उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,इलाहाबाद

कार्यक्रम अधिन्यास **2018-19**

Master of Computer Application

कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **MCA-01**	**Discrete Mathematics**	**Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks : 18**

1. Answer the following:
   a. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?
   b. In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there?

2. 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.

3. Explain the following terms with suitable examples –
   a. Conjuction
   b. Disjunction
   c. Contrapositive

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

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

5. In any boolean algebra show that
   (a + b) (b + c) (c + a) = ab + bc + ca.

6. Define with examples of NAND and NOR gates.
7. Briefly explain the Pigeonhole principle.

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Master of Computer Application

कोर्सकोड : Course Code: **MCA-02**	कोर्स शीर्षकः– (Course Title) **Programming through 'C'and Data Structures**	अधिकतमअंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ **अधिकतमअंक : 18**

Section-A **Maximum Marks : 18**

1. What is a stack? What operations are associated with a stack?
2. (a) Discuss about arithmetic operators and relational operators.

   (b) Differentiate between break and continue statements in C language with example.
3. Define AVL tree. Is the statement "Every Binary Tree is an AVL tree" correct? Justify your answer.

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

4. Write any five advantages of Pointers over Arrays.
5. Define "Binary Tree". How does a Binary Tree differ from a Tree?
6. Define "Graph". When can it be said that two vertices of a Graph are connected?
7. Write an algorithm for the addition of two matrices.

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कोर्सकोड : Course Code: **MCA-03**	कोर्स शीर्षकः– (Course Title) **Computer Organization And Assembly Language Programming**	अधिकतमअंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Discuss and Differentiate Hardware and Micro-programmed control unit with their advantages and disadvantages.
2. 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. Design a Synchronous Modulus-Six Counter Using SR Flip-Flop The modulus-six counter will count 0, 2, 3, 6, 5, and 1.

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

4. Distinguish between horizontal and vertical microprogram control unit.
5. What is instruction cycle? When will be any interrupt processed during the instruction cycle?
6. Briefly describe what are special purpose registers and general purpose registers in CPU.
7. Write an assembly language program to find factorial of 10 using loop.

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कोर्स कोड : Course Code: **MCA-E1**	कोर्स शीर्षकः– (Course Title) **Computer Architecture**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. What are the similarities and distinctions between multiprocessor and multicomputer system? Explain the classification of multiprocessor system.
2. Explain the Pipeline scheduling in detail.
3. Discuss the utility of RISC and CISC Architecture by comparing their various features.

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

4. Describe the role of system software to improve the performance of a computer.
5. What are the special registers in a typical computer? Explain their purposes in detail.
6. Discuss hit-rate and miss penalty
7. i) Distinguish between auto increment and auto decrement addressing mode
   ii) Under what situations the micro program counter is not incremented after a new instruction is fetched from micro program memory?

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Master of Computer Application

कोर्स कोड : Course Code: **MCA-E2**	कोर्स शीर्षकः– (Course Title) **Microprocessor and its Applications**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks : 18**

1. List the components of a computer and explain each in brief. What is the difference between a microprocessor and a CPU?
2. Discuss the features of 8085 interrupts. Also explain the SIM and RIM formats.
3. Explain the architecture of 8086 in detail with neat block diagram.

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

4. What do you understand by DMA?
5. What is the function of SI and DI Registers?
6. What do you mean by Conditional Flag?
7. What do you understand by Addressing mode?

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कार्यक्रम अधिन्यास सत्र 2018–19

Master of Computer Application (MCA)

कोर्स कोड : Course Code: **MCA-05**	कोर्स शीर्षकः– (Course Title) **Object oriented programming C++**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ अधिकतम अंक : 18

Section-A **Maximum Marks : 18**

1. What is operator overloading? Illustrate Operator overloading concept to concatenate strings.
2. Explain why do we need to use constructors? Explain copy constructor with an example.
3. What are the different forms of inheritance supported by C++? Explain with examples.

खण्ड ब अधिकतम अंक : 12

Section –B **Maximum Mark : 12**

4. What do you mean by “this” function? What are the applications of “this” pointer?
5. What are pure virtual functions?
6. What do you mean by container classes?
7. What is a Use case? Also explain with example.

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कोर्स कोड : Course Code: **MCA-06**	कोर्स शीर्षकः– (Course Title) **Database Management System**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ **अधिकतम अंक : 18**

Section-A **Maximum Marks: 18**

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. How distributed database different from client server database? Discuss them with their advantages and disadvantages.
3. Explain different type of locking protocols for concurrency control.

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

4. How does a deadlock occur in a computer system? How can you prevent deadlock happening in DBMS?
5. 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?
6. What is index file? What are the differences between B+ tree and B tree index file?
7. What is data? What do you mean by information? What are the differences between data and information?

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Master of Computer Application

कोर्स कोड : Course Code: **MCA-07A**	कोर्स शीर्षकः– (Course Title) **Computer Fundamental and its Organization**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Explain different types of Memories.
2. With the help of a diagram explain the components of a computer system.
3. Explain the difference between flow chart and pseudo-code with the help of an example.

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

4. What is a light pen? Briefly explain its working.
5. Differentiate between seek time and latency.
6. What is Data Transfer rate? Explain.
7. Explain signed 1’s complement representation of integers with the help of an example.

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कोर्स कोड : Course Code: **MCA-E3**	कोर्स शीर्षकः– (Course Title) **Data Warehouse and Mining**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. What is data mining? Define and describe relationship and pattern detected in data mining. What is the scope of data mining?
2. Explain structure of the data warehouse? Discuss in detail all the steps involve in making a data warehouse.
3. Explain OLTP and OLAP and also discuss difference between them?

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

4. What are the requirements of cluster analysis?
5. What type of processing takes place in a data warehouse?
6. What are the various types of metadata? Explain in detail?
7. What do you mean by knowledge discovery process?

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कोर्सकोड : Course Code: **MCA-E4**	कोर्स शीर्षकः– (Course Title) **System Analysis and Design**	अधिकतमअंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ अधिकतमअंक : 18
Section-A **Maximum Marks : 18**

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. Define Software Development life cycle (SDLC). What is spiral model? List the advantage and disadvantage of waterfall model.
3. What is Software Testing? What are the various characteristics of good testable software?

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

4. What are the differences between Black Box Testing" and "White Box Testing"?
5. What do you mean by Software Configuration Management?
6. Discuss the role of PERT Chart in software development.
7. What is coupling and Cohesion? What are the different types of Cohesion?

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कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **MCA-09**	**Software Engineering**	**Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Define the following:
   (i) Software Product
   (ii) Software Engineering
   (iii) Software Testing.
2. (a) Define software risk. Explain in brief the types of software risk.
   (b) Explain the layered approach used in software Engineering.
3. Explain SDIC in detail. Also explain the framework activities involved in the software development process.

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

1. Explain four differences between alpha & beta testing.
2. Explain the task in value at in Requirements Engineering.
3. Define software reliability and software availability.
4. Explain four approaches to handle the software sizing problem.

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Master of Computer Application (MCA)

कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **MCA-10**	**Data Communication and Computer Networks**	**Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. What is data communication? Discuss the different modes of Data communication.
2. What do you mean by addressing? Discuss the different type of addressing.
3. Give the ISO-OSI ref. model for Data Communication and explain the function of each layer in brief. How is it different from TCP/IP model?

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

1. How BGP is different from other distance vector routing protocols?
2. What do you mean by digital signature?
3. What do you mean by Baud rate? How is it different from Bit rate?
4. What is Analog data transmission?

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Master of Computer Application

कोर्स कोड : Course Code: **MCA-11**	कोर्स शीर्षकः– (Course Title) **Java Programming**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. What is inheritance? Explain any two benefits of inheritance with an example of each.
2. What is a constructor? Write a Java program to explain how super class constructors are called in their subclasses.
3. What is multithreading? Explain with the help of an example how inter thread communication takes place in Java.

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

1. Write down C++ features that are not supported by Java.
2. What is multithreading? Explain with example for removing the synchronicity behavior of a thread.
3. What is the difference between Overloading and Overriding? Is it possible to override an inner classes.
4. (a) What is Servelet ? What are the different methods for running the Servelets?
   (b) Why servlet is preferred over CGI script. Write the life cycle of a servlet.

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कोर्स कोड : Course Code: **MCA-E5**	कोर्स शीर्षकः– (Course Title) **Mobile Computing**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Explain the various generations of wireless networks.
2. What is mobile computing? Draw the architecture of mobile computing. Also explain various applications of mobile computing.
3. Explain IPv4. What are the advantages of IPv6 over IPv4.

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

4. Explain about the IP mobility support concept.
5. List the differences between IPv4 and IPv6.
6. Explain about the selective retransmission.
7. Define GSM Architecture.

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कोर्स कोड : Course Code: **MCA E6**	कोर्स शीर्षकः– (Course Title) **Parallel Computing**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Define Array processing. Why an array processor called as SIMD array computers?
2. State and Explain Gustafson‟s Law for measuring speedup performance of paralleled system. Explain with the help of an example.
3. Define cluster computing. Explain the memory organization in cluster computing.

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

4. What do you mean by Fat Tree?
5. What is systolic array?
6. What is parallel virtual machine (PVM)?
7. What do you mean by Data parallel programming?

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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):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Construct the deterministic finite automata for accepting the set of all strings with three consecutive 0's.
2. Distinguish NFA and DFA with examples.
3. Let G be the grammar
   S -> aB|bA
   A -> a|aS|bAA
   B-> b|bS|aBB
   For the string baaabbabba. Find leftmost derivation, rightmost derivation and parse tree.

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

4. Give regular set for the following expression: 1(01)*(10)*1
5. For the grammar G defined by S->AB, D->a,A->Aa,A->bB,B->Sb, give derivation tree for the sentential form babab.
6. Give an example of a language accepted by a PDA but not by DPDA.
7. Mention the difference between decidable and undecidable problems with examples of each.

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

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

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. How do you create a table and query in Microsoft Access? Write down the steps involved.
3. Explain the differences between the strong entity and weak entity set with suitable example.

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

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. What are query wizard used for in MS Access? What is the difference between all of the Queries provided by MS-Access?

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

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ **अधिकतमअंक : 18**
Section-A **Maximum Marks: 18**

1. Why is there need for process synchronization? Explain how semaphores can be used to deal with n-process critical section problem.
2. What is the need for disk scheduling? Explain the differences between the C-LOOK and C-SCAN disk scheduling algorithms.
3. Define thread. Differentiate user threads and kernel threads.

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

4. Mention the circumstances when a user would be better off using a time-sharing system rather than a PC or a single user workstation?
5. How does thrashing occur? Explain with an example.
6. What is a TLB? How does it improve effective access time of data?
7. How does deadlock happen in a system?

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कोर्स कोड : Course Code: **MCA-E7**	कोर्स शीर्षकः– (Course Title) **Artificial Intelligence**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Write a function division which divides a number X by Y such that if Y = O then the function returns the symbol “infinity” else it returns the quotient X/Y.
2. Write a LISP program expo to compute i raised to power j where i and j are natural numbers.
3. What is the structure of Agents? Also explain Goal Based Agents and utility Based Agents.

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

4. Explain the difference between forward chaining system & backward chaining system?
5. Explain MYCIN and COMPASS.
6. Write down application areas of expert systems. List down the characteristics of intelligent agent.
7. The variable X is bound to 5 and the variable Y is bound to 7. Further the value (5 + 5) * (7 + 7) is evaluated to 140.

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कोर्स कोड : Course Code: **MCA-E8**	कोर्स शीर्षकः– (Course Title) **Embedded System**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Explain the design challenges in Embedded Systems.
2. What are the branching operations supported by 8051 microcontroller? Explain with example.
3. Explain the process of address translation.

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

4. What are Embedded systems? Give the classifications of Embedded systems.
5. Explain various interfaces for external communication.
6. What is sequential circuit? Explain some sequential circuits.
7. What is buys-wait I/O? Differentiate between static and dynamic RAM.

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कोर्स कोड : Course Code: **MCA-17**	कोर्स शीर्षकः– (Course Title) **Unix Shell Programming**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Explain the time-sharing and client-server environment of the Unix operating system.
2. Explain the role of default files and directories in the Unix Operating system.
3. Explain the procedure of mounting and un-mounting a file in a Unix operating system. What is the significance of this process?

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

4. Write the command to get the list of the processes of all users who are logged in to the system.
5. Write the command to suspend a foreground job.
6. Compare threads with processes.
7. Explain how the priority of a job can be changed?

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कोर्स कोड : Course Code: **MCA-18**	कोर्स शीर्षकः– (Course Title) **Numerical and Statistical Computing**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Using the Gauss elimination method solve the following linear system of equations:
   X + y + z = 3
   4x + 3y + 4z = 8
   9x + 3y + 4z = 7
2. Explain Regula Falsi method with suitable examples.
3. Find a real root of the equation x Sin x + Cos x = 0 between (2,3) by Bisection method.

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

4. Explain floating point representations with suitable examples.
5. Evaluate the integral $\int_0^2 \frac{1}{1+x} dx$ by using Simpson's 3/8 rule with h = 1/3.
6. Show that the mean and Variance of the Poisson distribution are each equal to the parameter λ.
7. Explain Runge-Kutta method for fourth order.

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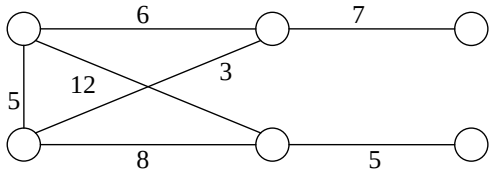
कोर्स कोड : Course Code: **MCA-19**	कोर्स शीर्षकः– (Course Title) **Design and Analysis Of Algorithms**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Show the results of inserting the keys: F, S, Q, K, C, L, H, T, V, W, M, R and N in order to an empty B-Tree with minimum degree 2.
2. Prove that if the weights on the edge of the connected undirected graph are distinct then there is a unique minimum spanning tree. Give an example in this regard. Also discuss Kruskal's algorithm for finding minimum spanning tree in detail.
3. Find the minimum spanning tree using Prim's algorithm for the following graph.



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

4. Solve the following recurrence. :
   $T(I) = 1$
   $T(n) = 4T(n/3) + n^2$ for $x <= 2$
5. Show the trace of heapsort algorithm for following input data :
   30, 50, -100, 200, 50, 30, 60, 80, 200 in order.
6. Write an algorithm for inserting a node into Fibonacci Heap.
7. Give an algorithm for Strassens's multiplication. Explain how a divide and conquer strategy is applicable to it? Also analyze your algorithm.

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कोर्सकोड : Course Code: **MCA-E9**	कोर्स शीर्षकः– (Course Title) **Computer Graphics**	अधिकतमअंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

खण्ड अ **अधिकतमअंक : 18**

Section-A **Maximum Marks: 18**

1. List the hardware and software components essential for professional multimedia development. Also, justify the need of each of the hardware components.
2. What is the method of storing image in vector format? Explain its advantages.
3. Explain the important features of Flash Software.

खण्ड ब **अधिकतम अंक : 12**

Section –B **Maximum Mark : 12**

4. Explain the various digital movie tools.
5. What is meant by Image Compression?
6. How is animation useful in multimedia?
7. How much time is spent scanning across each row of pixels during screen refresh on a raster system with a resolution of 1280 x 1024 and a refresh rate of 60 frames/ second?

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कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **MCA-E10**	**Operational Research**	**Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. Solve graphically:
   Maximize $Z = 2x_1 + 3x_2$
   Subject to constraints:
   $x1 + x2 \leq 30$
   $x2 \geq 3$
   $0 \leq x2 \leq 12$
   $x1-x2 \geq 0$
   $0 \leq x1 \leq 20$

2. Describe Monte Carlo method of simulation.
3. Write Short notes on:
   a. Genetic Algorithm b. Simulated Annealing Problem

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

4. What are the advantages and disadvantages of simulation?
5. Write down the steps of the graphical method to obtain an optimal solution to a linear programming problem.
6. Briefly describe the steps for solving a transportation problem.
7. Explain the steps involved in critical path method.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,इलाहाबाद

कार्यक्रम अधिन्यास सत्र **2018-19**

Master of Computer Application

कोर्स कोड :	कोर्स शीर्षकः– (Course Title)	अधिकतम अंक : 30
Course Code: **MCA-E11**	**Object Oriented Analysis and Design**	**Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. What is object design? Explain the steps of object design with suitable example.
2. What is multiplie inheritance? Discuss its role in object oriented analysis and design.
3. What is design optimization? Explain with suitable example.

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

4. Name the UML diagrams used for the following:
   a. Modelling behaviour of an object.
   b. Interaction between groups of objects.
5. How does object relational database differ from object databases? Explain.
6. Explain the design axioms applied to object-oriented design.
7. Give the sequence diagram for making a telephone call.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,इलाहाबाद

कार्यक्रम अधिन्यास सत्र **2018–19**

Master of Computer Application

कोर्स कोड : Course Code: **MCA-E12**	कोर्स शीर्षकः– (Course Title) **Information and Network Security**	अधिकतम अंक : 30 **Maximum Marks : 30**

नोट– (Instructions):

1. **Answer all Questions. सभी प्रश्नों के उत्तर दें|**
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है**
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है|**

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

1. What are the fundamental differences between symmetric and asymmetric cryptography.
2. Define the following terms in cryptography:
   a. Algorithm
   b. Key
   c. Plain Text
   d. Work Factor
   e. Key Space
   f. Steganography
3. Write and define different levels of controls in security Architecture.

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

4. Discuss any four types of attacks on a cryptosystem.
5. Explain Host based intrusion detection system.
6. Explain substitution cipher technique.
7. Mention the applications of IPSec.