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State Finished

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Time taken 12 hours 19 mins

Overdue 10 hours 49 mins

Grade 0 out of 100

Question 1

Not answered

Marked out of 6

A Turing machine has

Select one or more:

- a. an infinite number of internal states.
- b. a tape that can be used both for reading and writing.
- c. a tape of infinite length.
- d. a tape whose length is limited by the length of input string.

The correct answers are: a tape of infinite length., a tape that can be used both for reading and writing.

Question 2

Not answered

Marked out of 4

The language $L = \{a^n b^m : n \geq 0, m \geq 1\}$

Select one or more:

- a. can be generated by a grammar that does not contain recursion.
- b. can be described by a regular expression.
- c. contains the string *aabbb*.
- d. contains the string *ababb*.

The correct answers are: can be described by a regular expression., contains the string *aabbb*.

Question 3

Not answered

Marked out of 4

AES is a standard for

Select one or more:

- a. block encryption.
- b. asymmetric encryption.
- c. stream encryption.
- d. symmetric encryption.

The correct answers are: block encryption., symmetric encryption.

Question 4

Not answered

Marked out of 6

Little Fermat's Theorem states that:

Select one:

- a. $a^{(p-1)} \equiv 1 \pmod{p}$, where p is a prime and a is an integer coprime to p .
- b. $a^{(p-1)} \equiv 1 \pmod{p}$, where p is a prime and a is an integer.
- c. $a^{(p-1)} \equiv 0 \pmod{p}$, where p is a prime and a is an integer coprime to p .
- d. $a^{(p-1)} \equiv 1 \pmod{p}$, where p and a are composite numbers.

The correct answer is: $a^{(p-1)} \equiv 1 \pmod{p}$, where p is a prime and a is an integer coprime to p .

Question 5

Not answered

Marked out of 6

Transaction journal (log file, WAL) in a relational database

- a. is used for data recovery after the database system crash.
- b. keeps track of all actions executed by the database management system.
- c. is used to store metadata.
- d. is used for debugging of SQL commands.

The correct answers are: is used for data recovery after the database system crash., keeps track of all actions executed by the database management system.

Question 6

Not answered

Marked out of 4

Data Manipulation Language (SQL DML)

Select one or more:

- a. contains the commands GRANT, REVOKE
- b. contains the commands COMMIT, ROLLBACK
- c. contains the commands CREATE, ALTER, and DROP
- d. contains the commands INSERT, UPDATE, and DELETE

The correct answer is: contains the commands INSERT, UPDATE, and DELETE

Question 7

Not answered

Marked out of 6

Which of the following properties for summation and multiplication of square matrices $\mathbf{A}, \mathbf{B}, \mathbf{C} \in \mathbb{R}^{n,n}$ are correct?

Select one or more:

- a. $\mathbf{A} \cdot (\mathbf{B} \cdot \mathbf{C}) = (\mathbf{A} \cdot \mathbf{B}) \cdot \mathbf{C}$ (associative law)
- b. $(\mathbf{A} + \mathbf{B}) \cdot \mathbf{C} = \mathbf{A} \cdot \mathbf{C} + \mathbf{B} \cdot \mathbf{C}$ (distributive law)
- c. $(\mathbf{A} \cdot \mathbf{B})^T = \mathbf{A}^T \cdot \mathbf{B}^T$
- d. $\mathbf{A} \cdot \mathbf{B} = \mathbf{B} \cdot \mathbf{A}$ (commutative law)

The correct answers are: $\mathbf{A} \cdot (\mathbf{B} \cdot \mathbf{C}) = (\mathbf{A} \cdot \mathbf{B}) \cdot \mathbf{C}$ (associative law), $(\mathbf{A} + \mathbf{B}) \cdot \mathbf{C} = \mathbf{A} \cdot \mathbf{C} + \mathbf{B} \cdot \mathbf{C}$ (distributive law)**Question 8**

Not answered

Marked out of 4

Suppose matrix \mathbf{A} has an inverse matrix \mathbf{A}^{-1} . Which ones of the following statements are true?

Select one or more:

- a. The determinants of \mathbf{A} and \mathbf{A}^{-1} are equal.
- b. The ranks of \mathbf{A} and \mathbf{A}^{-1} are equal.
- c. Matrix \mathbf{A} is regular.
- d. The rank of matrix \mathbf{A} is smaller than the number of its rows.

The correct answers are: The ranks of \mathbf{A} and \mathbf{A}^{-1} are equal., Matrix \mathbf{A} is regular.

Question 9

Not answered

Marked out of 4

Simplify the following propositional logic formula $B \wedge (A \vee \neg(\neg B \vee A))$.

Select one:

- a. $B \vee \neg A$
- b. B
- c. $B \wedge \neg A$
- d. $B \wedge A$

The correct answer is: B

Question 10

Not answered

Marked out of 6

Decide which ones of the following propositional logic formulae are logical consequences of $A \wedge B$.

Select one or more:

- a. $\neg A \Rightarrow \neg B$
- b. $A \Rightarrow B$
- c. $\neg B \Rightarrow \neg A$
- d. $A \wedge (\neg A \vee B)$

The correct answers are: $\neg A \Rightarrow \neg B$, $A \wedge (\neg A \vee B)$

Question 11

Not answered

Marked out of 4

Which of the following synchronization techniques are block-based and can be used to synchronize processes or threads?

Select one or more:

- a. instruction TSL (Test-and-Set Lock)
- b. monitors
- c. Peterson's algorithm
- d. condition variables

The correct answers are: condition variables, monitors

Question 12

Not answered

Marked out of 6

A hard disk drive has a rotational speed of 6000 RPM. What is its average rotational latency (delay) when reading one disk sector?

Select one:

- a. 0ms
- b. 10ms
- c. 5ms
- d. 1ms

The correct answer is: 5ms

Question 13

Not answered

Marked out of 4

Consider the procedure ff defined by the following code:

```
void ff(int x) {  
    if (x > 0) ff(x-1) ;  
    abc(x);  
}
```

Determine how many times the procedure abc(x) is executed during the call ff(2).

Select one or more:

- a. 4 times
- b. 3 times
- c. 7 times
- d. 1 times

The correct answer is: 3 times

Question 14

Not answered

Marked out of 4

Which transport protocol is typically utilized by the WWW service:

Select one:

- a. ICMP (Internet Control Message Protocol)
- b. SCTP (Stream Control Transmission Protocol)
- c. UDP (User Datagram Protocol)
- d. TCP (Transmission Control Protocol)

The correct answer is: TCP (Transmission Control Protocol)

Question 15

Not answered

Marked out of 6

Which of the following statement(s) is/are true:

Select one or more:

- a. IPv6 address is 4x longer than IPv4 address.
- b. The address space of IPv6 is 2x larger than the space of IPv4.
- c. IPv6 address is 2x longer than IPv4 address.
- d. The address space of IPv6 is 4x larger than the space of IPv4.

The correct answer is: IPv6 address is 4x longer than IPv4 address.

Question 16

Not answered

Marked out of 4

Determine the combination of properties valid for the binary relation $R = \{(a, b), (a, c)\} \cup \Delta_X$ on the set $X = \{a, b, c\}$. The symbol Δ_X denotes the identity relation on X .

Select one:

- a. reflexive, asymmetric, transitive
- b. antisymmetric, asymmetric, transitive
- c. reflexive, symmetric, transitive
- d. reflexive, antisymmetric, transitive

The correct answer is: reflexive, antisymmetric, transitive

Question 17

Not answered

Marked out of 6

How many natural numbers from the interval $[1, 960]$ are coprime with 960?

Select one:

- a. 352
- b. 127
- c. 511
- d. 481
- e. 256

The correct answer is: 256

Question 18

Not answered

Marked out of 6

Consider we have a pointer to the start of a singly linked list containing exactly n elements. If we use a best known algorithm to insert a new element in the last list position, what is the dependence of the number of steps needed to do the insertion on the list size n ?

Select one:

- a. does not depend
- b. logarithmic
- c. linear
- d. quadratic

The correct answer is: linear

Question 19

Not answered

Marked out of 6

Assume that a box contains 3 white and 4 blue balls. One ball is randomly picked up from that box and put aside. Then another ball is randomly picked up from the box, which turns out to be white. What is the probability, that the first ball was also white?

Select one:

- a. $1/2$
- b. $2/7$
- c. $3/7$
- d. $1/3$

The correct answer is: $1/3$ **Question 20**

Not answered

Marked out of 4

The interpretation of the 8-bit pattern 1001 0110 in the sign-magnitude representation is the number (in decimal):

Select one:

- a. -22
- b. +96
- c. -16
- d. +26

The correct answer is: -22