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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.

WT

(2)

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- (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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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

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(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.

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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 through (3, -4) and (5, 6).

(e) If $A = \{a, b, c\}$ and $B = \{4, 7\}$, 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 :

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

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

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) $\{0, -1, 2, -3, 4, -5, 6, \dots\}$

(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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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.

WT

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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 $A = \{1, 4, 9, 16, 25, \dots\}$ in set-builder form.

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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.