उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र **2024–25**

कोर्स कोड : Course Code: **BCA 121**	कोर्स शीर्षकः– (Course Title) **Information and Network Security**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt <u>all three questions</u> from this section.

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Explain the following
   i)Hash function ii) substitution cipher technique iii) Digital Signature iv) firewall

2. i) Perform RSA encryption for the string "SECURE" using RSA algorithm by considering
   p = 17, q = 11 and e = 3 (for n value convert to ASCII).
   ii) Decode the following Caesar cipher using frequency analysis with shift +6 "KGYEZUHXKGQ"

3. i) Explain any two classical encryption techniques in detail.
   ii) Define and describe different levels of controls in security Architecture.

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt <u>all four questions</u> from this section.

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What is a virus? Explain various types of viruses.
5. What is the need of a VPN? Explain the two modes of a VPN.
6. Perform RSA encryption for the string "SECURE" using RSA algorithm by considering p = 17, q = 11 and e = 3 (for n value convert to ASCII).
7. What is digital certification? How it can be achieved?

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कोर्स कोड : Course Code: **BCA 122**	कोर्स शीर्षकः– (Course Title) **Design and Analysis of Algorithm**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ अधिकतम अंक : 18

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt <u>all three questions</u> from this section.

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. i) Explain advantages of dynamic programming over divide and conquer. Describe two applications of dynamic programming.
   ii) What do you understand by time complexity of an algorithm? Explain how we perform performance analysis of an algorithm.

2. i) What do you understand by the divide and conquer algorithm? Explain any two applications of a divide and conquer algorithm.
   ii) What is a binary search algorithm? Explain working of binary search with a suitable example.

3. i) How do we solve a problem with greedy algorithm? Does greedy algorithm always give optimal solution. Justify your answer.
   ii) What do you understand by data structure? Explain any two structure with suitable example.

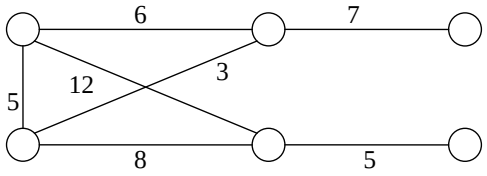
खण्ड ब अधिकतम अंक : 12

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt <u>all four questions</u> from this section.

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Solve the following recurrence relation and find the time complexity: $T(n)=7T(n/2)+18n^2$
5. Find the minimum spanning tree using Prims algorithm for the following graph.



6. What is the significance of Big-oh, Omega and theta?
7. How does the worse case time complexity of an algorithm is different from best case time complexity?

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र **2024–25**

कोर्स कोड : Course Code: **BCA 123**	कोर्स शीर्षकः– (Course Title) **Computer Graphics**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ अधिकतम अंक : 18

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt <u>all three questions</u> from this section.

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. (a) Explain the utility of Clipping algorithms with suitable example.

   (b) Explain various methods to design polygon mesh.

2. (a) What is Polygon Rendering? How it is used for real world 3-D objects?

   (b) List the advantages and disadvantages of the Ray tracing.

3. (a) Construct the Bezier Curve of order 3 and with 4 polygon vertices A(1,1), B(2,3), C(4,3), D(6,4).

   b) Write the properties of B-Spline curves. Also write advantages of B-Spline curves over Bezier curves.

खण्ड ब अधिकतम अंक : 12

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt <u>all four questions</u> from this section.

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Why do we need transformation in computer graphics?
5. Write down differences between scaling and shearing transformation with proper example.
6. What do you mean by projection? Explain various types of projection in computer graphics?
7. Implement DDA to draw a line from (3, 4) to (7, 6)?

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कोर्स कोड : Course Code: **BCA-EA**	कोर्स शीर्षकः– (Course Title) **Web Technology**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.

1. a) What is a suitable procedure to integrate different style sheets into website? Explain.
   b) Write a HTML code for which represents the score of a Hockey game games in which the team names have their respective team colors. The score of the leading/winning team should appear larger and in a different font than the losing team.

2. a) What is a session? Explain how client state is maintained using session.
   b) Explain about session tracking and session management using an example

3. a) Consider the Employee (id, name, address, designation, salary) database. Write an Ajax program to accept name and salary of employee and increase employee salary by 10% in the database.
   b) Describe briefly the integration of PHP and AJAX

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.

4. Compare DOM and SAX in XML processing.
5. Discuss the basic differences between Servlet and JSP. What are the advantages of using JSP for server side programming?
6. Explain various advantages and disadvantages of AJAX.
7. Write a CSS which adds background images and indentation?

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र **2024–25**

कोर्स कोड : Course Code: **BCA-EB**	कोर्स शीर्षकः– (Course Title) **Client Server Technology**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.

1. Why do we need Client-Server Computing? Explain the main elements of Client-Server Computing with a suitable diagram.
2. What do you understand by Distributed Computing? Discuss the term parallel computing with reference to Distributed computing.
3. What is .NET Framework? What are its advantages? Describe the main components of .NET Framework.

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.

4. Explain the various ways to improve the performance of Client/Server computing.
5. Differentiate between stateful and stateless servers.
6. What do you understand by ADO.NET? Explain relation of ADO.NET with XML.
7. What is CSS? Why do we use CSS?

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र **2024–25**

कोर्स कोड : Course Code: **BCA 127**	कोर्स शीर्षकः– (Course Title) **Python Programming**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ अधिकतम अंक : 18

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. a) What is a list in Python? How to create nested lists? Demonstrate how to create and print a 3-dimensional matrix with lists.
   b) Write a Python program that counts the number of occurrences of a letter in a string, using dictionaries.
2. a) Demonstrate implementation of hierarchical inheritance in Python with a program.
   b) What happens if except clause is written without any Exception type? Explain with an example.
3. a) Differentiate between lists and tuples.
   b) Explain in detail about Python type conversion and type casting?

खण्ड ब अधिकतम अंक : 12

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What are iterators in Python?
5. Discuss the purpose of lambda functions in Python?
6. What is the difference between immediate mode and script mode?
7. What is Module in Python? Explain with an example.

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र **2024–25**

कोर्स कोड : Course Code: **BCA 128**	कोर्स शीर्षकः– (Course Title) **Soft Computing**	अधिकतम अंक : 30 **Maximum Marks : 30**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt <u>all three questions</u> from this section.

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What is the role of activation functions in a Neural Network? Explain various types of activation functions with their merits and demerits

2. Describe the main features of Genetic Algorithms. What are requirements that a problem should satisfy in order to be suitable for solving it by a GA?

3. Consider the fuzzy relation

$$R = \begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}$$

Perform λ-cut operations for the values of λ = 0.9, 0+

खण्ड ब **अधिकतम अंक : 12**

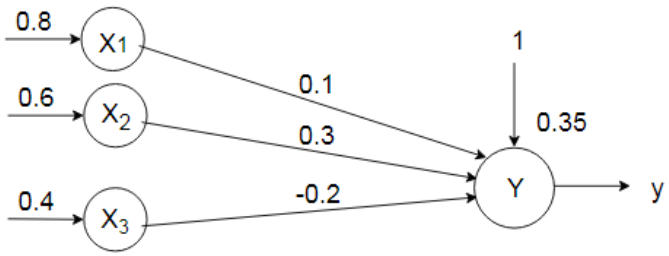
Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt <u>all four questions</u> from this section.

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What is Fuzzy Inference System (FIS)? Illustrate Mamdani FIS and Sugeno FIS with examples?

5. Obtain the output of neuron Y in following network using activation functions as:
   i) Sigmoid ii)Rectified Linear Unit (ReLU)



6. How do you train neural networks with backpropagation?
7. How recurrent neural network is different from convolutional neural network. Describe two applications of recurrent and convolutional neural network.

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कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **BCA-EC**	**Computer Architecture**	**Maximum Marks : 30**

खण्ड अ अधिकतम अंक : 18

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.

प्रश्न संख्या 1से 10 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।इस खंड सेकिसी भी तीन प्रश्नों का उत्तर दें।

1. What is use of transfer of control instructions? Give some examples of transfer of control instructions.
2. Why is the I/O system required in a computers system? Explain how data transfer takes place between I/O devices and CPU.
3. Identify the dependences in the following code snippet:
   ADD R1, R2, R3
   DIV R4, R1, R5
   ADD R5, R7, R4
   AND R5, R4, R2

खण्ड ब अधिकतम अंक : 12

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.

4. How do branch instructions affect the pipeline performance? Explain with the help of a suitable example.
5. What is micro-operation? Explain different types of microperations with suitable examples.
6. Suppose a cache is 10 times faster than main memory & suppose the cache can be used 70% of the time. How much speedup do we gain by using cache?
7. A cache memory needs an access time of 30ns and main memory 150ns.
   What is the average access time of CPU (assume hit ratio =80%) ?

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कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **BCA-ED**	**Microprocessor and its Applications**	**Maximum Marks : 30**

खण्ड अ अधिकतम अंक : 18

Section-A **Maximum Marks: 18**

नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.

प्रश्न संख्या 1से 9 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Explain memory organization in 80386 microprocessor.
2. Explain I/O addressing scheme used in 8086 with neat block diagram.
3. (a) Explain general purpose registers of 8086 microprocessor.
   (b) Compare 8-bit and 16-bit microprocessor.

खण्ड ब अधिकतम अंक : 12

Section –B **Maximum Mark : 12**

नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.

4. Explain the term op-code and operand in instruction format with example.
5. What are the advantages of segmented memory scheme?
6. Explain any five addressing modes of 8086 microprocessor with examples.
7. What is the difference between a microprocessor and a CPU?