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

(*e*) Find x, y, z if :

$$\begin{bmatrix} 5 & 3 \\ -3z & 6 \end{bmatrix} - \begin{bmatrix} 2x & -4 \\ 5 & 1 \end{bmatrix} = \begin{bmatrix} 8 & -5y \\ -7 & 5 \end{bmatrix}$$

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VD—25—2024

FACULTY OF COMPUTER SCIENCE

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

Paper BCS-303

(Data Structure and Algorithms)

Tuesday, 3-12-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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*) Elementary data organization

(*b*) POP operation

(*c*) Two-way Linked List

P.T.O.

(*d*) Recursion

(*e*) D-Queue

(*f*) Threads

(*g*) Insertion sort.

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

(*a*) Explain basic terminology of data structure.

(*b*) Explain data structure operation.

(*c*) Explain Algorithm complexity.

(*d*) Explain types of Binary tree.

(*e*) Explain evaluation of Postfix Expression.

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 Linked Representation of Queue.

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 concept of binary tree.

(*d*) Explain the Algorithm on Deletion operation in queue.

(*e*) Explain Graph theory terminology.

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

(*a*) Explain Priority Queue.

(*b*) Explain Arithmetic expression.

(*c*) Explain Traversing of binary tree.

(*d*) Explain PUSH and POP operations.

(*e*) Explain Garbage Collection in brief.

This question paper contains **4** printed pages]

VD—10—2024

FACULTY OF COMPUTER SCIENCE

B.Sc. (C.S.) (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

Paper-BCS-304 B

(Mathematical Techniques in Computer Science (MTCS))

(Thursday, 28-11-2024) **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 H.C.F. of 108, 288 & 360.

(*e*) Explain Probability.

(*f*) Explain DIVISIBILITY of 8 and 15 with suitable example.

(*g*) Describe Graphs.

P.T.O.

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

(*a*) Define event. Explain its types.

(*b*) Describe types of relation.

(*c*) Find the 10th term of the following series :

5, 10, 20, 40.....

(*d*) Describe Sample Space with example.

(*e*) Explain Isomorphism graph in detail.

(*f*) Find the adjoint of matrix :

$$L = \begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}.$$

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

(*a*) Explain Set operation in detail.

(*b*) Describe Arithmetic Progression.

(*c*) Explain walks, paths and circuit.

(*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. Answer 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}, find 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 :

$$A = \begin{pmatrix} 3 & 2 \\ 0 & 7 \end{pmatrix}$$

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

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

(*a*) What is the probability that a number selected from the numbers (1, 2, 3, ...15) is a multiple of 4.

(*b*) Explain Graph types in detail.

P.T.O.

(*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, ...} in set –builder form.

This question paper contains **3** printed pages]

VD—13—2024

FACULTY OF COMPUTER SCIENCE

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

Paper BCS-401

(Programming in Java)

(Friday, 29-11-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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*) Explain Java and Internet.

(*b*) Explain the final variable in Java.

(*c*) Explain the use of "THIS" Keyword in Java.

(*d*) Explain the Final Variable and Final Class.

P.T.O.

(*e*) Discuss the history of Java.

(*f*) What are the Java Features ?

(*g*) Explain the Java Programming Structure.

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

(*a*) Explain in detail super Method Overriding.

(*b*) Discuss the Date and Times in Java.

(*c*) Explain Multiple Catch Statement in detail.

(*d*) Write a Java program to demonstrate on display database records from nanded.mdb file.

(*e*) Explain String Buffer Class.

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 String Class in detail.

(*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 Byte Stream Class in detail.

(*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 Architecture of JDBC.

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VD—05—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

(Principle of Compiler Design)

(Wednesday, 27-11-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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.

(*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*) Explain need of translator.

(*b*) Explain Bootstrapping.

(*c*) Explain statements in brief.

P.T.O.

(*d*) Explain Semantic errors in brief.

(*e*) What is loop optimization ?

(*f*) What is syntax tree ? Explain in brief.

(*g*) Explain role of lexical analyzer in brief.

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

(*a*) Explain phases of compiler in brief.

(*b*) Explain lexical and syntactic structure of language.

(*c*) Explain different data structures in brief.

(*d*) Define compiler. Also explain one pass and multi-pass compiler in detail.

(*e*) Explain transition diagram with an example in detail.

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

(*a*) Explain Top down parsing technique.

(*b*) Explain Regular Expression in detail.

(*c*) Explain capabilities of context free grammar in detail.

(*d*) Explain language specifying lexical analyzer in detail.

(*e*) Explain minimizing the number of states of DFA.

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

(*a*) Explain intermediate code in detail.

(*b*) Differentiate between Parse tree and Syntax tree.

(*c*) Explain lexical base errors.

(*d*) How postfix notations are evaluated ? Explain with an example.

(*e*) Explain syntactic phase errors in detail.

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

(*a*) Cross compiler

(*b*) Code generation

(*c*) Postfix notation

(*d*) Input Buffering

(*e*) LR Parsing.

This question paper contains **3** printed pages]

VD—20—2024

FACULTY OF COMPUTER SCIENCE

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

Paper BCS-402

(Software Engineering)

(Monday, 2-12-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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*) Explain the Evolving Role of Software.

(*b*) What is Software Engineering ? Enlist different Software Process.

(*c*) Explain the Agile Process in short.

(*d*) Explain the essence of Software Engineering Practice.

P.T.O.

(*e*) Explain the system Engineering Hierarchy in detail.

(*f*) What are the characteristics of software ?

(*g*) What are the applications of software ?

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

(*a*) Explain different types of Myths in software developing.

(*b*) Explain Software Evolution in detail.

(*c*) Explain Software Crisis and Horizon in detail.

(*d*) What are the different Process Technologies ?

(*e*) Explain software engineering—A Layered Technology in detail.

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

(*a*) What is Agility ? Explain the politics of Agile Development.

(*b*) Explain Feature Driven Development (FDD) in detail.

(*c*) Explain Personal Software Process (PSP) in detail.

(*d*) Explain the Incremental Process Model.

(*e*) What is Agile Process Model ? Explain in detail.

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

(*a*) Explain Team Software Process (TSP).

(*b*) Explain the Waterfall Model in detail.

(*c*) Explain the Evolutionary Model in detail.

(*d*) Explain the Design Modeling Principles.

(*e*) Explain the Spiral Model in detail.

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

(*a*) Explain the Analysis Modelling Principles in detail.

(*b*) Explain Communication Practice in detail.

(*c*) Explain Planning Practice in detail.

(*d*) Explain System Modelling in detail.

(*e*) Explain System Simulation in details.

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VD—29—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(CBCS/Revised Pattern)

COMPUTER SCIENCE

Paper BCS-403

(RDBMS)

(Wednesday, 4-12-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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 order by clause.

(*b*) Explain data constraints.

(*c*) What are the advantages of RDBMS ?

(*d*) Explain group by clause.

P.T.O.

(*e*) Explain data types in SQL.

(*f*) Explain self join with example.

(*g*) Explain comparison operators IN, LIKE, IS NULL.

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

(*a*) Explain outer join in detail.

(*b*) Explain logical operators.

(*c*) Explain PL/SQL block.

(*d*) Explain where clause.

(*e*) Explain number function with example.

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

(*a*) Explain equal join.

(*b*) Explain cross join.

(*c*) Explain altering table with example.

(*d*) Explain string function.

(*e*) Explain concept of sorting with example.

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

(*a*) Explain multiple row functions with example.

(*b*) Explain sub-queries and its types.

(*c*) Explain DML commands in SQL.

(*d*) Explain concept of primary key with example.

(*e*) Explain network model in detail.

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

(*a*) DISTINCT clause

(*b*) View

(*c*) TCL

(*d*) Foreign key

(*e*) Tuples, relations and their schemes.