उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, प्रयागराज

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Master of Computer Application

कोर्स कोड : Course Code: **MCA-01**	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.

1. Construct truth tables for
   (i) $[(P \Rightarrow Q) \wedge (Q \Rightarrow R)] \Rightarrow (P \Rightarrow R)$
   (ii) $\sim (P \Rightarrow Q) \vee [(-P) \wedge Q] \vee Q$.
2. Write short notes :
   (i)   Regular graph
   (ii)   Bipartite graph
   (iii)   Hamiltonian graph.
3. Show that the relation $(x,y) R (a,b) \square x2 + y2 = a2 + b2$ is an equivalence relation on the plane. Also describe the equivalence classes.

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.

1. Define tautologies and contradictions with examples.
2. Construct the truth table for $P \vee (q \wedge r) \Leftrightarrow q \wedge (p \vee r)$.
3. What is Lattice? Explain the properties of Lattice.
4. What is planar graph? Also explain Euler's formula.

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कोर्स कोड : Course Code: **MCA-02**	कोर्स शीर्षकः– (Course Title) **Programming through 'C'and Data Structures**	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.

1. (a) A company insure its drivers in the following case.
   - If the drivers is married.
   - If the drivers is unmarried, male and above 30 year of age.
   If the driver is unmarried female and above 25 year of age.
   In all other case, the driver is not insured. Write a C program without using logical operator to determine whether the driver
   is insured or not.
   (b) Differentiate between the nested..... if and the switch statement in C language with suitable example.
2. Sort the following list of numbers using Quick Sort in descending order:
   1, 3, 2, 5, 4, 6, 12, 10, Show all the passes.
3. What are various data types used in C? Write its range and format also?

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.

1. What is the difference between call by value and call by reference parameter passing techniques.
2. Write a function int power (int x, int n) to return x^n
3. Write a function to return the sum of N number.
4. Write a program to find maximum and minimum elements of an array of size N.

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कोर्सकोड : Course Code: **MCA-03**	कोर्स शीर्षकः– (Course Title) **Computer Organization and Assembly Language Programming**	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.

1. What do you mean by Flip-Flop? Discuss the functions and circuits diagram of different type of flip flop?
2. What is Interrupt? Explain the types of Interrupts.
3. Draw the connections between memory module and processor and explain how data transfer takes place between them.

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.

1. What is DMA? Explain DMA transfer modes in detail.
2. Differentiate between RISC and CISC.
3. Explain the key differences between Compiler and Interpreter.
4. Write a assembly language program to compare values of the three variables and print them in descending order as: Largest = %d, Medium = %d, Smallest = %d.

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कोर्स कोड : Course Code: **MCA-05**	कोर्स शीर्षकः– (Course Title) **Object oriented programming C++**	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.**

1. Highlight the difference between pure virtual functions and virtual function.
2. Write a program using a try block to detect and throw an exception if the condition "divide by zero" occurs.
3. Explain why Object Oriented Programming approach is better than Structured Programming Approach.

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.**

1. What is reusability? Which things can be reused?
2. What is friend function? How it is implemented in C++ ?
3. What is template? Explain with suitable example.
4. What are different types of inheritance?

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कोर्स कोड : Course Code: **MCA-06**	कोर्स शीर्षकः– (Course Title) **DBMS**	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.**

1. What is three-tier client/server architectures? Also differentiate between logical data independence independence. And physical data.

2. What is entity and attribute? Give some examples of entities and attributes in a manufacturing environment. Why are relationships between entities important?

3. What do you mean by data redundancy? What is the difference between controlled and uncontrolled redundancy? What is data independence?

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.**

1. Who is a DBA? What are the responsibilities of a DBA?
2. What is a transaction? Which are the properties of a transaction and explain each.
3. What is a database trigger? Which are the different kinds of triggers?
4. 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:

   Find the names of all people who were born in the same city as their father.

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कोर्स कोड : Course Code: **MCA-07A**	कोर्स शीर्षकः— (Course Title) **Computer Fundamental**	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.

1. Explain the working of a laser printer.
2. Explain any three types of ROM.
3. Explain Virtual memory.

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.

1. Discuss some popular character codes used for representing characters in computer.
2. How are floating point numbers represented in computer? Explain.
3. List the characteristics of computer.
4. Discuss the units of memory.

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कोर्स कोड : Course Code: **MCA-09**	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.

1. What are project metrics? Explain different types of project metrics with an example for each.
2. What is prototyping? Explain the problems and advantages of prototyping in detail.
3. Explain various testing techniques.

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.

1. Explain the features of SCM.
2. What are the steps involved in software project estimation?
3. Discuss the Waterfall Model.
4. What is Cohesion? What are the different types of Cohesion?

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कोर्स कोड : Course Code: **MCA-10**	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.**

1. What is the difference between a frame and a packet? Why framing is required? What is the significance of padding used in some of frame format? Explain.
2. Write the short note on following:
       i) Multiplening ii) TCP Congestion Control Techniques.
3. What is switching? Explain the circuit switching with delay 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.**

1. Why do we need modulation?
2. What is Hamming distance and write about minimum Hamming distance?
3. What is flow and error control?
4. What is topology? Explain basic topology with advantage and disadvantage.

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कोर्स कोड : Course Code: **MCA-11**	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.

1. How Access Control Mechanism is implemented in Java?.What Method does subclass inherit from superclass.
2. Write down a java program to display number in word format, for Example: 123 will be shown as "One Two Three".
3. What is an applet?. List the methods you must extend to design an applet. What is the purpose of <PARAM …..>tag in Applet?

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.

1. What is a global variable?
2. What is encapsulation?
3. What is multithreaded programming ? Explain how threads are created in Java.
4. What is JDBC?

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कोर्स कोड : Course Code: **MCA-13**	कोर्स शीर्षकः– (Course Title) **Theory of Computation**	अधिकतम अंक : 30 **Maximum Marks : 30**

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

1. (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?

2. Obtain the following grammar in CNF
   S -> aBa|abba
   A -> ab | AA
   B -> aB| a

3. Construct a Mealy machine which is equivalent to the Moore machine given in table:

Present State	Next State		Output
	a=0	a=1	
q0	q3	q1	0
q1	q1	q2	1
q2	q2	q3	0
q3	q3	q0	0

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

1. What is meant by halting problem and post correspondence problem?
2. Mention any two undecidability properties for recursively enumerable languages.
3. Explain how TM can be simulated by a production system?
4. What do you meant by parse Tree?

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कोर्सकोड : Course Code: **MCA-14**	कोर्स शीर्षक:– (Course Title) **RDBMS**	अधिकतमअंक : 30 **Maximum Marks : 30**

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

खण्ड अ   अधिकतमअंक : 18

Section-A   Maximum Marks: 18

1. Consider the FLIGHT Table
   Flight-No Text
   Destination Text
   Fare Numeric
   Departure-Time Date~Time

   With reference to the FLIGHT table:
   a) Write down the steps for changing the field contents for the field 'Destination' from "DEL" to "DELHI" and from "CAL" to "CALCUTTA" for all the records.
   b) Create a Filter which will display only those records where Destination is equal to "DELHI" and Fare is greater than 10,000. (Just the steps).

2. a) Write a query in sql to create a table client master with the following fieldsclient_no, name, address, city, state, pin_code, balance due.

   b) add the following constraints on column of client master?
   • Create a primary key constraint on the column client_no.?
   • create the following check constraints
     Data values being inserted into the column client_no must start with 'c'.
     Data values being inserted into the column name balance due should be greater than 0?
   c) Add a new column in your table:AGE?

   d) Delete a row from client master where age is greater then 60?

3. What are the multivalue attribute? How do the RDBMS handle the multivalueattribute.

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.

1. How many Views does a Form Window have? What is the difference between these views?
2. 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?
3. What are Forms used for? Write down the steps for changing the font of Label and Text Box.
4. What is normalization and why do we use it?

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कोर्सकोड : Course Code: **MCA-15**	कोर्स शीर्षकः— (Course Title) **Operating System Concepts**	अधिकतमअंक : 30 **Maximum Marks : 30**

खण्ड अ
Section-A

अधिकतमअंक : 18
Maximum Marks: 18

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

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

2. Distinguish between preemptive and non-preemptive scheduling. Explain each type with an example.

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
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.

1. Explain the scenario when the page fault occurs?
2. What is the purpose of swap space?
3. List out the important services of an operating system.
4. What is purpose of Process Control Block?

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कोर्स कोड : Course Code: **MCA-17**	कोर्स शीर्षकः— (Course Title) **Unix Shell 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.

1. Explain the term *globbing* with examples.
2. What do you mean by *escape characters*? Explain their usage through echo command.
3. What is the use of the *bc* command? Explain a few functions that are associated with it.

अधिकतम अंक : 12
Maximum Mark : 12

खण्ड ब
Section –B

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

1. What are signals and their types?
2. Which system call is used in opening a file? List all its flags and modes.
3. What is the difference between fork() and vfork() system calls?
4. Explain the difference between calloc() and malloc().

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कोर्स कोड : Course Code: **MCA-18**	कोर्स शीर्षकः– (Course Title) **Numerical and Statistical 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.

1. Using Newton – Raphson method find an iterative scheme to compute the cube root of a positive number.
2. What do you mean by Binomial Distribution? Explain with suitable example.
3. Define lines of Regression. Derive the formula for angle between two lines of regression.

अधिकतम अंक : 12

खण्ड ब **Maximum Mark : 12**

Section –B

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

1. Given $\frac{dy}{dx} = \frac{y-x}{y+x}$ with y = 1 for x = 0. Find y approximately for x = 0.1 by Euler's method.
2. Define the followings :
   a. Coefficients of Kurtosis.
   b. Moments about mean.
   c. Coefficients of Skewness.
   d. Skewness of a distribution.
3. Which of the iterative methods for solving linear system of equations converge faster? Why?
4. A card is drawn from a well shuffled pack of playing cards. Find the probability that it is either a diamond or a king.

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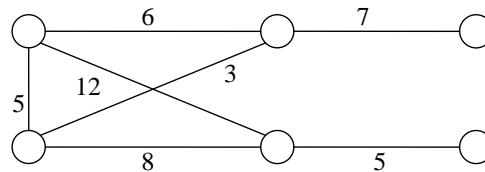| कोर्स कोड : Course Code: **MCA-19**	कोर्स शीर्षकः– (Course Title) **Design and Analysis Of Algorithms**	अधिकतम अंक : 30 **Maximum Marks : 30**

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.

1. Solve the recurrence relation by iteration
   $$T(n) = T(n-1) + n^4$$

2. 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 $64\ n\ \lg n$ steps. For which values of n does insertion sort beat merge sort?

3. Find the minimum spanning tree using Prim's algorithm for the following graph.

अधिकतम अंक : 12

खण्ड ब   **Maximum Mark : 12**

Section –B

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

1. Give single source shortest path algorithm. Give the time complexity.
2. Give the non-deterministic algorithm for sorting elements in non-decreasing order.
3. Define Generic Random Access Machine. What assumptions does it have?
4. Explain principle of Optimality.

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Course Code: Course Code: **MCA-22**	*Course Title:* *Probability and Distribution*	*Maximum Marks : 30*

Section- A
Long Answer Questions

Note: Attempt all questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1.   State and prove central limit theorem.

2.   Write down the axiomatic definition of probability. Let A, B and C be three events.

3.   Define characteristic function of random variable. State some of its important properties.

Section - B

Short Answer Questions

Maximum Marks: 12

Note: Write any four questions. Answer should be given in 200 to 300 Words.

1.   State and prove Jensen inequality.

2.   Discuss about the random variable and its type.

3.   Let $\{X_n\}$ be a strictly decreasing sequence of random variables which assume positive values only and suppose that $X_n \xrightarrow{a.s.} 0$

4.   State and prove Jenson's inequality.

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कोर्स कोड :	कोर्स शीर्षकः— (Course Title)	अधिकतम अंक : 30
Course Code: **MCA-23**	**Web Technology**	**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. 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 : Course Code: **MCA-24**	कोर्स शीर्षकः— (Course Title) **Introduction to 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 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 are necessary conditions to hold a deadlock in a system? Explain the resource allocation Graph algorithm to deal with deadlock problem. What are the limitations of this approach?
2. Define the following terms :
   a. Dispatchers   b. Scheduling   c. Swapping   d. Context switching
3. How is a process different from a program? What information is contained within a Process Control Block (PCB)?

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. Discuss the paging system for memory management; also give its advantages and disadvantages.
5. What do you understand by page replacement? Name the algorithm available for page replacement.
6. What do you mean by Multitasking operating system?
7. What is a scheduler? Explain any two types of schedulers.

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कोर्स कोड : Course Code: **MCA-E1**	कोर्स शीर्षकः– (Course Title) **Computer Architecture**	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.

1. Explain the interrupt driven mode of data transfer and the DMA driven data transfer, elaborating on how they are accomplished and their relative merits and demerits.
2. Explain the importance of different addressing modes in computer architecture with suitable example. What are the different addressing modes?
3. I) What do you mean by instruction cycle and interrupt cycle?
   II) Distinguish between hardwired and micro-programmed control unit.

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.

1. How many memory chips are needed to construct 2 M x 16 memory system using 512 K x 8 static memory chips?
2. Explain How interrupt requests from multiple devices can be handled?
3. Explain the difference between Horizontal and Vertical Microinstructions
4. An address space is specified by 24 bits and the corresponding memory space by 16 bits:
   How many words are in the
        (a) virtual memory   (b) main memory

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कोर्स कोड : Course Code: **MCA-E2**	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. Answer should be in 800 to 1000 words.**

1. Explain I/O addressing scheme used in 8086 with neat block diagram.
2. With block diagram describe the working of a DMA controller.
3. Explain the layout and operation of the PCI bus.

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.**

1. What are the advantages of segmentation?
2. List the feature of 8086 Microprocessor?
3. What are the advantages of segmented memory scheme?
4. What is the use of ALE?

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कोर्स कोड : Course Code: **MCA-E3**	कोर्स शीर्षकः– (Course Title) *Data Warehouse and Mining*	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.**

1. Explain basic data mining tasks with an example.
2. Give details on data mining versus knowledge discovery in databases.
3. Discuss data mining issues and data mining metrics.

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.**

1. What is Classification?
2. What do you mean by data cleaning?
3. Explain various data reduction techniques.
4. Briefly discuss the forms of Data preprocessing with neat diagram.

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कोर्सकोड : Course Code: **MCA-E4**	कोर्स शीर्षकः— (Course Title) **System Analysis and Design**	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.

1. Explain prototype model of software development. Is prototype model a suitable
2. Model for courier company management system? Justify your answer.
3. What is function point analysis? List four features of it.

अधिकतम अंक : 12

खण्ड ब **Maximum Mark : 12**

Section –B

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

1. Differentiate between decision table and decision tree.
2. What are the attributes of good analyst?
3. Explain the system development life cycle.
4. Distinguish between hierarchical structure and network structure.

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कोर्स कोड : Course Code: **MCA-E5**	कोर्स शीर्षकः— (Course Title) ***Mobile 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.

1. Explain the concept of IP packet delivery in a mobile system.
2. What is Mobile TCP? What are the disadvantages of conventional TCP to incorporate in wireless environment?
3. What is Mobile TCP? Explain selective retransmission.

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.

1. Define HLR and VLR.
2. Explain about the handover concept.
3. What are the benefits of location information for routing in ad-hoc network.
4. What is snooping TCP?

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कोर्स कोड : Course Code: **MCA E6**	कोर्स शीर्षक:— (Course Title) **Parallel 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.

1. Explain the Flynn's Taxonomy in detail.
2. Explain the major issues of concern in the effective utilization of a parallel computer architecture.
3. 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 2,000operations being done sequentially. Calculate the speedup achieved.

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.

1. What is synchronization latency problem in multithread process?
2. What is permutation Network?
3. List the classification of vector instruction.
4. Explain cube-connected cycles and de Bruijn networks.

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कोर्स कोड : Course Code: **MCA-E7**	कोर्स शीर्षकः— (Course Title) **Artificial Intelligence**	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.

1. Explain water jug problem using state space tree.
2. Explain unification algorithm used for reasoning under predicate logic with an example.
3. Describe in detail the steps involved in the knowledge Engineering 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.

1. In order to explain the use cut, we write a program to find the factorial (N) using cut as follows
   a. fact (N, 1) : n < = 1, !
   b. fact (N, F) : - M is N - 1, !
      i. fact (M, F1),
      ii. F is F1 * N.
2. Draw cons-cell structure for list ((A B) (C D)).
3. What do you mean by local maxima with respect to search technique?
4. List down the characteristics of intelligent agent. Explain the concept of learning from example.

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कोर्स कोड : Course Code: **MCA-E8**	कोर्स शीर्षकः— (Course Title) **Embedded 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.**

1. Explain the interrupt handling mechanism.
2. What are the advantages and dis-advantages of programming embedded system in C and assembly language programming?
3. Write about memory devices in detail.

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.**

1. What are the differences between a local and a global variable? Differentiate between task and process.
2. List any three embedded systems. What are the benefits of platform-based design?
3. Explain the following:
   Polling b. Masking   c. Cache hit   d. Cache miss
4. What are the addressing modes of 8051?

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कोर्सकोड : Course Code: **MCA-E9**	कोर्स शीर्षकः— (Course Title) **Computer Graphics**	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.

1. What do you understand by multimedia? What are the commercial tools available for developing multimedia?
2. Explain the benefits and problems in multimedia with multimedia system components?
3. Discuss in detail on multimedia platforms and illustrate cross platform compatibility and 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.

1. Write short note on: (a) MPEG   (b)   MP3
2. What do you understand by the term Multimedia and Hypermedia.
3. Explain any two multimedia features which can be used in business.
4. Define following terms:
   a) Refresh buffer/frame buffer.
   b) Pixel?
   c) Aspect ratio.

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कोर्स कोड : Course Code: **MCA-E10**	कोर्स शीर्षकः— (Course Title) **Operational Research**	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.

1. Explain the following:
   a. Weak duality property   b. Strong Duality property
2. Write any 3 key relations between primal and dual problems.
3. Use duality to solve the L.P.P.:
   Minimize $Z = 2x_1 + 2x_2$ subject to
   $2x1 + 4x2 \geq 1$, $- x1 - 2x2 \leq -1$, $2x1 + x2 \geq 1$ and x1, x2 ≥ 0

खण्ड ब अधिकतम अंक : **12**

Section –B **Maximum Mark : 12**

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

1. Compare between Assignment problem and Transportation problem.
2. Briefly explain Meta-heuristics.
3. Write short notes on decision trees.
4. Define the following with respect to games:
   Pay-off   b. Zero-sum game

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कोर्स कोड : Course Code: **MCA-E11**	कोर्स शीर्षकः— (Course Title) **Object Oriented Analysis and Design**	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.**

1. Describe in detail the major and minor elements of object model. Give suitable examples.
2. What are the approaches used for identification of classes and attributes? Explain.
3. What is the relationship between cohesion and coupling? Identify the type of coupling in the following. How can it overcome?

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.**

1. Describe the activities involved in an ATM transaction.
2. What do you mean by the State Diagram and the Event Trace Scenario? Draw the Event Trace Scenario for a Phone Call and the State Diagram for Phone Line.
3. Explain what is cohesion and coupling? What is the relationship between them?
4. How does object relational database differ from object databases?

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कोर्स कोड : Course Code: **MCA-E12**	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.

1. What is a VPN? Explain the two modes of a VPN.
2. Explain the firewall rules.
3. Explain the format of ESP packet in IP security.

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.

1. Briefly explain the different MIME content type.
2. 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).
3. Discuss in detail block cipher mode of operation.
4. Explain the Kerberos ticket granting approach.