उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,इलाहाबाद

Two year Certificate Course in Single Subject Science कार्यक्रम अधिन्यास सत्र **2024–25**

कोर्सकोड : Course Code: **CSSCS01**	कोर्स शीर्षकः– (Course Title) **Computer Fundamental**	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. Explain the differences between followings:
   (i)   Compiler and interpreter
   (ii)   Spooling and buffering
   (iii)   Message switching and Circuit switching.

2. Explain the different classification of Computers? Differentiate between microcomputers mini-computers and main-frames.

3. Explain the terms:
   (i)   Serial Processing
   (ii)   Batch Processing
   (iii)   Multiprogramming.

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 200 से 300 शब्दों में लिखना है।

4. What is Computer virus? Briefly explain different types of computer virus?
5. Explain the following Unix commands: (a) cp (b) chmod (c) sort (d) vi (e) ls (f) tee
6. What is a Semaphore? Explain the wait and signal operations of a semaphore.
7. . What are necessary conditions to hold a deadlock in a system?

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कोर्सकोड : Course Code: **CSSCS04**	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 <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 is a static variable? When should it be used?
   (b) What is a library function? What are its uses in C programming?

2. (a) Illustrate differences between else-if and switch.
   (b) Write a C program to find sum of the digits of any given positive integer.

3. (a) Explain arithmetic, logical and bitwise operators with examples.
   (b) Write a C program to check whether the given matrix is symmetric or not

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 200 से 300 शब्दों में लिखना है।

4. Write any five advantages of Pointers over Arrays.
5. What is a stack? Explain various applications of stack?
6. Write a program in C language to generate the given series upto terms less than 200.
   1 - 4 + 9 - 16 + 25 ....
7. Write the output/error of the following code with explanation.

```
Main ( )
{
static int var = 5;
printf ("%d", var .... );
if (var)
main ( );
}
```

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कोर्सकोड : Course Code: **CSSCS06**	कोर्स शीर्षकः– (Course Title) **DBMS**	अधिकतमअंक : 30 **Maximum Marks : 30**

खण्ड अ   अधिकतम अंक : 18
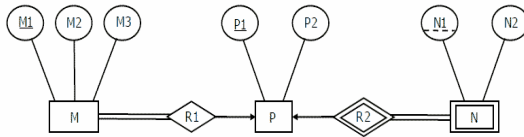
Section-A   **Maximum Marks: 18**

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 a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.
   (i) Draw an E-R diagram
   (ii) Transform the E-R diagram to a Relational Schema.

2. Consider the following ER diagram.

   Explain how many tables are needed to represent M, N, P, R1, R2?

3. Consider the relation R(A,B,C,D,E,G) with functional dependencies given by {AB->C, AC->B, AD-> E, B->D, BC->A, E-> G}. Consider the decomposition of R into {AB, BC, ABDE,EG}.

   a) Is this decomposition lossy or lossless? Explain why?

   b) Is this decomposition is dependency preserving or not? Explain why?

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

5. Let R (ABCDEF) is a relational schema having FDs {A→BCDEF, BC→ADEF, B→C, D→E} Find out the Candidate Key ?

6. What is derived attribute? Explain the differences between single-valued attributes and multi-valued attributes.

7. The employee information in a company is stored in the relation.

    Employee:(name,sex,salary,deptName)

    Assume name is primary key and consider the following SQL query:

    SELECT deptName FROM Employee WHERE sex='M' GROUP BY deptName

    HAVING AVG (salary)> (SELECT AVG(salary) FROM Employee);

    Explain the output of above SQL query?

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कोर्सकोड : Course Code: **CSSCS08**	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. Let P (x) be the statement "x can speak Russian" and let Q(x) be the statement "x knows the computer language C++." Express each of these sentences in terms of P (x), Q(x), quantifiers, and logical connectives. The domain for quantifiers consists of all students at your school.
   a) There is a student at your school who can speak Russian and who knows C++.
   b) There is a student at your school who can speak Russian but who doesn"t know C++.
   c) Every student at your school either can speak Russian or knows C++.
   d) No student at your school can speak Russian or knows C++.

2. Construct truth tables for
   (i)   [(P => Q) /\ (Q => R)] => (P => R)
   (ii)   ~ (P => Q) V [(~P) /\ Q] V Q.

3. 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?

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. Let R and S be two relations on a set A. Then if R and S are reflexive then prove that R∩S is reflexive.

5. Find using Karnaugh maps a minimal form for the boolean function.
   f (x, y, z) = xyz + xyz' + x'yz' + x'y'z'.

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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कोर्सकोड : Course Code: **CSSCS09**	कोर्स शीर्षकः– (Course Title) **Computer Network**	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. Differentiate between OSI and TCP reference model in terms of layers. Functionality of each layer and important protocols at each layer.
2. Assume message M: 1010101010 bits and generator G: 10001 bits. Explain how CRC is used for error detection using above message bits and generator bits.
3. Explain the working of Link State Routing Algorithm using an example.

खण्ड ब   अधिकतमअंक : 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.

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

4. Explain the working of Distance Vector Routing using an example.

5. Differentiate between mutlicast addressing and Unicast addressing.

6. What do we mean by class addressing and class-less addressing? Give the range of IP addresses used in different classes in class addressing mode.
7. Write short notes on the following:
   a. Hub   b. Repeater

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कोर्सकोड : Course Code: **CSSCS11**	कोर्स शीर्षक:– (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. Explain why do we need to use constructors? Explain a copy constructor with an example.

2. What is polymorphism? What are different forms of polymorphism? Explain implementation of polymorphism with the help of a C++ program.

3. Declare an abstract class *"Shape"* with methods **'area'** &**'volume'**. Refine this super class to subclasses like *"cone"*, *"cylinder"* &*"Rectangular Box.* Then, Calculate area and volume for the subclasses.

खण्ड ब   अधिकतमअंक : 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.**

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

4. What do you mean by "this" function? What are the applications of "this" pointer?

5. What is reusability? Which things can be reused?

6. What is friend function? How it is implemented in C++?

7. List the features of Object oriented programming.

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कोर्सकोड : Course Code: **CSSCS03**	कोर्स शीर्षकः— (Course Title) **Introduction to System Software**	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. Define the following terms :
   a. Dispatchers
   b. Scheduling
   c. Swapping
   d. Context switching

2. Explain the following Unix commands:
   (a) cp (b) chmod (c) sort (d) vi (e) ls (f) tee

3. What is a Semaphore? Explain the wait and signal operations of a semaphore. Why are these operations atomic?

खण्ड ब   अधिकतमअंक : **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.

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

4. Discuss the paging system for memory management; also give its advantages and disadvantages.

5. Differentiate between :
   (a) System software and application software
   (b) General purpose OS and real time OS

6. Write the merits and demerits of Assembly language and High level language.

7. Explain the difference between compiler and Interpreter. Write the names of two languages used in compiler and interpreter.

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कोर्सकोड : Course Code: **CSSCS07**	कोर्स शीर्षकः— (Course Title) **Element of System Analysis and Design**	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. Explain prototype model of software development. Is prototype model a suitable Model for courier company management system? Justify your answer.
2. Explain the following:
   a) Project b) Project scheduling c) Critical Path d) Milestones e) Checkpoints f) Project review.
3. With respect to purchasing and inventory control systems explain any three of the following:
   a) Why do retail outlets carry inventory b) Inventory carrying cost. c) Procurement lead time d) Bill of material.

खण्ड ब   अधिकतमअंक : 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.

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

4. What are the differences between Black Box Testing" and "White Box Testing"?
5. Discuss the role of PERT Chart in software development.
6. What is coupling and Cohesion? What are the different type of Cohesion?
7. What is spiral model?

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कोर्सकोड : Course Code: **CSSCS13**	कोर्स शीर्षकः– (Course Title) **Office Tools and Intenet**	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 do you understand by network architecture? Name the network architecture used in the Internet. Which LAN topology requires smallest length of wire and which topology requires the largest to establish connections in the network?
2. What is a table? How can we create it? Describe with example.
3. How can we create and use multiple worksheets? Explain with example.

खण्ड ब   अधिकतमअंक : 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.**

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

4. Discuss the role of an IP address in Internet. Explain the role of an Internet Service Provider (ISP).
5. Describe excel charts? Also discuss the use of excel chart.
6. What do you mean by shapes in MS Word? Elaborate your answer.
7. Explain how can you use File Transfer Protocol in Windows.