Bachelor of Computer Applications 5ᵗʰ Semester

(2122)

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. Differentiate between OSI and TCP/IP reference model in detail

13

2. Write a note on switching. Explain the components of various
switching techniques used for data transmission.   13

SECTION—B

3. Discuss various design issues of data link layer. Explain CRC
and Hamming code with example.   13

4. Explain the working of stop and wait ARQ and Go-back-N
ARQ protocols with example.   13

SECTION—C

5. Write notes on the following :

    (a) Shortest path routing

    (b) Broadcast and multicast routing.   13

6. What are the congestion prevention policies ? Discuss the working of token bucket and leaky bucket algorithm with example.   13

SECTION—D

7. Discuss the architecture and services of email highlighting role of SMTP.   13

8. What do you understand by DNS ? Write a note on network security and remote login.   13

(Compulsory Question)

9. (a) List uses of MODEM.   3

    (b) Differentiate between Time and Frequency division multiplexing.   2

    (c) What is the significance of dynamic channel allocation ?   2

    (d) Differentiate between noisy and noiseless channel.   2

    (e) Define sub netting.   2

    (f) Define POP.   2

Bachelor of Computer Applications 5ᵗʰ Semester
(2122)
DISCRETE MATHEMATICAL STRUCTURE
Paper : BCA-16-502

Time Allowed : Three Hours]   [Maximum Marks : 65

Note :—Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **I** is compulsory.

I.   (a) Let A, B be two sets such that A × B consists of 6 elements. If three elements of A × B are {(1, a), (2, b), (3, b)}, find A × B and B × A.

(b) Write the generating function of the sequence

$$2^{n-1} + \left(\frac{1}{3}\right)^{n-1} + 3.$$

(c) A graph G has 21 edges, 4 vertices of degree 3 and all other vertices of degree 2. Find the number of vertices in G.

(d) Let A = {a, b}. Describe the Language L(r) where (i) r = abb*a (ii) r = a ∨ b*.   3×3,4

UNIT–I

II. (a) For a certain test, a candidate could offer English or Hindi or both the subjects. Total number of students was 550, of whom 325 appeared in English and 120 in both the subjects. Use set operations to find :

(i) How many appeared in English only ?

(ii) How many appeared in Hindi ?

(iii) How many appeared in Hindi only ?

(b) Let A = {1, 2, 3}. Determine whether the relation R

whose Matrix $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$, is an equivalence relation ?

7,6

III. (a) Let R and S be the relations on X = {a, b, c} defined by R = {(a, b), (a, c), (b, a)} and S = {(a, c), (b, a), (b, b), (c, a)} :

(i) Find the composition relation RoS and M_{RoS}.

(ii) Find S^{-1} and matrix MS^{-1}.

(b) Find domain and range of the function $f(x) = \dfrac{1}{2x - 1}$. Is f(x) invertible ? If so, find f^{-1} and $f^{-1} \circ f$, $f \circ f^{-1}$.   6,7

UNIT–II

IV. (a) Solve the recurrence relation :

$$S(n) - 5S(n - 1) + 6S(n - 2) = 5^n.$$

(b) Solve $S(n) - 2S(n - 1) + S(n - 2) = 2$ with S(0) = 25, S(1) = 16.   6,7

V. (a) Write the sequence whose generating function is

$$\frac{6 - 29z}{30z^2 - 11z + 1}.$$

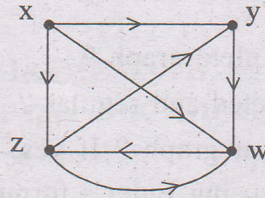(b) Find the generating function of the recurrence relation $S_n + 3S_{n-1} - 4S_{n-2} = 0$, n ≥ 2 with $S_0 = 3$, $S_1 = -2$.

6,7

UNIT–III

VI. (a) Find n if a complete graph with n vertices has 15 edges. Draw the graph also.

(b) Consider the directed graph G in figure :
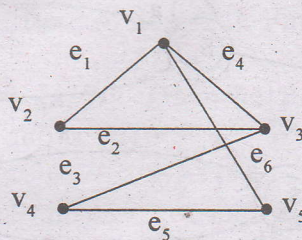

(i) Find the indegree and outdegree of each vertex of G.

(ii) Are there any sources or sinks ?

(iii) Find all simple paths from y to z.

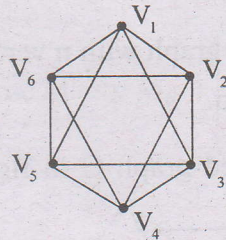(iv) Find all cycles in G.   6,7

VII. (a) For the given graph :

(i) Write adjacency matrix.

(ii) Find incidence matrix.

(iii) Draw complement graph.

(b) Consider the graph in the figure :

(i) Is it a complete graph ?

(ii) Is it connected and regular ?

(iii) Is it a planar graph ? If yes, find the number of regions by using Euler's formula.

Explain your answers. 7,6
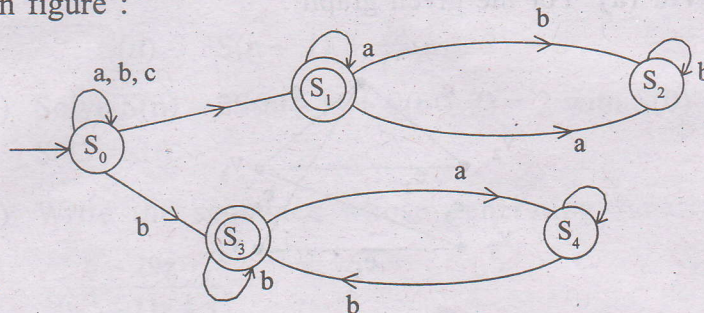
UNIT—IV

VIII. (a) Let A = {a, b, c} and w = abc. Find whether w belongs to L(r) where :

(i) r = a*(b + c)*

(ii) r = ab*(bc)*.

(b) Find the language of FSM (Finite State Machine) shown in figure :

Describe the machine. Does it accept the words abaaabb, bbbaabab ? 6,7

IX. (a) Prove that $5.5n^2 + 7n$ is $O(n^2)$.

(b) Show that 2^n is $O(3^n)$ but (3^n) is not $O(2^n)$. 6,7

(i)   Printed Pages : 2   Roll No. ....

(ii) Questions   : 9   Sub. Code : | 0 | 9 | 4 | 9 |
                                   Exam. Code : | 0 | 0 | 3 | 1 |

Bachelor of Computer Applications 5ᵗʰ Semester
(2122)
JAVA PROGRAMMING
Paper : BCA-16-503

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

Note :— Attempt any **ONE** question each from Units I–IV. Unit-V is compulsory.

UNIT—I

1. (a) Explain the use of constructors in Java with a program.   7

   (b) Explain the concept of dynamic method dispatch and use of Final keyword.   6

2. Explain various types of inheritance supported in Java with suitable examples.   13

UNIT—II

3. What are interfaces ? Write a program in Java to illustrate the implementation of multiple inheritances through interfaces.   13

4. (a) Define packages. Broadly explain the utilization of packages in Java with suitable examples.   9

   (b) What is String Buffer class ? Why is it used ?   4

UNIT—III

5. (a) What are the various ways to create thread in Java ? Explain with Java program.   9

    (b) Discuss the Java Thread model.   4

6. What is an Applet ? What are different types of Applets ? Write a Program to show parameters passing to applets.   13

UNIT—IV

7. What is GUI ? How can you add text box used for accepting passwords ? What is the difference between checkbox and radio button ? Explain with Java program.   13

8. Broadly explain the concept of JDBC with suitable examples.   13

UNIT—V

9. (a) What are the user defined exceptions ?   2

    (b) What is the use of init ( ) method in Applet ?   2

    (c) How do applets differ from application programs ?   2

    (d) What is the difference between finally and final ?   2

    (e) What is deadlock in multithreading ?   2

    (f) What is the functionality of static class ?   3

(i) **Printed Pages : 2**   Roll No. ....

(ii) **Questions   : 9**

Sub. Code : | 0 | 9 | 5 | 0 |

Exam. Code : | 0 | 0 | 3 | 1 |

Bachelor of Computer Applications 5ᵗʰ Semester

(2122)

WEB APPLICATION DEVELOPMENT USING PHP

Paper : BCA-16-504

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

Note :— Attempt **ONE** question each from Sections A to D. Question No. **9** (Section E) is compulsory. All questions carry equal marks.

SECTION—A

1. What do you mean by PHP ? How can you configure PHP environment ?   13

2. What do you mean by loop ? Describe and discuss the different types of loops available in PHP.   13

SECTION—B

3. What do you mean by strings ? How can you compare and search strings in PHP ?   13

4. What do you understand by recursion ? Write a program in PHP to illustrate the concept of recursion.   13

SECTION—C

5. What is form ? How can you use HTML with PHP ?   13

6. What do you mean by database ? How can you connect PHP with database ?   13

SECTION—D

7. What do you mean by cookies ? How can you create session cookie in PHP ?   13

8. What do you mean by file permissions ? With the help of a program, explain the concept of file permissions in PHP.   13

SECTION—E

(Compulsory Question)

9. Write short notes on the following :

   (a) opening a file in PHP   3

   (b) super global array   3

   (c) PHP arrays   3

   (d) each( )   3

   (e) if-else in PHP   1