उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

Bachelor of Computer Application   कार्यक्रम अधिन्यास सत्र **2022—23**

कोर्सकोड : Course Code: **BCA-101**	कोर्स शीर्षकः– (Course Title) **Computer Fundamental & PC Software**	अधिकतमअंक : 30 **Maximum Marks : 30**

खण्ड अ   अधिकतमअंक : 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.

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

1. Discuss variable, constant and data type with suitable example. Explain various types of conditional and looping statements in any programming language.
2. i) Describe the process of Cryptography. Why does cryptography is important in today scenario?
   ii) What are computer viruses? Briefly explain various types of computer viruses.

3. Explain how do you make backup of files on hard disk in Windows operating system. How do you setup Windows OS for multiple users? Also discuss the use of control panel in Windows operating System.

खण्ड ब   अधिकतमअंक : 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.

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. Why cache memory is needed in computer?
5. Why does input/output Module Interface is needed in computer system?
6. How do you use different types of graphs in MS Power Point
7. Describe find and replace features in MS Word? How can you check spellings in MS Word?

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Bachelor of Computer Application　　　　　　कार्यक्रम अधिन्यास सत्र **2022—23**

कोर्सकोड : Course Code: **BCA-102**	कोर्स शीर्षकः– (Course Title) **C Programming**	अधिकतमअंक : 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 1से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What is an operator? Explain the arithmetic, relational, logical and assignment operators in C language with appropriate example.
2. (a) Write a C program to imp1ement linear linked list, showing all the operations that can be performed on a linked list.
   (b) Write a C program to check whether the given matrix is symmetric or not
3. (a) Discuss the applications of searching techniques. Write a C program to implement a binary search.
   (b) What are control statements? Explain different loop control statements with examples.

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.**

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. Write a program in C language to generate the given series upto terms less than 200.
   1 - 4 + 9 - 16 + 25 ....
5. Write any three advantages of Pointers over Arrays.
6. Write a C Program for reversing the digits of an integer. Also check whether it is palindrome or not?
7. What is a library function? What are its uses in C programming?

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कोर्सकोड : Course Code: **BCA-103**	कोर्स शीर्षकः— (Course Title) **Data Structures**	अधिकतमअंक : 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. (a) Differentiate between stack and queue with appropriate example.
   (b) Explain linked list with suitable example. What are the differences between a singly linked list and a doubly linked list?
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.

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. Explain advantages of pointers over arrays.
5. Define "Graph". When can it be said that two vertices of a Graph are connected?
6. Write a function to return sum of first N natural number.
7. Write in-order, pre-order and post-order traversal of following binary tree.
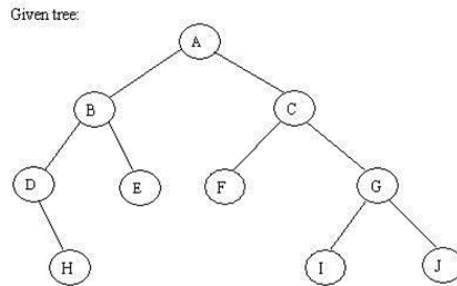
Given tree:

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कोर्सकोड : Course Code: **BCA-104**	कोर्स शीर्षकः— (Course Title) **Basic Mathematics**	अधिकतमअंक : 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. State and prove Lagrange's mean value theorem
2. a) Integrate $\int cos(x)^5 sin(x)^7 \, dx$
   b) Show that Every differentiable function is continuous but converse is not true.
3. a) Prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cup C)$.
   where A, B, C are non-empty sets.
   b) Find the Value of x: $(x^2 + 2x + 3)^{1/2} = (2x + 5)$

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.

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. Evaluate $\int (x + 1)e^x (xe^x + 5)^4 \, dx$
5. Evaluate $lim_{x \to 0} \sqrt{(1 + x)} - 1$
6. Find $\frac{dy}{dx}$, if $y = x^{x^x}$
7. Trace the curve y = x3 – 8x2 + x + 42.

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कोर्सकोड : Course Code: **BCA-106**	कोर्स शीर्षकः– (Course Title) **Numerical Analysis**	अधिकतमअंक : 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. Solve the following system of equation by Gauss Elimination method:
   $4x1 + x2 + x3 = 4$
   $x1 + 4x2 - 2x3 = 4$
   $3x1 + 2x2 - 4x3 = 6$
2. What do you mean by Simpson's 1/3 rd and 3/8 th rule. Find the value of $\int 1/\sqrt{(1-x^2)}\,dx$ by Simpson"s 1/3 rd rule.
3. Use the Jacobi method to approximate the solution of the following system of linear equations.
   $5x1 – 2x2 + 3x3 = 1$
   $-3x1 + 9x2 + x3 = 2$
   $2x1 - x2 - 7x3 = 3$
   Continue the iterations until two successive approximations are identical when rounded to three significant digits.

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.

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. If $\pi= 22/7$ is approximated as 3.14, find the absolute error and relative error respectively.
5. Find a root of $3x^3 – x^2 + 3x – 1 = 0$ near $x_0 = 0.2$ in two iterations by Birge-Vieta method.
6. Solve Sin x = x/2 by Newton-Raphson method.
7. Find the inverse of the matrix
   $$A = \begin{vmatrix} 5 & -2 & 4 \\ -2 & 1 & 1 \\ 4 & 1 & 0 \end{vmatrix}$$

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कोर्सकोड : Course Code: **BCA-107**	कोर्स शीर्षकः— (Course Title) **Multimedia Technology**	अधिकतमअंक : 30 **Maximum Marks : 30**

खण्ड अ

Section-A

अधिकतम अंक : **18**

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

खण्ड ब

Section –B

अधिकतम अंक : **12**

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

कोर्सकोड : Course Code: **BCA-108**	कोर्स शीर्षकः– (Course Title) **Discrete Mathematics**	अधिकतमअंक : 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. Write short notes :
   (i)　　Regular graph
   (ii)　Bipartite graph
   (i)　　Hamiltonian graph.
3. Determine whether the relation R on the set of all Web pages is reflexive, symmetric, antisymmetric, and/or transitive, where (a, b) ∈ 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.

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. Find using Karnaugh maps a minimal form for the boolean function.

   $f(x, y, z) = xyz + xyz' + x'yz + x'y'z'$.

5. What is planar graph? Also explain Euler's formula.

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. A bag contains 10 red marbles, 10 white marbles, and 10 blue marbles. What is the minimum no. of marbles you have to choose randomly from the bag to ensure that we get 4 marbles of same color?

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कोर्सकोड : Course Code: **BCA-109**	कोर्स शीर्षकः— (Course Title) **C++ and Object Oriented Programming**	अधिकतमअंक : 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. Write a short note on the following terms:
   i) Virtual class
   ii) Object
   iii) AWT
2. i) Write a C++ program to illustrate catching all exceptions.
   ii) What is the purpose of the constructor? Explain the various types of constructors.
3. i) What do you understand by object oriented programming? Compare object oriented programming with procedure oriented programming.
   ii) What is the purpose of UML? Draw an Use case and Class diagram of the University management system. Make necessary assumptions.

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 static function? What is its use? How can a member of class be declared as static?
5. Differentiate between private, public and protected visibility modes with suitable examples.
6. What is operator overloading? Write the rules to overload an operator.
7. What do you understand by the term polymorphism in C++?

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कोर्सकोड : Course Code: **BCA-111**	कोर्स शीर्षकः– (Course Title) **DBMS**	अधिकतमअंक : 30 **Maximum Marks : 30**

खण्ड अ

Section-A

अधिकतम अंक : 18

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. R(ABCDEF) F = {A→B, B→C, C→D, E→F} decomposed into D = R1(AB), R2(BCD), R3(DEF). Find whether D is Lossless or Lossy?

2. Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):
   The NHL has many teams, each team has a name, a city, a coach, a captain, and a set of players, each player belongs to only one team, each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records, a team captain is also a player, a game is played between two teams (referred to as host_team and guest_team).
   (i) Draw an E-R diagram
   (ii) Transform the E-R diagram to a Relational Schema.

3. Consider the two sets F and G with their FDs as below :
   F : A→C, AC→D, E→AD, E→H
   G: A→CD, E→AH
   Check whether two sets are equivalent or not.

खण्ड ब

Section –B

अधिकतम अंक : 12

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. Identify the Normal Forms of the relation R(ABCDEF) Functional dependencies given by {AB → C, C → D, B → E, B → F}

5. How does a deadlock occur in a computer system? How can you prevent deadlock happening in DBMS?

6. Discuss on the various ways in which we can arrive at a good database design. Discuss the ACID properties of a transaction.
7. 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 the following queries in SQL to find the names of all people who were born in the same city as their father.

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कोर्सकोड : Course Code: **BCA-112**	कोर्स शीर्षकः– (Course Title) **Operating System**	अधिकतमअंक : 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. Consider the following table of arrival time and burst time for five processes P1, P2, P3, P4 and P5.

Process	Burst Time	Arrival Time
P1	6 ms	2 ms
P2	2 ms	5 ms
P3	8 ms	1 ms
P4	3 ms	0 ms
P5	4 ms	4 ms

The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the five processes?

2. Consider the following page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3. How many page faults would occur for the LRU, FIFO, LFU and optimal page replacement algorithms assuming three and four frames?

3. Assuming the current disk cylinder to be 50 and the sequence for the cylinders to be (82,170,43,140,24,16,190) find the sequence of servicing using

(a) Shortest seek time first (SSTF)

(b) SCAN disk scheduling policies.

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 there is need of process synchronization? Explain how semaphores can be used to deal with n-process critical section problem.

5. What is the need for disk scheduling? Explain the differences between the C-LOOK and C-SCAN disk scheduling algorithms.

6. Define thread. Differentiate user threads and kernel threads.

7. How does process different from program? Explain different states of process in process state transition with a neat diagram.

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कोर्सकोड : Course Code: **BCA-113**	कोर्स शीर्षकः– (Course Title) **Software Engineering**	अधिकतमअंक : 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. What is Risk Management and what will risk management do for any business? How does software risk management related to Software process improvement?
2. What is Software Testing? What are the various characteristics of a good testable software?
3. Explain prototype model of software development. Is prototype model a suitable Model for courier company management system? Justify your answer.

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 the structure of SRS as per IEEE standards.
5. What do you mean by Software Configuration Management?
6. What is coupling? Explain its types?
7. What is (SQA)? What are the component of Software Quality Assurance (SQA).

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Bachelor of Computer Application　　　　　कार्यक्रम अधिन्यास सत्र

2022–23

कोर्सकोड :　Course Code: **BCA-114**	कोर्स शीर्षकः– (Course Title)　**Principle of Programming Languages**	अधिकतमअंक : 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. (a) Distinguish between data types, arrays and records.
   (b) What is call by value and call by reference? Give example.
2. (a) Explain stack based storage allocation mechanism.
   (b) Explain iteration control structure.
3. Write any four important uses of programming languages. List the design principles of imperative languages.

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. Distinguish between dangling pointers and memory leakage.
5. List the benefits of modular development approach.
6. Convert the infix expression into other notations (a+b)*(d+e) / (f+g)
7. Write two advantages of activation records.

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कार्यक्रम अधिन्यास सत्र **2022–23**

कोर्सकोड : Course Code: **BCA-116**	कोर्स शीर्षकः– (Course Title) **Computer Network**	अधिकतमअंक : 30 **Maximum Marks : 30**

खण्ड अ

Section-A

अधिकतम अंक : **18**

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. i) What is Network topology? Explain basic topologies with advantage and disadvantage.
   ii) Explain different types of transmission media. What are the differences between analog and digital signal?
2. i) Describe the ISO reference model for Data Communication and explain the function of each layer in brief.
   ii) Explain how the OSI reference model is different from TCP/IP model?
3. i) What do we mean by classfull addressing and class-less addressing? Give the range of IP addresses used in different classes in classfull addressing.
   ii) Name two well known data transport protocols provided by the Internet Transport Layer. Provide a description of each service and indicate what type of application might use that service.

खण्ड ब

Section –B

अधिकतम अंक : **12**

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 a frame and a packet?
5. What is a digital signal? Why do we need modem?
6. What are the functions of data link layer protocols in computer networks?
7. What are the advantages of ISDN?

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Bachelor of Computer Application　　　　　कार्यक्रम अधिन्यास सत्र **2022–23**

कोर्सकोड : Course Code: **BCA-117**	कोर्स शीर्षकः– (Course Title) **Java Programming**	अधिकतमअंक : 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. Write a short note on the following terms:
    i) Object
   ii) Type casting
   iii) Inheritence
   iv) Wrapper class
   v) Applet
   vi) this keyword
2. i) What do you understand by object oriented programming? Compare object oriented programming with procedure oriented programming.
   ii) What is static method? Explain why main method in java is always static.
3. How Access Control Mechanism is implemented in Java? What Method does subclass inherit from superclass.

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 Access Control Mechanism is implemented in Java? What Method does subclass inherit from superclass.
5. Describe the uses of final and super keywords with respect to inheritance.
6. What are the differences between interface and abstract class?
7. What is the difference between Overloading and Overriding? Is it possible to override inner classes.

कोर्सकोड : Course Code: **BCA-118**	कोर्स शीर्षकः– (Course Title) **Windows Programming**	अधिकतमअंक : 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. a) What do you mean by visual & Non-Visual Programming, Procedural, object-oriented programming language? Explain in detail.
   (b) What do you mean by VB environment? Explain Toolbox, Properties window, Form designer, Form layout and properties window in detail.
2. a) What do you mean by Procedures? Discuss various types of procedures available in VB in detail
   b) Describe the methodology to create a menu using Visual Basic.

3. b) What is an event? Discuss some of the event supported by VB object. Also explain the role of event processor in VB.
   a) What is form? How do we create the form and managed at time? Also discuss some common from properties.

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 concept of database connectivity.
5. Explain the need of built-functions in Visual Basic. List out the various built in functions that are available in the latest version.
6. Discuss the various features of Visual Basic.
7. What do you mean by hiding and showing forms?

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कोर्स कोड : Course Code: **BCA-119**	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 all <u>three questions from this section</u>.

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

1. Write a short note on the following terms:
   i) K-Map
   ii) Multiplexer
   iii) Register
   iv) Microprocessor
   v) Microcontroller
2. i) What do you mean by Flip-Flop? Discuss the functions and circuits diagram of different types of flip flops?
   ii) What are the differences between combinational and sequential circuit? Explain with appropriate example.
3. What is the role of control unit in a computer? Differentiate Hardware and Micro-programmed control unit with their advantages and disadvantages.

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 role of buses in a computer system. Explain the different types of buses with suitable examples.
5. What is DMA? Explain DMA transfer modes in detail.
6. Differentiate between RISC and CISC.
7. Write down the micro operations involves in fetch cycle.

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

   (a) Replay attack (b) Denial of service attack (c) authentication (d) integrity

   (e) confidentiality (f) nonrepudiation

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) Describe the fundamental differences between symmetric and asymmetric cryptography.
   ii) Explain RSA algorithm with an 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. 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. 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: **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. Let the dimensions of A,B,C,D respectively be 10X5, 5X15, 15X8, 8X20 generate matrix product chains that produces minimum number of matrix multiplications using dynamic programming.
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 algorithm for finding pivot element in quick sort algorithm and analyze its time complexity

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.
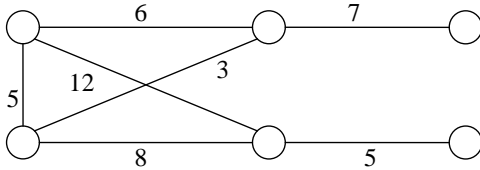
6. Explain how is dynamic programming different from greedy algorithms?
7. State the significance of θ, Ω and O notations.

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. 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. Define following terms:
   a) Refresh buffer/frame buffer.
   b) Pixel?
   c) Aspect ratio.

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. What are the differences between the GIF and JPEG?
5. Explain the various digital movie tools.
6. Explain the steps involved in the design of the animation sequence.
7. What do you mean by projection? Explain various types of projection in computer graphics?

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र **2022–23**

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 XML Element? Explain various rules while writing XML.
   b) What is DTD? Differentiate between DTD and Schema.
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. Explain the way in which a DNS server resolves addresses.
5. Give some advantages of using cascading style sheets.
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 **2022–23**

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. a) Discuss about the role of state management.

    b) What do you understand by session management? Explain.

2. Explain about network management and remote system management. How can security be provided to network?

3. Explain Connectivity and Communication Interface Technology in client/server application. How does transmission protocol work in client/server application?

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. Why OLE is needed? Explain its importance.
5. What do you understand by ADO.NET? Explain in detail.
6. Explain the properties of the Server Controls.
7. Explain the main components of .NET Framework?

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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 <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) 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 <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 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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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. What is the role of membership function? Describe the different properties of fuzzy sets.

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)
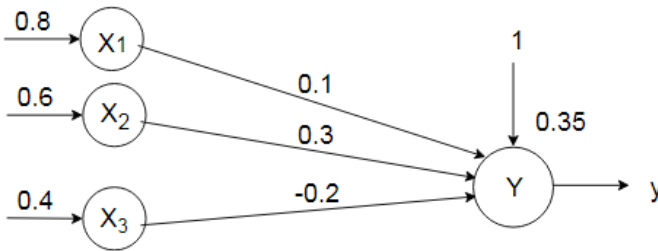
6. How do you train neural networks with backpropagation?

7. How recurrent neural network is different from convolutional neural network. Describe two applications of recurrent and convolutional neural network.

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%) ?

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Bachelor of Computer Application　　　　　कार्यक्रम अधिन्यास सत्र 2022—23

कोर्स कोड : Course Code: **BCA-ED**	कोर्स शीर्षकः– (Course Title) **Microprocessor and its Applications**	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.

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?