

(i) Printed Pages : 3

Roll No. 22048731

(ii) Questions : 9 Sub. Code :

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Bachelor of Computer Applications 5th Semester
(2124)

COMPUTER NETWORKS

Paper : BCA-16-501

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** each from Sections—A, B, C, & D.

SECTION—A

1. What is computer networking ? Discuss the various types of computer networking. Briefly differentiate between ISO-OSI reference model and TCP-IP model. According to you which model is better and why ? 13
2. (a) What do you mean by wireless transmission ? Briefly describe the various media that support wireless transmission.
(b) Differentiate among packet switching, message switching and circuit switching techniques. Why circuit switching can't be used for packet transmission ? Discuss.

SECTION—B

3. What is framing ? How are errors controlled in data link layer ? Explain sliding window protocol with an example. 13
4. Describe static and dynamic channel allocation in LAN's and MAN's. Discuss IEEE standard 802.3 for LANs. 13

SECTION—C

5. (a) What is IP addressing ? How is it classified ? How is subnet addressing performed ?
(b) In what way is Link State Routing better than Distance Vector Routing ? Explain in detail. 7,6
6. What is network congestion control ? What are its general principles ? Explain the working of Leaky Bucket Algorithm for congestion control with the help of suitable example. How is leaky bucket algorithm different from token bucket algorithm ? 13

SECTION—D

7. Describe how email works. Describe the key components and flows. Identify key standards that apply. Use figures as needed. 13
8. (a) What is Domain Name System (DNS) ? How does DNS perform name resolution ? What are different types of name servers ?
(b) Distinguish between the http://and https:// protocols. What is the main advantage of persistent connections in HTTP ? 7,6

SECTION—E

(Compulsory Question)

9. (a) What do you mean by ISDN ? Discuss its services and architecture.
- (b) A network with bandwidth of 10 Mbps can pass only an average of 12000 frames/ minute with each frame carrying an average of 10000 bits. What is throughput of this network ?
- (c) What do you mean by baud rate and bit rate ? Is there any relation between these two ?
- (d) What is Encryption ? What is a public and private key ? What are the main strategies to provide the security to a network system ?

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(i) Printed Pages: 3 Roll No.

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Bachelor of Computer Applications 5th Semester

(2124)

DISCRETE MATHEMATICAL STRUCTURE

Paper : BCA-16-502

Time Allowed : Three Hours] [Maximum Marks : 65

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

SECTION—A

1. (a) Define one-one and onto functions with examples. If f is a function defined on the set of real numbers \mathbb{R} by $f(x) = x^3$, then show that f is both one-one and onto function.
- (b) Let A, B and C be subsets of set U . Show that :
 $(A \cup B) - (C - A) = (A \cup B) \cap (C' \cup A)$. 6,7
2. (a) Show that the relation R in the set \mathbb{R} of real numbers, defined as $R = \{(a, b) : a \leq b^3\}$ is neither reflexive nor symmetric nor transitive.
- (b) If X and Y are two sets such that $X \cup Y$ has 50 elements, X has 28 elements and Y has 32 elements, how many elements does $X \cap Y$ have ? 6,7

SECTION—B

3. Using the method of generating functions, solve the following recurrence relation :

$$F_n = 5F_{n-1} - 6F_{n-2}, \text{ for } n \geq 2 \text{ where } F_0 = 1 \text{ and } F_1 = 4. \quad 13$$

4. Find the solution to the following recurrence relation :

$$a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3} \text{ with the initial conditions } a_0 = 2, a_1 = 5 \text{ and } a_2 = 15. \quad 13$$

SECTION—C

5. (a) Prove that the number of vertices of odd degree in a graph is always even.
(b) Show that a simple graph G with n vertices is connected if it has more than $(n-1)(n-2)/2$ edges. 6,7
6. State and prove Euler's formula. What conditions should a graph satisfy to have Euler circuit ? Explain. 13

SECTION—D

7. Give the difference between a Deterministic Finite Automation (DFA) and Non-Deterministic Finite Automation (NFA) with examples. Build a Finite State Machine to recognize the sequence '101'. 13
8. What is meant by space and time complexity of an algorithm ? How do you analyze algorithms ? Explain by taking appropriate examples. 13

SECTION—E

(Compulsory Question)

9. (a) Draw the graph of the function :

$$f(x) = |x| + 5 \text{ for } x \in [-5, 5].$$

- (b) What is Recursion ? Give an example of a recursive algorithm.
- (c) Let G be a graph with 10 vertices. If four vertices have degree four and six vertices have degree five, then find the number of edges of G .
- (d) What is the major objective of automata theory in Computer Science ?

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Bachelor of Computer Applications 5th Semester

(2124)

JAVA PROGRAMMING

Paper : BCA-16-503

Time Allowed : Three Hours] [Maximum Marks : 65

Note :— The students are required to attempt *one* question each from Sections A to D and the compulsory question.

SECTION—A

1. (a) Discuss characteristics of Java Language in detail. 6
(b) Define Constructors. What is the purpose of creating it ?
Discuss constructor overloading using an example. 7
2. Define the following :
(a) Dynamic Method Dispatch. 7
(b) Abstract class. 6

SECTION—B

3. (a) Difference between String and String Buffer class. Discuss its various methods. 6
(b) What are Packages ? Steps to create a User defined Package with an example. 7

4. Discuss Multiple Inheritance. How to implement it in Java using an example ? 13

SECTION—C

5. What are exceptions ? Elaborate Exception handling model in Java. Also discuss user defined exception by taking an example. 13
6. (a) Discuss Life cycle of an Applet with an example. 6
(b) What is multithreading ? Discuss different ways to create a thread with examples. 7

SECTION—D

7. What do you mean by AWT Controls ? Design a Student registration form using various AWT controls. 13
8. (a) How to handle events in Java ? Discuss event delegation model with an example. 7
(b) What are JDBC components ? Discuss steps to connect a database in Java. 6

(Compulsory Question)

9. (a) Explain JVM and Bytecode. 2
(b) What do you mean by Streams ? 2
(c) Discuss Scanner class. 2
(d) Thread Synchronization. 2
(e) Keyword final. 2
(f) Garbage Collection. 3

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Bachelor of Computer Applications 5th Semester

(2124)

WEB APPLICATION DEVELOPMENT USING PHP

Paper : BCA-16-504

Time Allowed : Three Hours] [Maximum Marks : 65

Note :— Attempt five questions in all, including question no. 9 (Unit-V), which is compulsory and taking one each from Units I-IV.

UNIT—I

1. (a) Discuss the various looping statements used in PHP with suitable example.
- (b) Write steps to Install WAMP and configure PHP environment. 6,7
2. (a) Explain the use of constants, variable and datatypes in PHP with the help of examples.
- (b) Write a program in PHP that displays the factorial of a number N. 6,7

UNIT—II

3. (a) How recursion is used in PHP ? Explain with suitable example.
- (b) How are strings used in PHP ? Explain any three functions with example. 6,7

4. (a) What is a function ? What is the difference between library and user defined functions in PHP ?
- (b) Write a PHP Program to find the number of characters in the string. 6,7

UNIT—III

5. How, do you create a query in PHP ? How do you fetch the dataset ? Discuss the four-fetching function in detail. 13
6. How are HTML Form controls connected to a database in PHP ? Consider any suitable example to explain. 13

UNIT—IV

7. What are cookies ? Why are they used ? How do you create, read and delete cookies ? 13
8. What is Database ? How is PHP code connected to a database for retrieving data set ? Consider any suitable example. 13

UNIT—V

9. (a) Differentiate between Actual and Formal parameters. 2
- (b) What is static variables ? 2
- (c) Name any two directory functions. 1
- (d) Describe the role of get and post methods in an HTML Form. 2
- (e) What is dataset ? 2
- (f) What is the difference between include and require ? 2
- (g) How a page is redirected in PHP ? 2