

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-01	कोर्स शीर्षक:– (Course Title) Discrete Mathematics Structure	अधिकतम अंक : 30 Maximum Marks : 30
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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।

- 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.
 - There is a student at your school who can speak Russian and who knows C++.
 - There is a student at your school who can speak Russian but who doesn't know C++.
 - Every student at your school either can speak Russian or knows C++.
 - No student at your school can speak Russian or knows C++.
- Construct truth tables for
 - $[(P \Rightarrow Q) \wedge (Q \Rightarrow R)] \Rightarrow (P \Rightarrow R)$
 - $\sim (P \Rightarrow Q) \vee [(\sim P) \wedge Q] \vee Q.$
- 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 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।

- Let R and S be two relations on a set A . Then if R and S are reflexive then prove that $R \cap S$ is reflexive.
- Find using Karnaugh maps a minimal form for the boolean function.
 $f(x, y, z) = xyz + xyz' + x'yz' + x'y'z'$.
- 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 $\frac{1}{3}$. 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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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-02	कोर्स शीर्षक:— (Course Title) Introduction to Programming Language Through 'C'	अधिकतम अंक : 30 Maximum Marks : 30
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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 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What is a structure? Create a suitable structure for storing the information about the Technical Institutions in India (Assume appropriate attributes to store the information). List all the institutes for a given state.
2. Suppose A is a header circular list in memory. Write a program in C which deletes the last node from A.
3. Convert the following infix expression into postfix expression using stack.
 - (i) $(a-b*(f+g * h)) * (d/e-f)$
 - (ii) $(a + b \uparrow d) / (e-f) + g$

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.

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

4. With the help of an example explain how dynamic memory allocation can be done in C.
5. Write a short note on call by value and call by reference parameter passing method with example.
6. Write a program in C to check whether a given string is a palindrome or not? Also give the total number of characters in the string.
7. What is Recursive Function? Explain with suitable Example.

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Master of Science in Computer Science

कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: MSC-CS-03	कोर्स शीर्षक:— (Course Title) Digital Computer Fundamentals and Assembly Language Programming	अधिकतम अंक : 30 Maximum Marks : 30
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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 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Explain the following addressing modes with an example and suggest a use for those addressing modes:
 - i. Register Indirect
 - ii. Auto increment
 - iii. Indirect address
 - iv. Base address
 - v. Indexed address
3. What do you mean by Flip-Flop? Discuss the functions and circuits diagram of different type of flip flop?
4. What is input-output interface? Draw and explain block diagram of input-output interface.

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.

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

10. What is instruction cycle? When will be any interrupt processed during the instruction cycle?
11. Briefly describe what are Special purpose registers and General purpose registers in CPU.
12. Write down the micro operations involves in fetch cycle.
13. What is the difference between isolated I/O and memory mapped I/O?

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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-05	कोर्स शीर्षक:— (Course Title) Theory of Computation	अधिकतम अंक : 30 Maximum Marks : 30
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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. Distinguish NFA and DFA with suitable examples.

2. Let G be the grammar

$S \rightarrow aB|bA$

$A \rightarrow a|aS|bAA$

$B \rightarrow b|bS|aBB$

For the string baaabbabba. Find leftmost derivation, rightmost derivation and parse tree.

3. Convert the following grammar into CNF

$S \rightarrow aBa|abba$

$A \rightarrow ab | AA$

$B \rightarrow aB| a$

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 the difference between decidable and undecidable problems?

5. Construct a DFA for the language 'all strings with 011 as a substring', over alphabet $\{0, 1\}$.

6. Obtain CFG for the language $L = \{ww^R \mid w \in \{a, b\}^*\}$, w^R is the reversal of w .

7. What is Push Down Automata? Give an example of a language accepted by a PDA but not by DPDA.

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Master of Science in Computer Science कार्यक्रम अधिन्यास सत्र 2018–19

कोर्स कोड :	कोर्स शीर्षक:– (Course Title)	अधिकतम अंक : 30
Course Code: Msc-CS-06	System Analysis and Design	Maximum Marks : 30

खण्ड अ

Section-A

अधिकतम अंक : 18

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. 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

Section –B

अधिकतम अंक : 12

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. 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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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-07	कोर्स शीर्षक:– (Course Title) Software Engineering	अधिकतम अंक : 30 Maximum Marks : 30
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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. What is prototyping? Explain the problems and advantages of prototyping in detail.
2. What are project metrics? Explain different types of project metrics with an example for each.
3. What are the different testing levels? What is the difference between the verification and validation process?

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 is Cohesion? What are the different types of Cohesion?
5. Define software risk. Explain in brief the types of software risk.
6. What are the steps involved in software project estimation?
7. Explain the features of Software Configuration Management (SCM).

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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-08	कोर्स शीर्षक:– (Course Title) Object oriented programming through C++	अधिकतम अंक : 30 Maximum Marks : 30
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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. 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.
2. Explain why do we need to use constructors? Explain a copy constructor with an example.
3. What is polymorphism? Explain implementation of polymorphism with the help of a C++ program.

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 do you mean by “this” function? What are the applications of “this” pointer?
5. List the features of Object oriented programming.
6. What is reusability? Which things can be reused?
7. What is friend function? How it is implemented in C++ ?

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MS-CS-09	कोर्स शीर्षक:— (Course Title) Computer Networks	अधिकतम अंक : 30 Maximum Marks : 30
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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. Explain the function of each layer of ISO ref. model for Data Communication. How it is different than TCP/IP model?
2. What is the difference between a frame and a packet? Why framing is required? Explain the significance of padding used in some of frame format?
3. What is topology? Explain basic topology with advantage and disadvantage.

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 is switching? Explain the circuit switching with delay diagram.
5. What is Hamming distance and write about minimum Hamming distance?
6. List differences between flow and error control?
7. What is classful addressing? Explain different notation of IPv4 addressing?

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MS-CS-11	कोर्स शीर्षक:– (Course Title) System Software	अधिकतम अंक : 30 Maximum Marks : 30
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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. What are the differences between Search Data Structures and Allocation Data Structures in Language Processors?
2. What is a general purpose macro processor? State and explain the algorithm for an one pass macro processor.
3. What is the role of parser in compiler design? Differentiate between top-down parsing and bottom-up 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 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 do you understand by Machine Dependency of System Software?
5. What is a loader? How loader is different from linker?
6. What is the regular expressions that denotes a language comprising all possible strings of even length over the alphabet (0 , 1)?
7. What are different code optimization techniques?

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Bachelor of Computer Application कार्यक्रम अधिन्यास

कोर्स कोड :	कोर्स शीर्षक:— (Course Title)	अधिकतम अंक : 30
Course Code: MS-CS-12	Object Oriented Analysis and Design	Maximum Marks : 30

खण्ड अ

Section-A

अधिकतम अंक : 18

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. What is the relationship between cohesion and coupling? Identify the type of coupling in the following. How can it overcome?
2. Explain Aggregation & Generalization in detail with suitable example.
3. Describe how class diagram, object diagram and generalization are represented with UML Diagram.

खण्ड ब

Section –B

अधिकतम अंक : 12

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. Describe the activities involved in an ATM transaction.
5. What are the shortcomings in structured approach? Why generally, does an object granted system use a relational DBMS?
6. Explain the steps for converting state diagram to code.
7. Differentiate between Class diagram & Instance diagram

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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-16	कोर्स शीर्षक:— (Course Title) Database Management System	अधिकतम अंक : 30 Maximum Marks : 30
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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. 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.
2. Consider the two sets F and G with their FDs as below :
F: $A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H$
G: $A \rightarrow CD, E \rightarrow AH$
Check whether two sets are equivalent or not.
3. $R(ABCDEF) F = \{A \rightarrow B, B \rightarrow C, C \rightarrow D, E \rightarrow F\}$ decomposed into $D = R1(AB), R2(BCD), R3(DEF)$. Find whether D is Lossless or Lossy?

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 do you mean by data redundancy? Explain how DBMS handle the data redundancy.
5. What is data independence? How does DBMS achieves this property?
6. What is a transaction? What are the properties of a transaction.
7. Discuss the advantages of DBMS over traditional file processing system.

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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-17	कोर्स शीर्षक:— (Course Title) Operating System	अधिकतम अंक : 30 Maximum Marks : 30
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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. Why there is need of process synchronization? Explain how semaphores can be used to deal with n-process critical section problem.
2. Consider the following page reference string: 1,2,3,4,2,1,5,6,1,2,3,7,6,3,2,1,2,3,6 How many page faults would occur for the LRU, FIFO, LFU and optimal page replacement algorithms assuming three and five frames?
3. Consider the following table of arrival time and burst time for three processes P0, P1 and P2.

Process	Arrival time	Burst Time
P0	0 ms	9 ms
P1	1 ms	4 ms
P2	2 ms	9 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 three processes?

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. How does thrashing occurs? Explain with an example.

5. What is a TLB? How does it improve effective access time of data?
6. What are the minimum requirements that should be satisfied by a solution to critical section problem?
7. What are the schemes used in operating system to handle deadlocks?

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कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-18	कोर्स शीर्षक:– (Course Title) Core Java	अधिकतम अंक : 30 Maximum Marks : 30
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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. What is a constructor? Write a Java program to explain how super class constructors are called in their subclasses.
2. What is Object Oriented Paradigm? Explain why Object Oriented Programming is preferred over structured programming?
3. What is inheritance? Explain two benefits of inheritance, with an example of each.

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 is static method? Explain why main method in Java is always static
5. What is package in Java? Explain how to decide the need of package(s) in a system.
6. What is the difference between Overloading and Overriding? Is it possible to override a inner classes.
7. What is multithreaded programming? Explain how threads are created in Java.

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कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-20	कोर्स शीर्षक:– (Course Title) Computer Graphics	अधिकतम अंक : 30 Maximum Marks : 30
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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 cube is in 3D space with coordinates $\{(2,2,2), (2,4,2), (4,2,2), (4,4,2), (2,2,4), (2,4,4), (4,2,4), (4,4,4)\}$. Perform 3D scaling; 2 unit in x-axis, 2 units in y-axis, and 2 units in z-axis. Write down new coordinates of cube and represent in homogenous coordinates.
2. Explain the mechanism of orthogonal projection in detail. Draw 6-view orthogonal projection of a 3D object assumed by you.
3. Explain the terms: Projection line, projection plan, centre of projection, and angle of projection.

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. Consider two raster systems with the resolutions of 640x480, 1280x1024, and 2560x2048. What size frame buffer (in bytes) is needed for each of these systems to store 12 bits/pixel? How much storage is required for each system if 24 bits per pixel are to be stored?
5. Explain the properties of Bezier curves. What is Bezier surface?
6. Explain DDA line drawing algorithm with Example.
7. What are the differences between raster scan and random scan system?

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कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: MSc-CS-21	कोर्स शीर्षक:– (Course Title) Design and Analysis of Algorithms	अधिकतम अंक : 30 Maximum Marks : 30
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खण्ड अ

अधिकतम अंक : 18

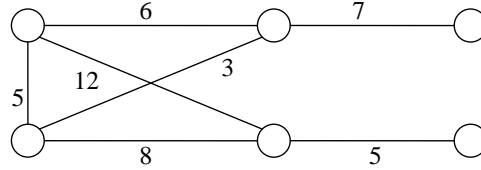
Section-A

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. Explain the divide and conquer strategy to solve a problem? What are the various applications of divide and conquer strategy.
2. Find the minimum spanning tree using Prim's algorithm for the following graph.



3. Explain greedy algorithms with suitable example. How is dynamic programming different from greedy algorithms?

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 do you understand by minimum spanning tree? Explain how minimum cost spanning tree is computed?
5. Suppose we are comparing implementations of insertion sort and merge sort on the same machine. For inputs of size n , insertion sort runs in $8n^2$ steps, while merge sort runs in $64n \lg n$ steps. For which values of n does insertion sort beat merge sort?
6. Discuss the differences between stable and in-place sorting techniques.
7. Compare and contrast quick sort and merge sort?

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कार्यक्रम अधिन्यास सत्र 2021–22

कोर्सकोड : Course Code: MSc-CS-28	कोर्स शीर्षक:– (Course Title) Principle of Programming Languages	अधिकतमअंक : 30 Maximum Marks : 30
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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. Describe the various attributes of a good programming language. Write any four important uses of programming languages.
2. Explain variable, constant and data types with suitable example. Explain various types of conditional and looping statements in a programming language.
3. What is High level programming language? Briefly explain various advantages of high level programming languages over assembly and machine level 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 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 is exception in programming language? How does the exception is handled?
5. What is static and stack based storage management?
6. Describe call by value and call by reference with suitable example.
7. Describe Language Translators? Explain different types of language translators.

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कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: MSc-CS-29	कोर्स शीर्षक:- (Course Title) Web Technology	अधिकतम अंक : 30 Maximum Marks : 30
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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. Explain the servlet API life cycle methods in brief.
2. Discuss the basic differences between Servlet and JSP.
3. Explain in detail the creation, instantiation and usage of java beans objects.

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. Compare DOM and SAX in XML processing.
7. Write a CSS which adds background images and indentation?

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कोर्स कोड :	कोर्स शीर्षक:— (Course Title)	अधिकतम अंक : 30
Course Code:MSc-CS-23	Artificial Intelligence	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 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Explain water jug problem using state space tree.
2. Explain the method of handling approximate inference in Bayesian Networks.
3. What factors determine the selection of forward or backward reasoning approach for an AI problem? Explain

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.

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

4. List down the characteristics of intelligent agent. Explain the concept of learning from example.
5. What are the limitations in using propositional logic to represent the knowledge base? Explain with the help of example.
6. Explain reinforcement learning with the help of an example.
7. What are the properties of a good knowledge representation system?

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कोर्स कोड :	कोर्स शीर्षक:— (Course Title)	अधिकतम अंक : 30
Course Code: MS-CS-24	Parallel Computing	Maximum Marks : 30

खण्ड अ

Section-A

अधिकतम अंक : 18

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

1. Define the cluster computing. Explain the memory organisation in a cluster computing.
2. Consider a program that requires 78% of the total time to perform parallel operation while the remaining time is used for serial operations. The program consists of 25,000 operations each taking 2.5ms to complete, with 2,000 operations being done sequentially. Calculate the speedup achieved.
3. With the help of a Block diagram explain the architecture of an SIMD array processor.

खण्ड ब

Section –B

अधिकतम अंक : 12

Maximum Mark : 12

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

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

4. What do you mean by Data parallel programming?
5. Define the transformation used in a shuffle network giving an example using eight processors.
6. Explain the concept of permutation Network with an example.
7. Define array processing. Why are array processors called as SIMD Array computers?