UG(V) — BCA
(C – 5002)

2023

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

Answer any **four** questions of the following : 10×4 = 40

1. Describe the method of Analysis of algorithm. What do you mean by best case, worst case and average case time complexity of an algorithm ?

2. What is asymptotic notation ? Explain the various asymptotic notation used in algorithm design and also write its properties.

3. Explain the Divide-and-Conquer Technique. Write a recursive algorithm for binary search and analyze running time complexity.

4. Explain Merge sort with an example. Apply the algorithm to sort the following elements and analyzed the time complexity. 23, 18, 34, 28, 12, 8, 19, 76.

5. Compare and contrast the Quick sort and Heap sort algorithms, including their time complexities and stability.

6. What is Spanning tree ? Describe Dijkstra's algorithm for finding the shortest path in a weighted graph.

7. What is a Greedy algorithm ? Provide an example of a problem where a greedy strategy leads to an optimal solution.

8. Differentiate between DFS and BFS algorithm. Write BFS graph traversing algorithm and analyze the time complexity.

Answer **all** questions of the following : $10 \times 3 = 30$

9. What is an algorithm ? What are its characteristics ?

10. List any three most networking algorithms used for Greedy approach.

11. Define Hashing Technique.

12. Define the concept of external Sorting and when it is usefull.

13. Define optimal binary search tree.

14. Discuss the key characteristics of dynamic programming problems .

15. Discuss the applications of Depth-First Search (DFS) in graph traversal.

16. What do you mean by Height and Depth of a tree ?

17. Discuss the concept of backtracking and its applications.

18. Explain Knapsack problem.

UG(V) — BCA
(C – 5003)

2023

Time : 3 hours

Full Marks : 70

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Answer from both the Groups as directed.

Group – A

Answer any **four** questions of the following : 10×4 = 40

1. Python is powerful language. Which features of the language make it powerful ?

2. What are data types ? List the operators that Python supports.

3. Define loops. Explain different loops in Python with example.

4. What type of conditional structures are present in programming language ? How many of them are supported in Python ? Explain with example.

5. Define function and its types. Write a function in Python to check the year whether the year is leap year or not.

6. Define List. How the list is accessible and also explain any three different operations used on the list.

7. Define Constructor. How to create a constructor in Python ? Explain it with suitable example.

8. What is NumPy ? What are its uses ? Also explain the various features of NumPy.

Group – B

Answer **all** questions of the following :

$3 \times 10 = 30$

9. What are Identifiers ?

10. Write any two benefits of Python.

11. What is the difference between a list and a tuple ?

12. What is the difference between .py and .pyc files ?

13. Define modules in Python.

14. Define the term lambda.

15. Why do we use the split ( ) method in Python ?

16. Define namespace in Python.

17. Define Class. How to create class in Python ?

18. Write a code in Python to reverse the string.

UG(V) — BCA
(C – 5004)

2023

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Sections as directed.

Scientific calculator is allowed.

Section – A

Answer any **four** questions of the following : 10×4 = 40

1. Find the sum of the following approximate numbers, each being correct only to the number of significant figures given

   561.32, 491.6, 86.954, 3.9462.

2. Apply Bisection method to determine a real root of the equation $x^3 - 2x - 5 = 0$, where the root lies between 2 and 3.

3. Find the root $x^4 - x - 10 = 0$. Using Newton-Raphson method correct to three decimal places.

4. Establish Newton formula for backword interpolation.

5. Find the first and second derivatives of the function $y = f(x)$ at the point $x = 1.1$, the values of y at different point x are :

X	Y
1.0	0.0
1.2	0.128
1.4	0.544
1.6	1.296
1.8	2.432
2.0	4.0

6. Solve the system of linear equations by Cramer's rule :

$$x + y + z = 1$$

$$x + 2y + z = 2$$

$$x + y + 2z = 0$$

7. Explain the Euler's method for solving the first order differential equation : $\frac{dy}{dx} = f(x, y)$.

8. Apply Runge-Kutta fourth order method to find an approximate value of y when x = 0.2 given that $\frac{dy}{dx} = x + y$ and y = 1 when x = 0.

Section – B

Answer **all** questions of the following :

3×10 = 30

9. Define absolute and relative errors.

10. Write the successive iteration for $x = \phi(x)$.

11. Write the formula of Simpson's $3/8$ for numerical integration of a function y = y(x).

12. Evaluate : $\Delta^3 y$.

13. State the trapezoidal rule for numerical integration.

14. Prove that $\Delta \log x = \log(1 + h/x)$.

15. Write the second forword difference $\Delta^2 y$.

16. Find the inverse of a matrix :

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & -1 & 0 \end{bmatrix}$$

17. Describe Runge-Kutta Method.

18. Write down the Newton interpolation formula.

UG(V) — BCA
(E – 5008) E. Com.

2023

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Sections as directed.

Section – A

Answer any **four** questions of the following : 10×4 = 40

1. Define E-Commerce. Explain merits and demerits of E-Commerce.

2. Define Electronics Payment System of E-Commerce. Explain advantages and disadvantage of various types of Electronic Payment Systems.

3. What is different types of E-Commerce business models ? Discuss them by taking suitable example.

4. What is a Website ? List and explain some tools that can imporve an E-Commerce web site performance.

5. What is SaaS E-Commerce ? Compare it with PaaS E-Commerce.

6. Write your views on the statement "The arrival of E-Commerce giants like Amazon or Flip cart have restricted the growth of retail markets in India".

7. Define internet. Why is internet important in E-Commerce ?

8. What do you mean by intellectual property rights ? Discus various types of rights protected under Intellectual Property rights.

Sections – B

Answer **all** questions of the following :

3×10 = 30

9. What are benefits of E-Commerce to society ?

10. Differentiate between E-Commerce and Traditional Commerce.

11. What are Cyber laws ?

12. Why is security important in E-Commerce ?

13. What do you mean by Digital Cash ?

14. List any three important web technologies for E-Commerce web development.

15. What are the limitations of E-Commerce ?

16. Define Digital signature.

17. What are the features of a food ordering E-Commerce website ?

18. Explain how E-Commerce is helpful in customer retention ?

UG(V) — BCA
(C – 5001)

2023

Time : 3 hours

Full Marks : 70

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Answer from both the Groups as directed.

Group – A

Answer any **four** questions of the following : 10×4 = 40

1. Define Internet. Explain TCP / IP protocol and its services.

2. What is DNS ? What are the main functions of Domain names ?

3. Define data types. Explain all the data types used in JavaScript.

4. Define function and its types. Write a function in JavaScript to accept any string from the user and display it in reverse order.

5. Define XHTML. Differentiate between HTML and XHTML.

6. What is Document Type Definition (DTD) ? Explain its types with suitable example.

7. What is Java Server Pages (JSP) ? Discuss JSP directives and its types.

8. Define Array. Explain different types of arrays available in PHP. Write a program in PHP to find the sum of all elements of an array.

Group – B

Answer **all** questions of the following : 3×10 = 30

9. What is Protocol ?

10. What is SGML ?

11. Define alert () method of window object.

12. Differentiate between Web client and Web server.

13. List any three string functions of PHP.

14. Why XML are used ?

15. What is " type of " operator in JavaScript ?

16. Write a program in JavaScript to print first ten natural number.

17. Write a PHP script to count the length of the string.

18. Write any two advantages of JSP.