**1. Given the relations**

**employee (name, salary, deptno) and  
department (deptno, deptname, address)**

**Which of the following queries cannot be expressed using the basic relational algebra  
operations (U, -, x, π, σ, p)?**   
(a) Department address of every employee  
(b) Employees whose name is the same as their department name  
(c) The sum of all employees’ salaries  
(d) All employees of a given department

**Answer:** (c)

**2. Given the following relation instance.**

**x y z**

**1 4 2**

**1 5 3**

**1 6 3**

**3 2 2**

**Which of the following functional dependencies are satisfied by the instance?**

(a) XY -> Z and Z -> Y  
(b) YZ -> X and Y -> Z  
(c) YZ -> X and X -> Z  
(d) XZ -> Y and Y -> X

**Answer:** (b)

**3. Given relations r(w, x) and s(y, z), the result of  
select distinct w, x from r, s  
is guaranteed to be same as r, provided**  
(a) r has no duplicates and s is non-empty  
(b) r and s have no duplicates  
(c) s has no duplicates and r is non-empty  
(d) r and s have the same number of tuples

**Answer:** (a)

**4. In SQL, relations can contain null values, and comparisons with null values are treated as unknown. Suppose all comparisons with a null value are treated as false. Which of the  
following pairs is not equivalent?**   
(a) x = 5, not (not (x = 5)  
(b) x = 5, x > 4 and x < 6, where x is an integer  
(c) x < 5, not(x = 5)  
(d) None of the above

**Answer** (c)

**5. Consider a schema R(A, B, C, D) and functional dependencies A -> B and C -> D. Then the decomposition of R into R1 (A, B) and R2(C, D) is**  
a) dependency preserving and loss less join  
b) loss less join but not dependency preserving  
c) dependency preserving but not loss less join  
d) not dependency preserving and not loss less join

**Answer** (c)

**6. Consider the following two statements about database transaction schedules:**

**I. Strict two-phase locking protocol generates conflict serializable schedules that are also recoverable.**

**II. Timestamp-ordering concurrency control protocol with Thomas’ Write Rule can generate view serializable schedules that are not conflict serializable.**

**Which of the above statements is/are TRUE?**

(A) I only

(B) II only

(C) Both I and II

(D) Neither I nor II

Ans (c)

**7.**

In a database system, unique timestamps are assigned to each transaction using Lamport's logical clock. Let TS(T1) and TS(T2) be the timestamps of transaction T1 and T2 respectively. Besides T1 holds a lock on the resource R, and T2 has requested a conflicting lock on the same resource R. The following algorithm is used to prevent deadlocks in the database system assuming that a killed transaction is restarted with the same timestamp.

if TS(T2) < TS(T1) then

T1 is killed

else

T2 waits.

Assume any transaction that is not killed terminates eventually. Which of the following is TRUE about the database system that uses the above algorithm to prevent deadlock?

(A) The database system is both deadlock-free and starvation-free.

(B) The database system is deadlock-free, but not starvation-free.

(C) The database system is starvation-free, but not deadlock-free

(D) The database system is neither deadlock-free nor starvation-free.

Ans (a)

**8. Which one of the following is NOT a part of the ACID properties of database transactions?**

(A) Atomicity

(B) Consistency

(C) Isolation

(D) Deadlock-freedom

Ans (d)

**9.**

Consider the following two phase locking protocol. Suppose a transaction T accesses (for read or write operations), a certain set of objects {O1,...Ok}. This is done in the following manner:

Step1. T acquires exclusive locks to O1,...Ok in increasing order of their addresses.

Step2. The required operations are performed.

Step3. All locks are released.

This protocol will

(A) guarantee serializability and deadlock-freedom

(B) guarantee neither serializability nor deadlock-freedom

(C) guarantee serializability but not deadlock-freedom

(D) guarantee deadlock-freedom but not serializability

Ans (a)

**10. Suppose a database schedule S involves transactions T1,...,Tn. Construct the precedence graph of S with vertices representing the transactions and edges representing the conflicts. If S is serializable, which one of the following orderings of the vertices of the precedence graph is guaranteed to yield a serial schedule?**

(A) Topological order

(B) Depth-first order

(C) Breadth-first order

(D) Ascending order of transaction indices

Ans (a)

**Q. 11** A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit-string after stuffing is 01111100101, then the input bit-string is

(A) 0111110100 (B) 0111110101 (C) 0111111101 (D) 0111111111

Answer: B

**Q. 12** Consider the following three statements about link state and distance vector routing protocols, for a large network with 500 network nodes and 4000 links.

[S1] The computational overhead in link state protocols is higher than in distance vector protocols.

[S2] A distance vector protocol (with split horizon) avoids persistent routing loops, but not a link state protocol.

[S3] After a topology change, a link state protocol will converge faster than a distance vector protocol.

Which one of the following is correct about S1, S2, and S3?

1. S1, S3 is true and S2 is false
2. S1, S2 is true and S3 is false
3. S2, S3 is true and S1 is false
4. None of the above

Answer: A

**Q. 13** Which one of the following is TRUE about interior Gateway routing protocols - Routing Information Protocol (RIP) and Open Shortest Path First (OSPF)

1. RIP uses distance vector routing and OSPF uses link state routing
2. OSPF uses distance vector routing and RIP uses link state routing (C ) Both RIP and OSPF use link state routing

(D)Both RIP and OSPF use distance vector routing

Answer: A

**Q. 14**

An IP machine Q has a path to another IP machine H via three IP routers R1, R2, and R3.

Q—R1—R2—R3—H

H acts as an HTTP server, and Q connects to H via HTTP and downloads a file. Session layer encryption is used, with DES as the shared key encryption protocol. Consider the following four pieces of information:

[I1] The URL of the file downloaded by Q [I2] The TCP port numbers at Q and H [I3] The IP addresses of Q and H

[I4] The link layer addresses of Q and H

Which of I1, I2, I3, and I4 can an intruder learn through sniffing at R2 alone?

1. I1, I4
2. I2,I4
3. I1, I2
4. I2, I3

Answer: D

**Q. 15**

Host A (on TCP/IPv4 network A) sends an IP datagram D to host B (also on TCP/IPv4 network B). Assume that no error occurred during the transmission of D. When D reaches B, which of the following IP header field(s) may be different from that of the original datagram D?

1. TTL
2. Checksum
3. Fragment Offset
   1. All (i), (ii) and (iii) are changed:
   2. (ii) and (iii) are changed
   3. Only (i) is changed
   4. None of the above

Answer: A

**Q16.** In the IPv4 addressing format, the number of networks allowed under Class C addresses is

(A) 214 (B) 27 (C) 221 (D) 224

Answer: C

**Q17.** Every host in an IPv4 network has a 1-second resolution real-time clock with battery backup. Each host needs to generate up to 1000 unique identifiers per second. Assume that each host has a globally unique IPv4 address. Design a 50-bit globally unique ID for this purpose. After what period (in seconds) will the identifiers generated by a host wrap around?

1. 26
2. 28
3. 210

(D) 212

Answer: B

**Q.18** An IP router with a Maximum Transmission Unit (MTU) of 1500 bytes has received an IP packet of size 4404 bytes with an IP header of length 20 bytes. The values of the relevant fields in the header of the third IP fragment generated by the router for this packet are

1. MF bit: 0, Datagram Length: 1444; Offset: 370
2. MF bit: 1, Datagram Length: 1424; Offset: 185
3. MF bit: 1, Datagram Length: 1500; Offset: 370
4. MF bit: 0, Datagram Length: 1424; Offset: 2960

Answer: A

**Q19.** Which of the following transport layer protocols is used to support electronic mail?

(A) SMTP (B) IP (C) TCP (D) UDP

Answer: C

20. Which one of the following socket API functions converts an unconnected active TCP socket into a passive socket.

1. connect (C ) listen
2. bind (D) accept

Answer: C

|  |  |  |
| --- | --- | --- |
| 21. | Number of key(s) are involved in asymmetric/public key cryptosystem. | |
| a) one | | b) two |
| c) three | | d) zero |
| Answer: b | | |
| 22. | Number of key(s) are involved in symmetric cryptosystem between 2 communicating parties is. | |
| a) one | | b) two |
| c) three | | d) zero |
| Answer: a | | |
| 23. | RSA cryptosystem is | |
| a) asymmetric cryptosystem | | b) symmetric cryptosystem |
| b) both a and b | | d) none |
| Answer: a | | |
| 24. | Digital signature preserves | |
| a) integrity | | b) authenticity |
| c) both a and b | | d) none |
| Answer: c | | |
| 25. | Hash function can preserve | |
| a) integrity | | b) authenticity |
| c) confidentiality | | d) none |
| Answer: a | | |
|  | Encryption scheme preserves | |
| a) integrity | | b) authenticity |
| c) confidentiality | | d) none |
| Answer: c | | |
|  | Confidentiality can be achieved by | |
| a) encryption schemes | | b) digital signature schemes |
| c) both a and b | | d) none |
| Answer: a | | |
|  | Integrity can be achieved by | |
| a) encryption schemes | | b) digital signature schemes |
| c) both a and b | | d) none |
| Answer: b | | |
| 26. | Verifying the identity of a person, called as | |
| a) authentication | | b) confidentiality |
| c) integrity | | d) non-repudiation |
| Answer: a | | |
| 27. | Assurance that the owner of a signature key cannot deny his signature, called as | |
| a) authenticaiton | | b) confidentiality |
| c) integrity | | **d) non-repudiation** |

28. In a computer system, four files of size 11050 bytes, 4990 bytes, 5170 bytes and 12640 bytes need to be stored. For storing these files on disk, we can use either 100 byte disk blocks or 200 byte disk blocks (but can't mix block sizes). For each block used to store a file, 4 bytes of bookkeeping information also needs to be stored on the disk. Thus, the total space used to store a file is the sum of the space taken to store the file and the space taken to store the book keeping information for the blocks allocated for storing the file. A disk block can store either bookkeeping information for a file or data from a file, but not both. What is the total space required for storing the files using 100 byte disk blocks and 200 byte disk blocks respectively?

**(A)** 35400 and 35800 bytes  
**(B)** 35800 and 35400 bytes  
**(C)** 35600 and 35400 bytes  
**(D)** 35400 and 35600 bytes

Answer: c

29. The size of the data count register of a DMA controller is 16 bits. The processor needs to transfer a file of 29,154 kilobytes from disk to main memory. The memory is byte addressable. The minimum number of times the DMA controller needs to get the control of the system bus from the processor to transfer the file from the disk to main memory is \_\_\_\_\_\_\_\_\_

Note : This question was asked as Numerical Answer Type.  
**(A)** 3644  
**(B)** 3645  
**(C)** 456  
**(D)** 1823

Answer: c

30. A micro program control unit is required to generate a total of 25 control signals. Assume that during any microinstruction, at most two control signals are active. Minimum number of bits required in the control word to generate the required control signals will be  
**(A)** 2  
**(B)** 2.5  
**(C)** 10  
**(D)** 12

Answer: c

1. Assume arrays A and B of integers and initialized as:

A = {30, 20, 50, 40, 10} and B = {3, 4, 0, 1, 2}

If the following code-snippet in ‘C’ is executed assuming the initialization given, what will be

the last element of array A at the end of the execution?

int i, j, t;

for(i = 0; i < 4; i++) {

for (j= 0; j < (4-i); j++) {

if ( A[B[j]] > A[B[j+1] ] )

{

t = A[B[j]];

A[B[j]] = A[B[j+1]];

A[B[j+1]] = t;

}

}

}

1. 20 B. 30 C. 40 D. 50

The answer is A

1. Consider a binary search tree whose pre-order traversal is as follows.

Pre-order : 10 6 4 2 5 8 18 15 12 17 20 25

The right child or the root of the tree is :

1. 12 B. 15 C. 18 D. 25

The answer is C

1. Consider a Red-Black tree where a path from root to leaf contains 10 black nodes. Maximum number of nodes on any path of the tree is :
2. 5 B. 10 C. 15 D. 20

The answer is D

1. The number of binary trees with 5 nodes are
2. 32 B. 42 C. 25 D. 31

The answer is B.

1. In a binary tree, every node has either 0 or 2 children. The number of leaves in the tree is 5. Total number of nodes in the tree are
2. 9 B. 10 C. 16 D. 32

The answer is A

1. The elements 50, 30, 10, 40, 45, 42 are inserted in a binary search tree such that after every insertion the tree is checked to be an AVL tree. If it is not, then appropriate rotations are applied. At the end of all insertions, the root node is
2. 10 B. 30 C. 40 D. 50

The answer is C

1. What does the following declaration mean? int (\*ptr)[10];

A. ptr is array of pointers to 10 integers

B. ptr is a pointer to an array of 10 integers

C. ptr is an array of 10 integers

D. ptr is an array of 10 integer pointers

The answer is B.

1. A person is climbing a staircase. While climbing, in every step he climbs either 1 or 2 stairs. If there are 10 stairs in the stair-case, then in how many ways the staircase can be climbed?
2. 55 B. 64 C. 89 D. 100

The answer is C.

1. Consider a sorting algorithm which divides array into two equal parts, sorts each part of the array using bubble sort and then merges the two sorted parts. If T(N) denotes the the number of comparisons done by the algorithm with input size of the array being N. Then the term T(N) is closest to
   1. N2 b. NlogN c. (N2/2) \*logN d. ( N2/4) + N

Answer – d

1. To implement Kruskal’s algorithm, which of the combination of data structures leads to the best possible efficiency ?
   1. Linked list, AVL trees
   2. Binary Search Tree, B-Trees
   3. Heap, Union-Find
   4. Priority Queue, B+ Trees

Answer – c

1. Which of the following represents the life-cycle of software development?
   1. Analysis -> Design -> Coding -> Testing -> Operation and Maintenance
   2. Design -> Analysis -> Coding -> Testing -> Operation and Maintenance
   3. Design -> Analysis -> Coding -> Testing
   4. Analysis -> Design -> Coding -> Operation and Maintenance

Answer: a

1. Defining a class so that the implementation of the data and methods of the class are not known to the programmers who use the class is called:
   1. Data Binding
   2. Polymorphism
   3. Encapsulation
   4. Inheritance

Answer: c

1. Which of the following is NOT a key component of object oriented programming?
   1. Inheritance
   2. Encapsulation
   3. Polymorphism
   4. Parallelism

Answer: d

1. Which of the following characteristics of an object-oriented programming language restricts behavior so that an object can only perform actions that are defined for its class?
   1. Dynamic Binding
   2. Polymorphism
   3. Inheritance
   4. Encapsulation

Answer: d

1. www is based on which model?
2. Local – Server
3. Client- Server
4. 3-tier
5. None of these

Ans. B

What is the value of the String S after the following line?

String S = (new String("arach")).substring(0,2) +

(new String("nophobia")).substring(3);

* 1. "arachobia"
  2. "arnophobia"
  3. "arhobia"
  4. "rachobia"

Answer: c

1. Which of these is TRUE of the relationship between objects and classes?
   1. A class is an instance of an object.
   2. An object is the ancestor of its subclass.
   3. An object is an instance of a class.
   4. An object is the descendant of its superclass.

Answer: c

1. The Java compiler translates source code into
   1. machine code.
   2. Assembly code.
   3. Byte code.
   4. JVM code.

Answer: c

1. Which of the following statements is NOT correct?
   1. We can use a new operator on String to create a "String" object.
   2. We can use the new operator on int to create an "int" object.
   3. Variables of type "int" can be assigned a value just after being declared.
   4. Variables of type "String" can be assigned a value just after being declared.

Answer: b

1. Which of the following is NOT true?
   1. Both float and double represent real numbers.
   2. long can present a larger range of values than double.
   3. The size of long and double is the same.
   4. char is not a numeric data type.

Answer: b

1. What keyword is used to specify that a data member is a class data member (shared among all in-stances of that class)?
   1. final
   2. shared
   3. public
   4. static

Answer: d

1. Paging \_\_\_\_\_\_\_\_\_.

1 solves the memory fragmentation problem

2 allows modular programming

3 allows structured programming

4 avoids deadlock

Ans ) 1

1. Which of the following is crucial time while accessing data on the disk?

1 Seek time

2 Rotational time

3 Transmission time

4 Waiting time

Ans ) 1

1. The host repeatedly checks if the controller is busy until it is not. It is in a loop that status register's busy bit becomes clear. This is called \_\_\_\_\_\_\_\_\_\_\_\_\_ and a mechanism for the hardware controller to notify the CPU that it is ready is called \_\_\_\_\_\_\_\_\_\_\_.

1 Interrupt and Polling

2 Polling and Spooling

3 Polling and Interrupt

4 Deadlock and Starvation

Ans ) 3

1. Unix Operating System is an \_\_\_\_\_\_\_\_\_\_.

1 Time Sharing Operating System

2 Multi-User Operating System

3 Multi-tasking Operating System

4 All the Above

Ans ) 4

1. Which of the following memory allocation scheme suffers from External fragmentation?

1 Segmentation

2 Pure demand paging

3 Swapping

4 Paging

Ans ) 1

1. Information about a process is maintained in a \_\_\_\_\_\_\_\_\_.

1 Stack

2 Translation Lookaside Buffer

3 Process Control Block

4 Program Control Block

Ans ) 3

1. Real time systems are \_\_\_\_\_\_\_\_.

1 Primarily used on mainframe computers

2 Used for monitoring events as they occur

3 Used for program development

4 Used for real time interactive users

Ans ) 2

1. The problem of fragmentation arises in \_\_\_\_\_\_\_\_.

1 Static storage allocation

2 Stack allocation storage

3 Stack allocation with dynamic binding

4 Heap allocation

Ans ) 4

1. Which file system does DOS typically use ?

1 FAT16

2 FAT32

3 NTFS

4 WNFS

Ans ) 1

1. A thread is a \_\_\_\_\_\_\_\_\_\_ process .

1 Heavy Weight

2 Mutliprocess

3 Inter Thread

4 Light wieght

Ans ) 4

1. A telephone company’s task is to provide phone lines to a village with n houses each labelled H1 through Hn. The wiring should be such that all the homes are connected to each other. The length of the phone lines required would be the distance between the two houses. The cost of the wiring is proportional to the length of the wire used. The task is to connect all the ten houses in minimum cost. Give a suitable algorithm for the same.
2. Dijkstra’s shortest path algorithm
3. Prims Minimum spanning tree algorithm
4. All pairs shortest path algorithm
5. Floyd Warshall Algorithm

Answer: b

1. VNIT student, Twisha, is taking her computer science algorithms exam. She notices that her professor has assigned points to each problem according to the professor's opinion of the difficulty of the problem. Unfortunately, Twisha’s studying was a bit spotty so her opinion of the difficulty of each problem differs quite a bit from the professor's. However, Twisha does understand greedy algorithms so she decides to apply a greedy algorithm to her test taking. For each problem, she estimates how much time it will take her to complete the problem. *Her goal is to maximize the points she will receive* given that (*p*1*; p*2*; ….; pn)* are the number of points assigned by the professor to each of the *n* problems, (*t*1*; t*2*; ….; tn)* are Twisha’s estimates of the time required to do each problem, and *T* is the total time available for taking the exam. Note that Twisha’s professor gives partial credit to problems that are partially done. Describe a greedy algorithm that Twisha could use to maximize her marks in the algorithms exam.
2. Sort t array and solve in increasing order
3. Sort t array and solve in decreasing order
4. Sort p array and solve in decreasing order
5. Sort according to p/t and then go in decreasing order.

Answer: d

1. In the standard quick sort algorithm on an array of size n, you split an array into 2 parts with the help of a pivot. Now, the best case is when you split the array into two sub arrays of almost equal size i.e. of size n/2 each. Suppose that your selection of pivot is such that it splits the array into two halves of size n/10 and 9n/10. Assume that this happens at each step in your recursion. How will the asymptotic time complexity of your algorithm change?
2. It will not change
3. It will be less
4. It will be more
5. Can’t say

Answer: a

1. State which of the following statements is false:
   1. To show a problem to be NP complete, we reduce it to a known NP complete Problem
   2. To show a problem to be NP complete, we reduce it from a known NP complete Problem.
   3. A problem is said to belong to a class P space when it executes using polynomial space.
   4. A problem is shown to belong to the class NP complete when it belongs to both NP and NP hard.

Answer: a

1. Solve this recurrence relation by any method you know and tick the correct answer

T(n) = 8T(n/2) + O(n2)

1. O(n)
2. O(n2.)
3. O(nlogn)
4. O(n3)

Answer: d

1. What is the time complexity of the recursive implementation used to find the nth Fibonacci term?  
   a)O(1)  
   b)O(n2)  
   c)O(n!)  
   d) Exponential

Answer: d

Suppose we find the 8th term using the recursive implementation. The arguments passed to the function calls will be as follows:

fibonacci(8)

fibonacci(7) + fibonacci(6)

fibonacci(6) + fibonacci(5) + fibonacci(5) + fibonacci(4)

fibonacci(5) + fibonacci(4) + fibonacci(4) + fibonacci(3) + fibonacci(4)

+ fibonacci(3) + fibonacci(3) + fibonacci(2)

:

:

:

Which property is shown by the above function calls?

a) Memoization  
b) Optimal substructure  
c) Overlapping subproblems  
d) Greedy

Answer: c

1. What is the space complexity of the recursive implementation used to find the nth fibonacci term?  
   a) O(1)  
   b) O(n)  
   c) O(n2)  
   d) O(n3)

Answer: a

1. Consider the strings “PQRSTPQRS” and “PRATPBRQRPS”. What is the length of the longest common subsequence?  
   a) 9  
   b) 8  
   c) 7  
   d) 6

Answer: c

1. What is the time complexity of the brute force algorithm used to find the longest common subsequence?  
   a) O(n)  
   b) O(n2)  
   c) O(n3)  
   d) O(2n)

Answer: d

71. Backtracking algorithm is implemented by constructing a tree of choices called as?  
a) State-space tree  
b) State-chart tree  
c) Node tree  
d) Backtracking tree

Answer: a

1. What happens when the backtracking algorithm reaches a complete solution?  
   a) It backtracks to the root  
   b) It continues searching for other possible solutions  
   c) It traverses from a different route  
   d) Recursively traverses through the same route

Answer: b

1. Fractional knapsack problem is solved most efficiently by which of the following algorithm?  
   a) Divide and conquer  
   b) Dynamic programming  
   c) Greedy algorithm  
   d) Backtracking

Answer: c

1. Which of the following is not true about QuickSort?  
   a) in-place algorithm  
   b) pivot position can be changed  
   c) adaptive sorting algorithm  
   d) can be implemented as a stable sort

Answer: b

1. Which one of the following is false?  
   a) Heap sort is an in-place algorithm  
   b) Heap sort has O(nlogn) average case time complexity  
   c) Heap sort is stable sort  
   d) Heap sort is a comparison-based sorting algorithm

Answer: c

1. How many elements can be sorted in O(logn) time using Heap sort?  
   a) O(1)  
   b) O(n/2)  
   c) O(logn/log(logn))  
   d) O(logn)

Answer: c

1. A compiler for a high-level language that runs on one machine and produces code for a different machine is called \_\_\_\_\_\_\_\_\_\_\_

a) Optimizing compiler

b) One pass compiler

c) Cross compiler

d) Multipass compiler

Answer: c

1. What is the output of lexical analyzer?

a) A set of RE

b) Syntax Tree

c) Set of Tokens

d) String Character

Answer: c

1. Which concept of FSA is used in the compiler?

a) Lexical analysis

b) Parser

c) Code generation

d) Code optimization

Answer: a

1. Which of the following are Lexemes?

a) Identifiers

b) Constants

c) Keywords

d) All of the mentioned

Answer: d

1. The process of forming tokens from an input stream of characters is called \_\_\_\_\_\_

a) Liberalisation

b) Characterisation

c) Tokenization

d) None of the mentioned

Answer: c

1. When expression sum=1+2 is tokenized then what is the token category of 1?

a) Identifier

b) Assignment operator

c) Integer Literal

d) Addition Operator

Answer: c

1. When expression sum=3+2 is tokenized then what is the token category of sum?

a) Identifier

b) Assignment operator

c) Integer Literal

d) Addition Operator

Answer: a

1. What is the output of a lexical analyzer?

a) Machine Code

b) Intermediate Code

c) Stream of Token

d) Parse Tree

Answer: c

1. Which phase provides input to syntax analyser?

a) Lexical analyser

b) Syntactic Analyser

c) Semantic Analyser

d) None of the mentioned

Answer: a

1. A compiler can check?

a) Logical Error

b) Syntax Error

c) Both Logical and Syntax Error

d) Not Logical and Syntax Error

Answer: b

1. All the regular languages can be described by one or more of the following:  
   i) DFA ii) NFA iii) e-NFA iv) Regular Expressions  
   Which of the following are correct?  
   a) i, ii, iv  
   b) i, ii, iii  
   c) i, iv  
   d) i, ii, iii, iv

Answer: d

1. Which of the following are non regular?  
   a) The set of strings in {a,b}\* with an even number of b’s  
   b) The set of strings in {a, b, c}\* where there is no c anywhere to the left of a  
   c) The set of strings in {0, 1}\* that encode, in binary, an integer w that is a multiple of 3. Interpret the empty strings e as the number 0.  
   d) None of the mentioned

Answer: d

1. L = (an bn an | n = 1,2,3) is an example of a language that is

(A) Context free

(B) Not context free

(C) Deterministic

(D) Both (b) and (c)

Answer: b

1. Which of the following strings is not generated by the following grammar? S 🡪 SaSbS|epsilon

(A) aabb

(B) abab

(C) aababb

(D) aaabb

Answer : d

1. Given L = (0+1)\*. If R = (0^n 1^n, n > 0) , then language L ∪ R and R are respectively

(A) Regular, regular

(B) Not regular, regular

(C) Regular, not regular

(D) Not regular, not regular

Answer: c

1. Consider a language L for which there exists a Turing machine T, that accepts every word in L and either rejects or loops for every word not in L. The language L is

(A) NP hard

(B) NP complete

(C) Recursive

(D) Recursively enumerable

Answer:d

1. A given grammar is called ambiguous if

(A) Two or more productions have the same non-terminal on the left hand side

(B) A derivation tree has more than one associated sentence

(C) There is a sentence with more than one derivation tree corresponding to it

(D) Brackets are not present in the grammar

Answer: c

1. Following context free grammar

S —> aB | bA

A —>b | aS | bAA

B —> b | bS | aBB

generates strings of terminals that have

(A) Equal number of a's and b's

(B) Odd number of a's and odd number b's

(C) Even number of a's and even number of b's

(D) Odd number of a's and even number of a's

Answer: a

1. G is defined as S🡪 aS | bS | SS. The language generated by G is
2. Empty
3. Even number of a’s and b’s
4. (a+b)\*
5. a\*b\*

Answer: a

1. Recursively enumerable languages are not closed under

(A) Union

(B) Homomorphism

(C) Complementation

(D) Concatenation

Answer: d

1. Which of the following is involved in the system planning and designing phase of the Software Development Life Cycle (SDLC)?
2. Sizing
3. Parallel run
4. Specification freeze
5. All of the above

Answer: d

1. Which of the following does not relate to Evolutionary Process Model?
2. Incremental Model
3. Concurrent Development Model
4. WINWIN Spiral Model
5. All of the above

Answer: d

1. What is the major drawback of the Spiral Model?
   1. Higher amount of risk analysis
   2. Doesn't work well for smaller projects
   3. Additional functionalities are added later on
   4. Strong approval and documentation control

Answer: b

1. When the user participation isn't involved, which of the following models will not result in the desired output?
2. Prototyping & Waterfall
3. Prototyping & RAD
4. Prototyping & Spiral
5. RAD & Spiral

Answer: d