उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

अधिन्यास (Assignment) **2016-2017**

कम्प्यूटर में परास्नातक कार्यक्रम (एम0सी0ए0)

Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.01**

Course Title: Discrete Mathematics — Course Code: MCA-01

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Determine whether the relation R on the set of all Web pages is reflexive, symmetric, antisymmetric, and/or transitive, where (a, b) ∈ R if and only if
   a) everyone who has visited Web page a has also visited Web page b.
   b) there are no common links found on both Web page a and Web page b.
   c) there is at least one common link on Web page a and Web page b.
   d) there is a Web page that includes links to both Web page a and Web page b.
2. Let P (x) be the statement "x can speak Russian" and let Q(x) be the statement "x knows the computer language C++." Express each of these sentences in terms of P (x), Q(x), quantifiers, and logical connectives. The domain for quantifiers consists of all students at your school.
   a) There is a student at your school who can speak Russian and who knows C++.
   b) There is a student at your school who can speak Russian but who doesn't know C++.
   c) Every student at your school either can speak Russian or knows C++.
   d) No student at your school can speak Russian or knows C++.
3. How many positive integers between 100 and 999 inclusive
   a) are divisible by 7?
   b) are odd?
   c) have the same three decimal digits?
   d) are not divisible by 4?
   e) are divisible by 3 or 4?
   f) are not divisible by either 3 or 4?
   g) are divisible by 3 but not by 4?
   h) are divisible by 3 and 4?

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Find the number of ways in which 5 boys and 5 girls can be seated in a row if the boys and girls are to have alternate seats.
5. What is the smallest number of people in a group, so that it is guaranteed that three of them will have their birthday in the same month?
6. Express the statements "Some student in this class has visited Mexico" and "Every student in this class has visited either Canada or Mexico" using predicates and quantifiers.
7. Is the following argument valid? If you do every problem in this book, then you will learn discrete mathematics. You learned discrete mathematics.
8. (i) Give a direct proof of the theorem "If n is an odd integer, then n^2 is odd."
   (ii) Prove that if n is an integer and 3n + 2 is odd, then n is odd.
9. How many license plates can be made using either two or three uppercase English letters followed by either two or three digits?

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विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.02**

Course Title : Programming through C and Data structure — Course Code MCA-02

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Write short notes on the following:
   (a) Minimum Spanning Tree
   (b) Indexed File Organization
2. Write a C program to read the contents of a file and store it in another file.
3. Write a C Program to implement Bubble Sort.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Calculate the sum of first hundred natural numbers using recursion.
5. List the difference between a structure and a union.
6. Explain Breadth First Search algorithm for graph traversal.
7. Discuss the implementation of lists using pointers.

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विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.03**

Course Code : COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING — Course Code MCA-03

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
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 of a Synchronous Modulus-Six Counter Using SR Flip-Flop The modulus six counter will count 0, 2, 3, 6, 5, and 1.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Differentiate RISC Vs CISC.
5 . Distinguish between horizontal and vertical microprogram control unit.
6 What is instruction cycle? When will be any interrupt processed during the instruction cycle?
7. Explain the differences among microoperation and microprogram? Write down the micro operations involves in fetch cycle.
8. Briefly describe what are Special purpose registers and General purpose registers in CPU.
9. Write an assembly language program to find factorial of 10 using loop.

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.E1**

Course Title: Computer Architecture — Course Code: MCA-E1

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

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 microprogrammed control unit.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. What is cache coherency and how is it eliminated?
5. What are different pipelining hazards and how are they eliminated?
6. Suppose a cache is 10 times faster than main memory & suppose the cache can be used 70% of the time. How much speedup do we gain by using cache?
7. Identify the dependences in the following code snippet:
   ADD R1, R2, R3
   DIV R4, R1, R5
   ADD R5, R7, R4
   AND R5, R4, R2
8. A no pipeline system takes 50 ns to process a task. The same task can be processed in 6 segment pipeline with a clock cycle of 10 ns. Determine the speedup ratio of pipeline for 100 tasks.
9. Assume that for a certain processor, a read request takes 50 nanoseconds on a cache miss and 5 nanoseconds on a cache hit. Suppose while running a program, it was observed that 80% of the processor's read requests result in a cache hit. Find the average read access time in nanoseconds.

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Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.E2**

Course Title: Microprocessor and Its Application — Course Code : MCA-E2

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Explain the architecture of 8086 in detail with neat block diagram.
2. Explain I/O addressing scheme used in 8086 with neat block diagram.
3. With block diagram describe the working of a DMA controller

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. What are the advantages of segmented memory scheme?
5. What is the use of ALE?
6. List the operating mode of 8259.
7. What are the flags in machine status word?
8. Explain the layout and operation of the PCI bus.
9. What is serial data transfer?

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.05(N)**

Course Title: Object oriented programming C++ — Course Code MCA-05(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. List the features of Object oriented programming.
2. Highlight the difference between pure virtual functions and virtual function.
3. Write a program using a try block to detect and throw an exception if the condition "divide by zero" occurs.

Section—B

Maximum Marks : 12
अधिकतम अंक : 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. Answer all questions. All questions are compulsory.

4. What is dynamic memory allocation?
5. What are the applications of "this" pointer?
6. 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.
7. What is Inheritance? Explain the different forms of inheritance with the help of example.

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Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : एम.सी.ए.

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — कोर्स कोड : एम.सी.ए.06(N)

Course Title : Database Management System — Course Code MCA-06(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

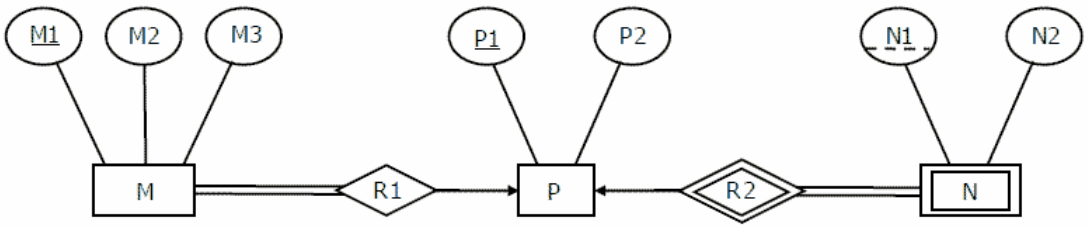
1. The musical company wants to store information about the musicians who perform on its albums. Each musician has a musician id, a name, an address and a phone number. Some musicians may have the same address and some of them may have more than one phone number. Each musician may play several instruments and an instrument and may be played by several musicians. Each instrument has name and a musical key. The album recorded has a title, a copyright date, a format and an album identifier. Each album has a number of songs where a song has a title and an author. Each song may be performed by several musicians and a musician may perform a number of Bongs. One of the musicians of the song acts as a producer. A producer may produce several albums.
   (i) Draw an E-R diagram.
   (ii) Transform the E-R diagram to a Relational Schema.
2. Explain how transactions are possible in distributed database.
3. What is Deadlock? What are different ways of preventing Deadlock.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Consider the following ER diagram.



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

5. Consider the relation R(A,B,C,D,E,G) with functional dependencies given by {AB->C, AC->B, AD-> E, B->D, BC->A, E-> G}. Consider the decomposition of R into {AB, BC, ABDE,EG }.
   a) Is this decomposition lossy or lossless? Explain why?
   b) Is this decomposition is dependency preserving or not? Explain why?
6. The employee information in a companyis stored in the relation.
   Employee:(name,sex,salary,deptName)
   Assume name is primary key and consider the following SQL query: SELECT deptName FROM Employee WHERE sex='M' GROUP BY deptName HAVING AVG(salary)> (SELECT AVG(salary) FROM Employee); What is the output of above SQL query?
7. Consider the following database schedule with two transactions, T1, T2 and T3

S1 = r1(X); r2(z); r3(x); r1(z); r2(Y);r3(y);w1(x)c1;w2(z);w3(y),w2(y); c2;c3; S2= r3(X); r1(x); w3(x); r2(x); w1(Y); r2(y);w2(x);c1;c2;c3;

where ri(K) denotes a read operation by transaction Ti on a variable Z, wi(K) denotes a write operation by Ti on a variable K and ci denotes commit operation by transaction Ti. Are these schedule recoverable? If yes which type of recoverable schedule it is? Explain why?

8. Explain different type of locking protocals for concurrency control. Which concurrency control protocols ensure both conflict serialzability and freedom from deadlock?
9. Consider two Functional dependencies set F and G

   F={A->B, AB->C, D->AC, D->E}

   G={A->BC, D-> AE}

   Answer the following questions with the explanation.

   a) Is F⊂G (G cover F) ?

   b) Is F ⊃D (F cover G)?

   c) Is F ≡G (F cover G and G cover F)?

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए.** E3(N)

Course Title: Data ware house and mining — Course Code: MCA-E3(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. (a) Explain basic data mining tasks with an example.
   (b) Give details on data mining versus knowledge discovery in databases.
2. (a) Discuss data mining issues and data mining metrics.
   (b) Define the terms: **confidence, cleaning, consequent, cross validation**
3. (a) Give an overview of Applications of data mining.
   (b) Discuss issues to consider during data integration.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4 . Explain various data reduction techniques.
5. Briefly discuss the forms of Data preprocessing with neat diagram.
6. Explain about concept hierarchy generation for categorical data.
7. Draw and explain the architecture of typical data mining system.
8. Differentiate OLTP and OLAP.
9. Explain data mining as a step in the process of knowledge discovery.

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए. E4(N)**

Course Title: System Analysis and Design — Course Code: MCA-E4(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Explain the following:
   a) Project b) Project scheduling c) Critical Path
   d) Milestones e) Checkpoints f) Project review.
2. What is strategic planning? Relate strategic planning to management control and operational control.
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.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Differentiate between decision table and decision tree.
5. What are the attributes of good analyst?
6. Explain the system development life cycle.
7. Distinguish between hierarchical structure and network structure.
8. Define Bench Mark?
9. What is brain storming?

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए. 09(N)**

Course Title : Software Engineering — Course Code MCA-09(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
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 a good testable software?

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. What is the difference between the verification and validation process?
5. What are the different testing levels?
6. What is Cohesion ? What are the different type of Cohesion?
7. What is (SQA)? What are the component of Software Quality Assurance (SQA).

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — कोर्स कोड : एम.सी.ए. 10(N)

Course Title: Data Communication and Computer Networks. — Course Code: MCA-10(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Explain OSI model with working of every layer.
2. Explain different notation of IPv4 addressing? Explain classful addressing.
3. What is switching? Explain the circuit switching with delay diagram.

Section – B

खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. What is topology? Explain basic topology with advantage and disadvantage.
5. Explain the Distance Vector Routing algorithm. (6 Marks)
6. What is cryptography? Explain the model for network security.
7. Explain the working of simple parity check code for error detection.

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विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड : एम.सी.ए. 11(N)**

Course Title Java programming - Course Code: MCA-11(N)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

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?

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Write down C++ features that are not supported by Java.
5. What is multithreading? Explain with example for removing the synchronicity behavior of a thread.
6. What is the difference between Overloading and Overriding? Is it possible to override a inner classes.
7. (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.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

अधिन्यास (Assignment) **2016-2017**

कम्प्यूटर में परास्नातक कार्यक्रम (एम0सी0ए0)

Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : एम.सी.ए. MCA-E-5

Course Title: Mobile Computing — Course Code: MCA-E-5

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. (a) Explain various generation of wireless networks.
   (b) What is mobile computing? Draw architecture of mobile computing with various applications of mobile computing.
2. (a) Explain IPv4. What are the advantages of IPv6 over IPv4.
   (b) Explain the concept of IP packet delivery in a mobile system.
3. (a) What is Mobile TCP? What are the disadvantages of conventional TCP to incorporate in wireless environment?
   (b) What is Mobile TCP? Explain selective retransmission

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

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.
8. Define HLR and VLR.
9. Explain about the handover concept.

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Master of Computer Applications (MCA)

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : एम.सी.ए. MCA-E-6

Course Title: Parallel Computing — Course Code: MCA-E-6

MCA-5.4(O)

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

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 2,000 operations being done sequentially. Calculate the speedup achieved.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4 . Define: speedup, Amdahl's law.

5 . Explain cube-connected cycles and de Bruijn networks.

6. Explain the RAM and the PRAM models.

7. Define the transformation used in a shuffle network giving an example using eight processors.

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-13

Course Title : **Theory of Computation** — Course Code: MCA-13

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. (i) Construct the deterministic finite automata for accepting the set of all strings with three consecutive 0's.
   (ii) Distinguish NFA and DFA with examples.
2. 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.
3. (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?

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

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.
8. What is meant by halting problem and post correspondence problem?
9. Mention any two undecidability properties for recursively enumerable languages.

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-14

Course Title : **Relational Database Management System** — Course Code : MCA-14

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
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. Explain the differences between the stronge entity and weak entity set with suitable example. What are the multivalue attribute? How do the RDBMS handle the multivalue attribute.
3. What is referential integrity and why is it important? Explain different referential integrity constraints violations with suaitable examples.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Let E1 and E2 be two entities in an E/R diagram with simple single-valued attributes. R1 and R2 are two relationships between E1 and E2, where R1 is one-to-many and R2 is many-to-many. R1 and R2 do not have any attributes of their own. What is the minimum number of tables required to represent this situation in the relational model? Briefly explain how your answer.
5. The relation schema Student_Performance (name, courseNo, rollNo, grade) has th following FDs: name,courseNo->grade
   rollNo,courseNo->grade
   name->rollNo
   rollNo->name
   Find the highest normal form of this relation scheme.
6. Consider the relation R(A,B,C,D,E,G) with functional dependencies given by {AB->C, AC->B, AD-> E, B->D, BC->A, E-> G}. Consider the decomposition of R into {AB, BC, ABDE,EG}.
   a) Is this decomposition lossy or lossless? Explain why?
   b) Is this decomposition is dependency preserving or not? Explain why?
7. Consider the following relations:
   Student(snum: integer, sname: string, major: string, level: string, age: integer)
   Class(name: string, meets at: string, room: string, fid: integer)
   Enrolled(snum: integer, cname: string)
   Faculty(fid: integer, fname: string, deptid: integer)
   The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class.Write the following queries in SQL.

No duplicates should be printed in any of the answers.

(i) Find the names of all Juniors (level = JR) who are enrolled in a class taught by I. Teach.

(ii) Find the age of the oldest student who is either a History major or enrolled in a course taught by I. Teach.

8 Explain different type of locking protocals for concurrency control. Which concurrency control protocols ensure both conflict serialzability and freedom from deadlock?

9. Check whether the schedule is conflict serializable or not?
S: R3(y); R3(z); R1(x); W1(x); W3(y); W3(z); R2(z); R1(y); W1(Y); R2(y); W2(y)

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Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-15

Course Title: Operating System Concepts & Networking — Course Code : MCA15

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. **Explain** Real Time operating system, Semaphore and Deadlock Avoidance.
2. Explain the structure of UNIX and Windows Operating Systems.
3. How PCB (Process Control Block) helps in process management? Explain the structure of PCB.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Explain the concepts of segmentation and paging with the help of neat diagram.
5. Consider a logical address space of 8 pages of 1024 words each, mapped on to a physical memory of 32 frames. How many bits are there in the logical and physical address respectively?
6. Mention the major attributes and operations of a file.
7. Consider the following set of processes:

Process	Arrival time	Processing time
P1	0	7
P2	3	2
P3	4	3
P4	4	1
P5	5	3

Find out the average waiting time and average turnaround time for
(a) FCFS
(b) SJF

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Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : एम.सी.ए.

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-E7

Course Title: Artificial Intelligence — Course Code : MCA-E7 / MCA-5.2(O)

अधिकतम अंक : 30
Maximum Marks: 30

Note. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. (a) Explain water jug problem using state space tree.
   (b) Explain minmax algorithm with example.
2. (a) Explain unification algorithm used for reasoning under predicate logic with an example.
   (b) Describe in detail the steps involved in the knowledge Engineering process.
3. (a) Explain the method of handling approximate inference in Bayesian Networks.
   (b) Explain AO* algorithm with an example

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4 List down the characteristics of intelligent agent.
5. What do you mean by local maxima with respect to search technique?
6. What factors determine the selection of forward or backward reasoning approach for an AI problem?
7. What are the limitations in using propositional logic to represent the knowledge base?
8. What are the differences and similarities between problem solving and planning?
9. Explain the concept of learning from example.

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कम्प्यूटर में परास्नातक कार्यक्रम (एम0सी0ए0)

Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-E8

Course Title: EMBEDDED SYSTEMS — Course Code : MCA-E8

अधिकतम अंक : 30
Maximum Marks: 30

Note. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. When is a microprocessor used and when is a micro controller used for embedded system.
2. Compare and contrast top down and bottom up software design.
3. With an example, describe the use of DAA instruction in 8051 micro controller.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Why is program memory different from data memory in 8051 micro controller?
5. Describe the features of any two commercially available real time operating system.
6. Describe any two real time scheduling algorithms.
7. How is mutual exclusion ensured in real time software design?
8. What is net advanced embedded system?
9. Describe the various levels of abstraction in the embedded design process.

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Master of Computer Applications (MCA)

विषय : कम्प्यूटर — विषय कोड : **एम.सी.ए.**

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-E9

Course Title: Computer Graphics And Multimedia — Course Code: MCA-E9 MCA-5.1 (O)

अधिकतम अंक : 30
Maximum Marks: 30

Note. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Explain DDA line drawing algorithm with Example. [4]
2. Describe the matrix formulation of 2D Translation, Scaling and Rotation. [6]
3. Explain Bresenham's circle generating algorithm. [4]
4. Derive the equation for reflection on y = -x. [4]

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

1. What are the 2 type of projections? Describe using figures. [2]
2. Define refresh buffer/frame buffer. [2]
3. What is pixel? [2]
4. Define aspect ratio. [2]
5. List the properties of Bezier Curves. [2]
6. Discuss shear 2D transformation in brief. [2]

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विषय : कम्प्यूटर — विषय कोड : एम.सी.ए.

Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-5.3

Course Title: Numeral and Statistical Computing. — Course Code: MCA-5.3 MCA-18(O)

अधिकतम अंक : 30
Maximum Marks: 30

Note. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Solve the following system of equation by Gauss Elimination method: [6]
   $4x_1 + x_2 + x_3 = 4$
   $x_1 + 4x_2 - 2x_3 = 4$
   $3x_1 + 2x_2 - 4x_3 = 6$
2. Use Lagrange's interpolation to find the value for x=3 in the following table: [6]
   x: 3.2 2.7 1.0 4.8
   f(x): 22.0 17.8 14.2 38.3
3. The equations of two lines of regression are as follows: [6]
   $2x + 3y - 8 = 0$ and
   $x + 2y - 5 = 0$
   Obtain the value of correlation coefficient and variance of y given that the variance of x is 12.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

1. Which of the iterative methods for solving linear system of equations converge faster? Why?
2. If $\pi = \frac{22}{7}$ is approximated as 3.14, find the absolute error and relative error respectively.
3. A student obtained the mean and the standard deviation of 100 observations as 40 and 5.1. It was later found that one observation was wrongly copied as 50, the correct figure being 40. Find the correct mean and the S.D.
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.
5. What is the expected number of heads appearing when a fair coin is tossed three times? [2]

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-5.5

Subject Title : Accountency & Financial Manement. — Course Code : MCA-5.5

अधिकतम अंक : 30
Maximum Marks: 30

Note: Long Answer Questions. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. What are the purposes of accounting information? Explain
2 What do you mean by Balance Sheet? How does it differ from profit and loss Account?
3 Examine the role of accounting concepts in the preparation of financial statements.

Section- B
खण्ड–ब

अधिकतम अंक : 12

Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words each. Answer all questions. All questions are compulsory.

4 Why do we prepare the trial balance?
5 Distinguish between management accounting and financial accounting?
6 What do you mean by working capital?
7 Differentiate between ‘Fixed Cost’ and ‘Variable Cost
8 State the importance and limitations of profit and loss account.
9 What is cash cycle?

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Subject : Computer — Subject Code : MCA

कोर्स शीर्षक : — **कोर्स कोड** : MCA-19

Course Title: Design and Analysis Of Algorithms. — Course Code: MCA-4.1

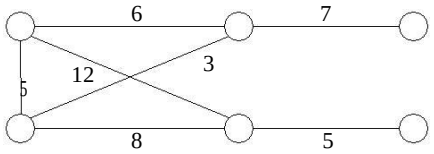
अधिकतम अंक : 30
Maximum Marks: 30

Note. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

Section – A
खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. (a) Solve the recurrence relation by iteration
   $T(n) = T(n-1) + n_4$
   (b) Suppose we are comparing implementations of insertion sort and merge sort on the same machine. For inputs of size n, insertion sort runs in 8.n2 steps, while merge sort runs in 64 n lg n steps. For which values of n does insertion sort beat merge sort?
2. (a) Find the minimum spanning tree using Prims algorithm for the following graph.



   (b) Using Dynamic Programming Approach, find the minimum number of scalar multiplications to multiply the chain of matrices given below.
   M1 * M2 * M3
   10*20 20*50 50*1
3. Explain P, NP, NP-Complete and NP-Hard class problems.

Section – B
खण्ड - ब

अधिकतम अंक : 12
Maximum Marks: 12

Note: Short Answer Questions. Answer should be given in 200 to 300 words. All questions are compulsory.

4. Define Generic Random Access Machine. What assumptions does it have?
5. State the significance of θ, Ω and O notations.
6. Explain principle of Optimality.
7. Explain Satisfiability Problem?
8 Explain why the statement, "The running time of algorithm A is at least $O(n_2)$," is meaningless.
9. Find the optimal solution using greedy criterion for a knapsack having capacity 50 kg. The list of items having values and weight as are shown in the table: Item

Item	I_1	I_2	I_3	I_4	I_5
Profit	10	20	24	9	8
weight	8	14	34	5	4