

2021  
Bachelor of Computer Application  
Fifth Semester  
BCA-16-501: Computer Networks

Time allowed: 3 Hours

Max. Marks: 65

**NOTE:** Attempt five questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question each from Unit I-IV.

x-x-x

**UNIT – I**

- I. What are the uses of computer networks? Explain various topologies used in computer networks with advantages and limitations of each. (13)
- II. Discuss the concept of multiplexing. Explain various types of multiplexing in detail. (13)

**UNIT – II**

- III. List major design issues of data link layer. Discuss data link protocols for noisy and noiseless channels. (13)
- IV. Explain the significance of error detection and error correction codes for data transfer. Construct the hamming code for bit sequence 10011110. (13)

**UNIT – III**

- V. Discuss various IP address classes highlighting the concept of sub netting and subnet mask. (13)
- VI. Explain the principles of congestion control. Discuss working of leaky bucket and token bucket algorithms. (13)

**UNIT – IV**

- VII. Explain the architecture and services of electronic mail in detail. Write a note on MIME. (13)
- VIII. Write note on:-
  - a) SMTP
  - b) POP
  - c) DNS(13)

P.T.O.

(2)

UNIT – V

IX. Answer the following:-

- a) What is switching? (3)
- b) Define ISDN. (2)
- c) Differentiate between static and dynamic channel allocation. (2)
- d) Write a note on flooding. (2)
- e) What is the significance of HTTP? (2)
- f) Define FTP. (2)

x-x-x

2021  
Bachelor of Computer Applications  
5<sup>th</sup> Semester

BCA-16-502: Discrete Mathematical Structure

Time allowed: 3 Hours

Max. Marks: 65

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting one question from each Unit I-IV.

\_\*\_\*\_\*\_

- I. (a) For sets A, B & C, prove that  $A - (B \cup C) = (A - B) \cap (A - C)$   
(b) Given  $A = \{1, 2, 3, 4\}$ . Let  $R = \{(1,1)(2,2)(3,2)(2,3), (4,2), (4,4)\}$  be a relation on A.  
Is R reflexive, transitive? Justify your answer.  
(c) Write the generating function of one sequence  $\frac{1}{2}(-1)^n + \left(\frac{1}{3}\right)^{n-1}$ .  
(d) Determine the number of edges in a graph with 6 vertices, 2 of degree 4 and 4 of degree 2. Draw such a graph.  
(e) Can there exist a simple graph with degree sequence 1,2,3,4? Explain your answer.  
(f) If  $u = a^2babb$  &  $v = ba^2b^2a$  then find  $uv$  and  $vu$ . Are they equal?  
(2+2+2+2+2+3)

**UNIT-I**

- II. (a) For a certain test, a candidate could offer English or Hindi or both the subjects. Total number of students was 500, of which 350 appeared in English and 90 in both the subjects. Find how many appeared (i) in English only? (ii) in Hindi only? (iii) in Hindi?  
(b) Let  $B_1 = \{1, 3, 5\}$  and  $B_2 = \{1, 2, 3\}$  be subsets of a set  $A = \{1, 2, 3, 4, 5, 6\}$ .  
(i) Find the mixsets and maxsets generated by  $B_1$  and  $B_2$ .  
(ii) Do minsets and maxsets form a partition of A?  
(iii) Illustrate via Venn diagram all mixsets obtained in part (i) (7+6)
- III. (a) If R is the relation "less than" from  $A = \{1, 2, 3, 4, 5\}$  to  $B = \{1, 4, 5\}$ , express R as a set of ordered pairs. Find the domain & range of R. Also find  $R^{-1}$ .  
(b) If  $f : R \rightarrow R$  is given by  $f(x) = x^2 + 2$  and  $g : R \rightarrow R$  is given by  $g(x) = 2x - 3$ , find:  
(i)  $(g \circ f)(x)$   
(ii)  $(f \circ g)(x)$  at  $x=3$   
(iii)  $(f \circ f)(x)$  at  $x=1$   
Is  $(f \circ g)(x) = (g \circ f)(x)$ ? Justify. (7+6)

**UNIT-II**

- IV. (a) Solve the recurrence relation  $S(k) - 10S(k-1) + 9S(k-2) = 0$  with  $S(0)=3$ ,  $S(1)=11$ .  
(b) Solve the recurrence relation  $S(k) - 6S(k-1) + 8S(k-2) = k \cdot 4^k$  with  $S(0)=8$ ,  $S(1)=22$ . (6+7)

**P.T.O.**

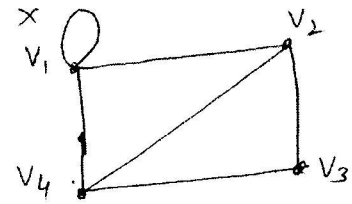
(2)

- V. (a) Write the sequence whose generating function is given by  $\frac{1}{1-5z+6z^2}$ .  
 (b) If  $S(k) - 6S(k-1) + 5S(k-2) = 0$  with  $S(0)=S(1)=2$ , solve this using the method of generating function. (6+7)

**UNIT-III**

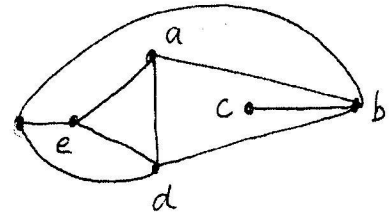
- VI. (a) Prove that the number of edges in a complete graph with n vertices is  $\frac{n(n-1)}{2}$ .

- (b) Find the adjacency matrix and incidence matrix of the graph in figure.



(6+7)

- VII. (a) Consider the graph given in figure:  
 (i) Is the graph a planar? If so specify the number of regions.  
 (ii) Verify Euler's formula if it is connected and planar.  
 (iii) Find the sum of degrees of vertices of graph.



- (b) (i) Can there be a simple graph with 8 vertices and 29 edges.  
 (ii) Find k if k-regular graph with 6 vertices has 12 edges. Also draw the k-regular graph. (7+6)

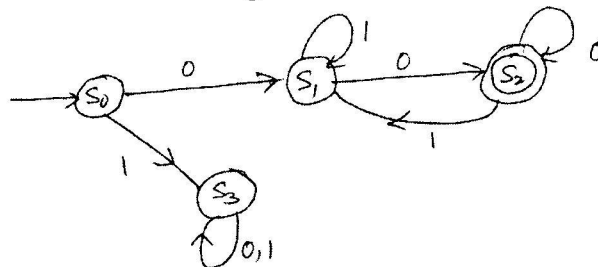
**UNIT-IV**

- VIII. (a) Let  $A = \{a, b, c\}$ . Find  $L^*$  where:  
 (i)  $L = \{b^2\}$  (ii)  $L = \{a, b\}$  (iii)  $L = \{a, b, c^3\}$   
 (b) If  $A = \{a, b\}$ , describe the language  $L(r)$  for each of the following regular expression:  
 (i)  $r = aa^*$  (ii)  $r = a \vee b^*$  (iii)  $r = (a \vee b)^* bb$  (6+7)

- IX. (a) Draw the diagram of the machine whose state transition table is given in the figure:  
 Find the input set A, the state set S and the initial state.  
 Does the machine accepts the words 00100100 & 010110

	0	1
$S_0$	$S_0$	$S_1$
$S_1$	$S_1$	$S_2$
$S_2$	$S_2$	$S_0$

- (b) Describe the following FSM. Also determine its language.



(7+6)

2021  
Bachelor of Computer Application  
Fifth Semester  
BCA-16-503: Java Programming

Time allowed: 3 Hours

Max. Marks: 65

**NOTE:** Attempt five questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question each from Unit- I-IV

x-x-x

**UNIT – I**

- I. a) Write any six characteristics of Java programming language?  
b) Explain various types of inheritance supported in Java with suitable examples. (6,7)
- II. a) Discuss the various flow control statements in Java programming.  
b) Explain the use of Final keyword. (9,4)

**UNIT – II**

- III. a) How to implement interfaces in Java? Explain with suitable example.  
b) Discuss any two functions of String Buffer class. (9,4)
- IV. a) What are the types of packages? Discuss the access protection in package with a program.  
b) Write short notes on one-dimensional Arrays and Streams. (9,4)

**UNIT – III**

- V. a) What are the types of Exception? How Exceptions can be handled in Java? Explain with suitable examples.  
b) Explain the Java thread model. (9,4)
- VI. What are the types of applet? Discuss the applet lifecycle and give suitable example. (13)

**UNIT – IV**

- VII. What is Layout manager in Java? Explain the Flow Layout, Border Layout, and Grid Layout (13)
- VIII. What is the use of JDBC? Write the steps to insert and delete record in database using JDBC. (13)

P.T.O.

(2)

UNIT – V

IX. Attempt the following:-

- a) In what ways does a Switch statement differ from if statement? (2)
- b) What are the user defined exceptions? (2)
- c) Name the various data types used in Java. (2)
- d) What is a container in a GUI? (2)
- e) What is the importance of paint() method in Applet? (2)
- f) What is deadlock in multithreading? (3)

x-x-x

2021  
Bachelor of Computer Application  
Fifth Semester  
BCA-16-504: Web Application Development Using PHP

Time allowed: 3 Hours

Max. Marks: 65

**NOTE:** Attempt five questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question each from Unit I-IV.

x-x-x

**UNIT – I**

- I. a) Write steps to install WAMP and configure PHP environment.  
b) Define operators. Explain different types of operators used in PHP. (2x6½)
- II. a) Explain 'do.... while' construct used in PHP. Write a program to print your name 5 times using it.  
b) Describe the data types used in PHP. (2x6½)

**UNIT – II**

- III. a) Name and explain any four library functions used in PHP.  
b) What is a function? How are they created and used in PHP? Write a function in PHP that accepts two strings and displays them after concatenation. (2x6½)
- IV. a) How are strings used in PHP? Explain any three String functions with examples.  
b) Differentiate numeric and associative arrays with example. Write a PHP script to print items stored in an array using for each loop. (2x6½)

**UNIT – III**

- V. Write a PHP script to insert records in student table with in the Course database having fields -student-id, student name, student age through Form and display records in table format. (13)
- VI. What is Database? How is PHP code connected to a database for retrieving data set? Consider any suitable example. (13)

**UNIT – IV**

- VII. What are cookies? How can you create, access and delete a cookie in PHP with the help of an example? Also differentiate between a session and Cookie. (13)

P.T.O.

(2)

- VIII. Write a PHP script to open, close, read and write data into a file. Also describe various file permissions. (13)

UNIT – V

- IX. Write short answers of the following:-

- a) What is the use of === operator? (2)
- b) Explain the difference between \$message and \$\$message. (2)
- c) What is the purpose of the super global variable called \$\_SERVER? (2)
- d) What is the difference between include and require? (2)
- e) How a page is redirected in PHP? (2)
- f) Name and explain the function used to delete a file from the system. (2)
- g) How can the execution of a PHP script be stopped? (1)

x-x-x