उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

Master of Computer Science   कार्यक्रम अधिन्यास सत्र **2022—2023**

कोर्स कोड : Course Code: **MCS 101**	कोर्स शीर्षकः– (Course Title) **Discrete Mathematics**	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 1से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Rewrite the following arguments using qualifiers, variables and predicate symbols:
   a. All birds can fly
   b. Some men are genius.
   c. Some numbers are not rational
   d. There is a student who likes mathematics but not geography.
2. Determine whether the relation R on the set of all Web pages is reflexive, symmetric, antisymmetric, and/or transitive, where $(a, b) \in R$ if and only if
   a) Everyone who has visited Web page a has also visited Web page b.
   b) There are no common links found on both Web page a and Web page b.
   c) There is at least one common link on Web page a and Web page b.
   d) There is a Web page that includes links to both Web page a and Web page b.
3. Explain the following terms with example:
   a. Homomorphism and Isomorphism graph
   b. Euler Graph and Hamiltonian graph

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. Define Cartesian product of two sets and prove that
   $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

5. Define tree. Show that in a tree of n vertex will have n-1 edges.
6. P and Q are consider to apply for a job. The probability that P applies for the job is 1/4, the probability that applies for the job given that Q applies for the job is 1/2 and the probability that Q applies for the job given that P applies for the job is 1/3. Then what is the probability that P does not apply for the job given that Q does not apply for the job?
7. Five balls are drawn from a bag containing 6 white and 4 black balls. What is the probability that 3 are white and 2 black?

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कोर्स कोड : Course Code: **MCS 102**	कोर्स शीर्षकः— (Course Title) **C++ and Object oriented 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 <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) Write a C++ program to define three overloaded functions to swap two integers, swap two floats and swap two doubles.
    ii) State four points of differences between function overloading and function overriding.

2. i) What is a static function? What is its use? How can a member of class be declared as static?
    ii) Differentiate between private, public and protected visibility modes with suitable examples.

3. i) Write a C++ program to illustrate catching all exceptions.
    ii) What is the purpose of the constructor? Explain the various types of constructors.

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 operator overloading? Write the rules to overload an operator.
5. Explain the need for virtual classes while building class hierarchy.
6. What do you understand by the term polymorphism in C++?
7. What do you mean by "this" function? What are the applications of "this" pointer?

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कोर्स कोड : Course Code: **MCS 103**	कोर्स शीर्षकः– (Course Title) **Data Structures**	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) Describe AVL tree? How does AVL tree differ from Binary Search Tree?
   (b) Starting with an empty B tree, insert the following keys into the B tree: 5, 16, 22, 45, 2, 10, 18, 30, 50, 12, and 31. How does the final tree look like?
2. Describe the minimum spanning tree with an example? Explain the applications of Breadth First Search and Depth First search?
3. (a) What are the various applications of searching techniques? How is binary search different from sequential search?
   b) Describe various types of sorting techniques. Explain the advantages of Quick sort over Bubble sort.

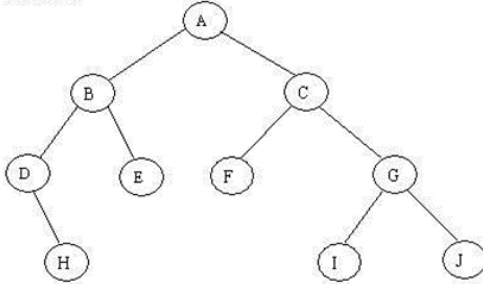खण्ड ब   अधिकतम अंक : 12
Section –B   **Maximum Mark : 12**

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. Write down the Inorder, Preorder and Postorder traversals of a given binary tree with proper explaination:

Given tree:

5. Explain advantages of pointers over arrays.
6. Define "Graph". When can it be said that two vertices of a Graph are connected?
7. Write a function to return sum of first N natural number.

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कोर्स कोड : Course Code: **MCS 104**	कोर्स शीर्षकः— (Course Title) **Software Engineering**	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 Software Quality Assurance (SQA)? What are the components of SQA?

2. How is software configuration management done in software?

3. (a) Define software risk. Explain in brief the types of software risk.
   (b) Explain the layered approach used in software Engineering.

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. How coupling is different from cohesion. Explain with example.
5. What are the steps involved in software project estimation?
6. What is prototyping? Explain the problems and advantages of prototyping in detail.
7. Explain four approaches to handle the software sizing problem.

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कोर्स कोड : Course Code: **MCS 106**	कोर्स शीर्षकः– (Course Title) **Computer Organization**	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) What is instruction cycle? When will be any interrupt processed during the instruction cycle?
   ii) What is Interrupt? Explain various types of Interrupts.
2. What is the difference between combinational and sequential circuit? Explain with appropriate example.
3. i) Describe the role of buses in a computer system. Explain the different types of buses with suitable examples.
   ii) What is the difference between isolated I/O and memory mapped I/O?

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 NAND and NOR gates are called as Universal gate?
5. What is the role of control unit in a computer?
6. What is DMA? Explain DMA transfer modes in detail.
7. What do you mean by memory hierarchy? Why are registers present in CPU

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कोर्स कोड : Course Code: **MCS 107**	कोर्स शीर्षकः– (Course Title) **Computer Graphics and Multimedia**	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) What do you understand by transformation? Explain basic transformations in computer graphics.
   ii) Describe the matrix formulation of 2D Translation, Scaling and Rotation.
   .

2. i) Explain DDA line drawing algorithm with Example.

   ii) Explain Bresenham's circle generating algorithm.

3. i) Explain shading in detail. Discuss the difference between Phong shading and Gouraud shading.

   ii) What is visible surface detection? Describe methods for detecting the visible surface on the screen.

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 does image compression is needed?
5. Explain the steps involved in the design of the animation sequence.
6. What do you mean by projection? Explain various types of projection in computer graphics?
7. What are the differences between raster scan and random scan system?

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कोर्स कोड : Course Code: **MCS 108**	कोर्स शीर्षकः– (Course Title) **Data Communication and Computer Networks**	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) Describe the three-way handshaking in TCP for connection establishment with suitable diagram.
   ii) Explain the services provided by internet transport protocols. How does the TCP congestion control work?
2. i) Explain the error control strategies in the data link layer.
   ii) Discuss how the flow control is achieved in the data link layer.
3. i) Explain the OSI reference model with a suitable diagram.
   ii) Describe the functionality of each layer of OSI reference model.

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. Differentiate between flow and error control.
5. What is pure Aloha? Why is slotted Aloha better than pure Aloha?
6. How does CSMA/CD detect collisions?
7. What do you mean by digital signature? Differentiate between private key and public key cryptography

कोर्स कोड : Course Code: **MCS 109**	कोर्स शीर्षकः– (Course Title) **Database Management System**	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. Consider the following requirements of a staff management system of an organization :

   a) The basic information that needs to be stored about the staff includes staff-id, name, address, date of birth, date of employment, post held.
   b) It keeps dependent information of employees. An employee can have many dependents.
   c) Pay details of the employees are also kept.
   d) It also keeps track of the various departments and employees of those departments.
   Draw the E-R diagram for the organization. Make suitable assumptions, if any.

2. Let R (A, B, C, D) be a relational schema with the following functional dependencies:

   {A → B, B → C, C → D and D → B}.

   The relation R is decomposed into R1(AB), R2(BC), R3(BD). Determine whether it is dependency preserving or dependency not preserving decomposition.

3. You are given the following relational schema:

   Person(PersonID, Name, Sex, CityOfBirth)

   Parent(ParentID, ChildID)

   ParentID and ChildID are foreign keys referring to Person.PersonID.

   Write an SQL to find the names of all people who were born in the same city as their father.

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. Write a query in sql for the following database:
   Employee (empno,ename,deptno,job,hiredate)
   a) Create a table employee and make the empno as primary key of the table.

   b) Give list of employee name & their job spec who are working in deptno 20?

5. Explain how DBMS handle the data redundancy.

6. How does DBMS achieves data independence property?

7. What is a transaction? What are the properties of a transaction?

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कोर्स कोड : Course Code: **MCS 111**	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. Solve the following recurrence. :
   $T(I) = 1$
   $T(n) = 4T(n/3) + n^2$; for $x <= 2$
2. Show the steps of heapsort algorithm for following order of input data:
   30, 50, -100, 200, 50, 30, 60, 80, 200

3. Write the recursive and iterative algorithms for finding the reverse of a given string and analyze time and space complexities.

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. Explain the divide and conquer strategy to solve a problem with its applications.
5. Find the minimum spanning tree using Prims algorithm for the following graph.
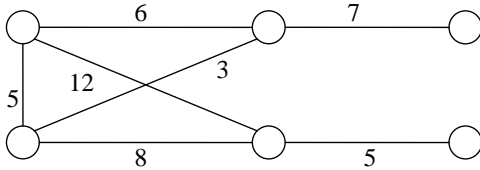
6. Explain how is dynamic programming different from greedy algorithms?
7. State the significance of θ, Ω and O notations.

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कोर्स कोड : Course Code: **MCS 112**	कोर्स शीर्षकः– (Course Title) **Java 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 <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 the steps involved in creating and executing a java program.
   ii) What is package in Java? How packages are created and accessed in Java.

2. i) Write down a java program to display number in word format, for Example: 123 will be shown as "One Two Three".
   ii) How Access Control Mechanism is implemented in Java? What Method does subclass inherit from superclass.

3. i) What is an instance variable? Explain how an instance variable of a class can have different values for each object of that class.
   ii) What is static method? Explain why main method in java is always static.

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. Describe the uses of final and super keywords with respect to inheritance.
5. What are the differences between interface and abstract class?
6. What is the difference between Overloading and Overriding? Is it possible to override inner classes?
7. What is a constructor? Write a Java program to explain how super class constructors are called in their subclasses.

कोर्स कोड : Course Code: **MCS 113**	कोर्स शीर्षकः– (Course Title) **Theory of Computation**	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. Design a DFA to accept the binary numbers which are divisible by 5.
2. Let G be the grammar

   S → aB | bA

   A → a

   B → aBB | bS | b

   For the string aaabbabbba. Find leftmost derivation, rightmost derivation and parse tree.
3. (i). What are P, NP, NP-complete, and NP-hard?

   (ii). How to prove that a given problem is NP complete?

   (iii). What is polynomial time reduction?

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 are the difference between decidable and undecidable problems?
5. Give an example of a language accepted by a PDA but not by DPDA.
6. Obtain CFG for the language L = {ww^R | w ϵ {a, b}* }, w^R is the reversal of w }.
7. For the grammar G defined by S → AB, A → Aa | a, B → b give derivation tree for the sentential form aab.

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कोर्स कोड : Course Code: **MCS 114**	कोर्स शीर्षकः– (Course Title) **Multimedia 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. 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) How is animation useful in multimedia? List out the key features of all Animation Tools.
    b) Describe various phases of multimedia application development.
2. Explain the need of various hardware and software essential for professional multimedia development.
3. Briefly explain the following terms:
    i.   Hypertext
    ii.   Animation
    iii. Multimedia Protocols
    iv.   Broadcast Video Standards

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 are the differences between icon based and event based authoring tools?
5. Explain advantages of storing image in vector format.
6. What are the important features of Flash Software?
7. What are the authoring tools? List out some silent features of a good authoring tool.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

Master of Computer Science कार्यक्रम अधिन्यास सत्र **2022—2023**

कोर्स कोड : Course Code: **MCS 116**	कोर्स शीर्षकः— (Course Title) **Operating System**	अधिकतम अंक : 30 **Maximum Marks : 30**

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. Assume that there are 3 page frames which are initially empty. If the page reference string is 1, 2, 3,4, 2, 1, 5, 3, 2, 4, 6, what is the number of page faults using the optimal replacement policy?

2. For the processes listed in the following table, which of the following scheduling schemes will give the lowest average turnaround time?

Process	Arrival Time	Processing Time
A	0	3
B	1	6
C	4	4
D	6	2

a) First Come First Serve b) Non – preemptive Shortest Job First c) Shortest

3. An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1, and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution.

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. The system is currently in a safe state. Consider the following independent requests for additional resources in the current state:

REQ1: P0 requests 0 units of X,
0 units of Y and 2 units of Z
REQ2: P1 requests 2 units of X,
0 units of Y and 0 units of Z

Whether the REQ1 can be permitted or Only REQ2 can be permitted or Both REQ1 and REQ2 can be permitted?

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 the main disadvantage of semaphore based solution to critical section problem? How does it is removed?
5. What are the advantages and disadvantages of user-level threads over kernel-level threads?
6. What is the purpose of Unix Inode? Describe the structure of Unix Inode.
7. How the SCAN does differs from C SCAN disk scheduling algorithm.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

Master of Computer Science   कार्यक्रम अधिन्यास सत्र **2022−2023**

कोर्स कोड : Course Code: **MCS 117**	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. What is Roulette Wheel Selection? Why mutation and crossover is important in genetic algorithm?

3. Describe the different properties of fuzzy sets. Explain the working of a fuzzy logic air conditioner controller with block diagram.

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. Define Dilation, Concentration and Contrast intensification on fuzzy sets.
5. Obtain the output of neuron Y in following network using activation functions as:
   i)   Sigmoid   ii)Rectified Linear Unit (ReLU)
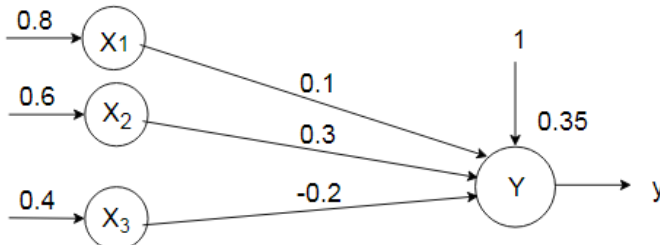
6. Explain the convergence criteria of genetic algorithm.
7. How recurrent neural network is different from convolutional neural network. Describe two applications of recurrent and convolutional neural network.

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कोर्स कोड : Course Code: **MCS 119**	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. 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"

2. i) Describe the fundamental differences between symmetric and asymmetric cryptography.
   ii) Explain RSA algorithm with an example.

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. Explain the different classes of intruders.
5. What is the need of a VPN? Explain the two modes of a VPN.
6. Explain any four types of attacks on a cryptosystem.
7. What is digital certification? How it can be achieved?

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कोर्स कोड : Course Code: **MCS 120**	कोर्स शीर्षकः— (Course Title) **System Software**	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 are the criteria for classification of Data Structures for Language Processors?

2. What are the types of text editors? How programming environment is useful to the user?

3. a) Differentiate between top-down parsing and bottom-up parsing.

   b)Explain non-recursive predictive parsing.

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 the main purpose of assembler? Where does assembler stores all the names and their corresponding values?

5. What are different code optimization techniques?

6. Explain the operation frequently used by a Language Processor.

7. Describe different forms of intermediate code.