

(i) Printed Pages : 3 Roll No. ....

(ii) Questions : 9 Sub. Code : 

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Exam. Code : 

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Bachelor of Computer Applications 5<sup>th</sup> Semester  
(2123)

COMPUTER NETWORKS

Paper : BCA-16-501

Time Allowed : Three Hours]

[Maximum Marks : 65

Note :— Candidate is required to attempt FIVE questions in all including Question No. 9 (which is compulsory) and attempt remaining FOUR questions by selecting ONE question from each Section.

SECTION-A

1. Discuss different network topologies such as star, bus and ring. Provide examples of real world scenarios where each topology might be most suitable, considering factors like scalability and fault tolerance. 13
2. Explain in detail modems (modulator-demodulator) in networking. Describe how modems facilitate the conversion of digital and analog signals, and discuss their significance in connecting different types of communication networks. 13

### SECTION-B

3. Explain the concept of framing in the data link layer. Describe various framing methods used in data communication and discuss their advantages and disadvantages. 13
4. Explain the principles of the sliding window protocol and how it enhances data link layer efficiency. Discuss the differences between Stop-and-Wait ARQ, Go-back-N ARQ and Selective Repeat ARQ. What are the advantages and limitations of each approach? 13

### SECTION-C

5. Discuss the principles of routing algorithms in the network layer. Explain the concept of shortest path routing and its importance in determining optimal routes for data transmission. 13
6. Describe broadcast and multicast routing algorithms. How do they differ from unicast routing and what are the specific use cases for these routing methods? 13

### SECTION-D

7. Describe the functions and types of DNS servers. How do DNS servers work together to provide domain name resolution? Discuss the responsibilities of authoritative DNS servers and caching DNS resolvers. 13
8. Explain the Post Office Protocol (POP) and its role in email retrieval. How does POP work to download email messages from a server to a local client device? 13

### COMPULSORY QUESTION

9. (a) Explain circuit switching, message switching and packet switching. 3
- (b) How do IEEE standards like 802.3 impact networking ? 2
- (c) What are remote login and file transfer protocols used for ? 2
- (d) What are the different classes of IP addresses ? 2
- (e) Explain network layer addressing and its importance. 2
- (f) What are MIME and its functions in emails ? 2

(i) Printed Pages : 3 Roll No. ....

(ii) Questions : 9 Sub. Code : 

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Exam. Code : 

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**Bachelor of Computer Applications 5<sup>th</sup> Semester**  
(2123)

**DISCRETE MATHEMATICAL STRUCTURE**

**Paper : BCA-16-502**

**Time Allowed : Three Hours] [Maximum Marks : 65**

**Note :—**Attempt FIVE questions in all, including Q. No. 9 in Section-E, which is compulsory and taking ONE question each from Sections A–D. Each question carries 13 marks.

**SECTION—A**

1. (a) What do you mean by composition of functions ?  
Let  $f : \mathfrak{R} \rightarrow \mathfrak{R}$  defined as  $f(x) = 4x + 3$  and  
 $g : \mathfrak{R} \rightarrow \mathfrak{R}$  defined as  $g(x) = x/3$ . Find  $f \circ g(x)$ .
- (b) Let  $X = \{1, 2, 3\}$  and  $R$  is a relation on  $X$  defined as  
 $xRy \Leftrightarrow x \neq y$  for all  $x, y \in X$ . Find the elements of the  
relation  $R$  and  $R^{-1}$ . Also check whether  $R$  is transitive ?

6,7

2. Explain the laws of set theory and prove the following set identities :

(a)  $A - (B \cup C) = (A - B) \cap (A - C)$

(b)  $\overline{(A \cup B)} = \bar{A} \cap \bar{B}$ .

6,7

### SECTION—B

3. Solve the following recurrence relation :

$$F_n = 3F_{n-1} + 10F_{n-2} + 7.5^n \text{ where } F_0 = 4 \text{ and } F_1 = 3.$$

13

4. What are the generating functions for the sequences  $\{a_k\}$  with  $a_k = 2$  and  $a_k = 3k$  ?

13

### SECTION—C

5. Define a graph. Prove that the sum of degrees of all vertices in a graph is twice the number of edges. Verify it through one example.

13

6. Define a weighted graph. Prove that a connected graph has an Euler path but not an Euler circuit if and only if it has exactly two vertices of odd degree.

13

### SECTION—D

7. What is an algorithm ? What is meant by time complexity of an algorithm ? Define  $O$ ,  $\Theta$  and  $\Omega$  notations used in analyzing algorithms.

13

8. What is a finite state machine (FSM) ? How do Finite State Machines act as Language Recognizers ? Build a Finite State Machine to recognize the sequence '101'. 13

**SECTION—E**

**(Compulsory Question)**

9. (a) Define injective and bijective functions with an example.  
(b) Suppose a graph has vertices of degree 0, 2, 2, 3 and 9. How many edges does the graph have ?  
(c) What is travelling salesman problem ?  
(d) Define automata theory. 3,3,3,4

(i) Printed Pages : 3 Roll No. ....

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**Bachelor of Computer Applications 5<sup>th</sup> Sem.**

**(2123)**

**WEB APPLICATION DEVELOPMENT USING PHP**

**Paper—BCA—16—504**

**Time Allowed : Three Hours] [Maximum Marks : 65**

**Note :—** Attempt **FIVE** questions in all by selecting **ONE** question from each unit. Entire question number IX is compulsory.

**UNIT-I**

I. Differentiate the followings :

- (a) Client-Side Scripting and Server-Side Scripting
- (b) Static and Dynamic Websites
- (c) Echo and Print Statements. 5,4,4

II. (a) How many types of loops are supported by PHP ? Explain their syntax and examples.

(b) Explain the use of File Inclusion statements used in PHP.

7,6

**UNIT-II**

III. (a) How are user-defined functions created and invoked in PHP ? Give any suitable example.

(b) What is a Recursive Function ? Explain its use with the help of examples. 7,6

IV. (a) Write String Functions for the following in PHP :

(a) To check whether a string is empty or not

(b) To create a substring

(c) To search a Substring in a given string.

(b) Explain the syntax and use of foreach loop in accessing Arrays elements in PHP. Give examples. 7,6

#### UNIT-III

V. Write a PHP script to accept student-id, student name and student age from the user through HTML form, store it in a database Table named as 'Student' and display those records in a Tabular form. 13

VI. (a) What is a Data Set ? How is it fetched ? Explain with the help of suitable example in PHP.

(b) List and explain use and scope of Super Global variables in PHP with examples. 7,6

#### UNIT-IV

VII. (a) How is a session cookie created, used and deleted in PHP ? Give a suitable example.

(b) What is a Session ? Explain its use in PHP. 7,6

VIII.(a) Explain various file reading and writing functions used in PHP.

(b) Explain the file permissions allowed in PHP. How can they be changed ? 7,6



**(Compulsory Question)**

IX. Write short answers :

- (i) Differentiate between `$x == $y` and `$x === $y`.
- (ii) Name and explain the function used to display the type of a variable.
- (iii) Differentiate between Actual and Formal parameters.
- (iv) What is the use of header () function in PHP ?
- (v) How is a page set as a home page in a PHP based site ?
- (vi) How is a file deleted in PHP ?
- (vii) What do you understand by term PHP ? 6×2+1