



Kunal Jha

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Computer Science Engineering(CS)

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Q. 1

Solution Video

Have any Doubt ?



Complete the sentence by filling in the appropriate words from the options provided.

Sports for the visually challenged ____ their confidence and help them to mingle with the ____ of society.

(A) enrich, stalwarts

(B) plummet, elite

(C) boost, mainstream

Correct Option

Solution :

(c)

Keywords are 'help them to mingle with'. A positive word must fill the first blank.

(D) abate, cream

QUESTION ANALYTICS



Q. 2

Solution Video

Have any Doubt ?

Choose the correct pair from the options provided, which has a similar relationship to the given pair.
AMORPHOUS : SHAPE

(A) obvious : evidence

(B) humble : belief

(C) nondescript : classification

Correct Option

Solution :

(c)

Amorphous is something that lacks shape, similarly nondescript lacks classification.

(D) momentary : fame

QUESTION ANALYTICS



Q. 3

Solution Video

Have any Doubt ?



A train left a station P at 6 am and reached another station Q at 11 am. Another train left station Q at 7 am and reached P at 10 am. At what time did the two trains pass one another?

(A) 7:50 am

(B) 8:13 am

(C) 8:30 am

Correct Option

Solution :

(D)

Let the distance between the two stations be 150 kms.

Time taken by Train A = 5 hrs.

Speed of Train A = 30 km/h.

Time taken by Train B = 3 hrs.

Speed of Train B = 50 km/h.

The first train starts at 6 a.m. i.e., 1 hour before the other train started journey. So the first train has already travelled 30 km till 7 am when second train starts moving. Hence, at 7 am the distance left between two trains = $150 - 30 = 120$ kmSince they are travelling in opposite direction, their relative speed = $30 + 50 = 80$ km/h.

$$\text{Time} = \frac{120}{80} = 1.5 \text{ hours}$$

They must have passed one another at $\frac{120}{80} = 1.5$ hours past 7 am = 8.30 am

(D) 8:42 am

QUESTION ANALYTICS



Q. 4

[▶ Solution Video](#)[Have any Doubt ?](#)

If 6th March, 2005 is Sunday, what was the day of the week on 6th March, 2004?

 A Sunday B Saturday

Correct Option

Solution :

(b)

The year 2004 is a leap year. So, it has 2 odd days.
 But, Feb 2004 not included because we are calculating from March 2004 to March 2005. So it has 1 odd day only.
 ∴ The day on 6th March, 2005 will be 1 day beyond the day on 6th March, 2004.
 Given that, 6th March, 2005 is Sunday.
 ∴ 6th March, 2004 is Saturday.

 C Tuesday D Wednesday

Q. 5

[▶ Solution Video](#)[Have any Doubt ?](#)

The number that should come in place of ? in the following series is_____
 8, 6, 9, 23, 87, ?

 C 429

Correct Option

Solution :

429

$$\begin{aligned}8 \times 1 - 2 &= 6 \\6 \times 2 - 3 &= 9 \\9 \times 3 - 4 &= 23 \\23 \times 4 - 5 &= 87 \\87 \times 5 - 6 &= 429\end{aligned}$$



Q. 6

[▶ Solution Video](#)[Have any Doubt ?](#)

French cuisine is highly regarded all over the world. Yet in Paris there are more American restaurants selling burgers and fries (which many people now class as junk food) than there are in any other European capital city. Obviously the French are very fond of junk food, and are not too proud to eat it.
 Which of the following, if true, would most weaken the author's contention?

 A There are also a larger number of Lebanese restaurants in Paris than there are in other European capital cities. B French Cordon Blue cuisine is very expensive. C The number of French tourists eating in New York burger restaurants is very low. D There are an unusually large number of American tourists in Paris who eat at burger joints.

Correct Option

Solution :

(d)

The author's contention (argument) is that the French are very fond of junk food because there are so many American restaurants in Paris. The best way to defeat this argument is to show, if possible, that the French do not eat in those American restaurants. The closest to that is option (d) which suggests that the American tourists are the ones who eat at those restaurants.



Q. 7

[▶ Solution Video](#)[Have any Doubt ?](#)

If all vowels occupy odd places, how many words can be formed from the letters of the word
 HALLUCINATION?

A $\left(\frac{7!}{2!}\right)^2$

B $\left(\frac{7!}{2! 2!}\right)^2$

Correct Option

Solution :

(b) There are 7 odd places and 6 vowels of which 2 vowels occur two times.

$$\text{Hence number of arrangements of vowels} = \frac{7P_6}{2!2!}$$

Now the remaining 7 consonants of which two consonants

occur two times, can be arranged in 7 places in $\frac{7!}{2!2!}$ ways.

$$\text{Hence, the required number of ways} = \frac{7P_6}{2!2!} \times \frac{7!}{2!2!} = \left(\frac{7!}{2!2!} \right)^2$$

C $\frac{(7!)^2}{2}$

D none of these

QUESTION ANALYTICS

+

Q. 8

Solution Video

Have any Doubt ?

Q

A jar was full with honey. A person drew out 20% of the liquid from the jar and replaced it with sugar solution. He repeated the same process 3 times more and finally there was only 512 gm of honey left in the jar, the rest part of the jar was filled with the sugar solution. The initial amount of honey in the jar was:

A 1.25 kg

Correct Option

Solution :

(a)

Let the initial amount of honey in the jar was K , then

$$512 = K \left(1 - \frac{1}{5}\right)^4 \quad \left(\because 20\% = \frac{20}{100} = \frac{1}{5}\right)$$

or $512 = K \left(\frac{4}{5}\right)^4$

$\Rightarrow K = \frac{512 \times 625}{256}$

$\therefore K = 1250$

Hence initially the honey in the jar = 1.25 kg.

B 1 kg

C 1.5 kg

D none of these

QUESTION ANALYTICS

+

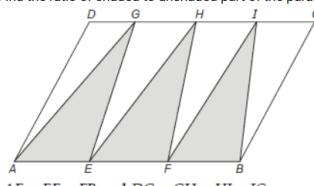
Q. 9

Solution Video

Have any Doubt ?

Q

Find the ratio of shaded to unshaded part of the parallelogram ABCD as shown below.



$AE = EF = FB$ and $DG = GH = HI = IC$

A 4 : 3

B 3 : 4

C 2 : 3

D none of these

Correct Option

Solution :

(d)

Since the triangles AGE , EHF , FIB have the same height, the ratio of shaded to unshaded area = 1 : 1.

QUESTION ANALYTICS

+

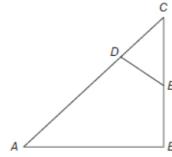
Q. 10

Solution Video

Have any Doubt ?

Q

$\angle ABC$ and $\angle CDE$ are right angled triangle. $\angle ABC = \angle CDE = 90^\circ$, D lies on AC and E lies on BC.
 $AB = 24$ cm, $BC = 60$ cm. If $DE = 10$ cm, then the length of CD in cm is_____.



25 (24 - 26)

Correct Option

Solution:
25 (24 - 26)

$\angle ABC$ is similar to $\angle EDC$

$$\begin{aligned} \therefore \frac{AB}{ED} &= \frac{BC}{DC} = \frac{AC}{EC} \\ \therefore \frac{AB}{DE} &= \frac{BC}{DC} \\ \Rightarrow \frac{24}{10} &= \frac{60}{DC} \Rightarrow DC = 25 \text{ cm} \end{aligned}$$

QUESTION ANALYTICS

+

Item 1-10 of 65 « previous 1 2 3 4 5 6 7 next »



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Q. 11
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the following commands to be run on a push down automata:

- I. $\delta(q_0, 0, 1) = (q_1, 01)$
- II. $\delta(q_0, 1, 10) = (q_1, \epsilon)$
- III. (a) $\delta(q_0, \epsilon, 0) = (q_1, \epsilon)$
 (b) $\delta(q_0, 0, 0) = (q_2, 11)$

How many of the above are valid DPDA commands?

 A I only

[Correct Option](#)
Solution :

- (a)
Only I is valid.

II is clearly invalid. Let's concentrate on why III is invalid.

III actually ends up creating a choice. How?

It has 2 subcommands, which together say "If the top of the stack is '0', then either pop it without reading the input tape, or, if upon reading the input 0 is seen, then replace 0 by 11 in the stack. Since DPDA doesn't entertain choice, III is invalid".

Hence only I is valid.

 B Both I and II

 C Both II and III

 D All I, II, III

QUESTION ANALYTICS

Q. 12
[Have any Doubt ?](#)


Consider the following C-program:

```
#include <stdio.h>
void happen (int * X, int * Y)
{
    int * Z;
    Z = Y
    Y = X
    X = Z
}
int main ( )
{
    int a = 2020, b = 0, c = 2, d = 4;
    happen (&a, &b);
    if (a < c)
        happen (&c, &a);
    happen (&a, &d);
    printf ("%d", a);
}
```

The output of the program is _____.

 A 2020

[Correct Option](#)
Solution :

- (a)
There is no effect on variables due to happen() function. Hence, a's value gets printed as it is.

 B 0

 C 2

 D 4

QUESTION ANALYTICS

Q. 13
[▶ Solution Video](#)
[Have any Doubt ?](#)


The number of distinct subwords for the word 'MEZZANINE' is equal to _____.

 A 36

B 18

C 28

D 42

Correct Option

Solution :

(d)

- One letter subwords: (M, E, Z, A, N, I) = 6
- Two letter subwords: (ME, EZ, ZZ, ZA, AN, NI, IN, NE) = 8
- 3 letter subwords: 7
- 4 letter subwords: 6
- ...
- 7 letter subwords: 3
- 8 letter subwords: 2
- 9 letter subwords: 1

$$\text{So total} = 6 + (8 + 7 + 6 + \dots + 3 + 2 + 1) = 42$$

QUESTION ANALYTICS



Q. 14

Solution Video

Have any Doubt ?



Determine True(T) / False(F) of the following statements.

- 1. Dynamic RAM consists of internal flip-flops.
- 2. Static RAM consists of capacitors.
- 3. Static RAM is easier to use than dynamic RAM.
- 4. Static RAM has shorter read and write cycles than that of dynamic RAM.

A FFTF

B TTTT

C FFTT

Correct Option

Solution :

(c)

Static random access memory is a type of semiconductor memory that uses bistable latching circuitry or flip-flop while dynamic random access memory uses capacitor. SRAM is easier to use and has smaller read and write cycles than that of DRAM.

D TTFF

QUESTION ANALYTICS



Q. 15

Solution Video

Have any Doubt ?



Consider a directed graph $G(V, E)$ it contain two vertices u and v , what is the time complexity to find shortest path from ' u ' to ' v ' with exactly m edge on the path using dynamic algorithm?

A $O(V^2 m)$

B $O(V^3 m)$

Correct Option

Solution :

(b)

The idea of the algorithm to build a 3D table with 3 dimension of source, destination and number of edges from source to destination and the value is count of walk. The time complexity of the algorithm is $O(V^3 m)$.

C $O(Vm)$

D $O(V^2 \log m)$

QUESTION ANALYTICS



Q. 16

Solution Video

Have any Doubt ?



Consider the following statement:

- "If today is 20th of August, then it is Sandler's birthday".
Which of the following follows from the above statement?
I. If it is Sandler's birthday, then today is 20th of August.
II. If today is the 17th of October, then it is not Sandler's birthday.

A I only

B II only

C Both I and II

D None of these

Correct Option

Solution :

(d)

None of the above follows from the above statement. If we see I, it is actually the converse of the given statement which obviously need not be true, although it is quite tempting to mark it as correct. Similarly II is the inverse of the given statement, which carries the same reason for not being necessarily true.

Hence both are false and (d) is the appropriate choice.

QUESTION ANALYTICS +

Q. 17

Solution Video

Have any Doubt ?



Consider the below statements with respect to FCFS scheduling.

1. Waiting time can be large if short service requests wait behind the long service ones.
2. It is not suitable for time sharing systems where each user gets the CPU for an equal amount of time interval.
3. A proper mix of jobs is needed to achieve good results from FCFS scheduling.

Which of the above statements are TRUE?

A 1 and 2 only

B 2 and 3 only

C 1 and 3 only

D All statements are correct

Correct Option

Solution :

(d)

All statements are true with respect to FCFS scheduling. Waiting time can be large if short requests wait behind long ones. For time sharing systems Round Robin scheduling is suitable where each user gets the CPU for an equal amount of time interval. A proper mix of jobs is needed to achieve good results (less waiting time, turn around time and response time) for FCFS scheduling.

QUESTION ANALYTICS +

Q. 18

Solution Video

Have any Doubt ?



A master slave configuration consists of two identical flip-flops connected in such a way that the output of the master is input to the slave. Which one of the following is correct?

A Master is level triggered and slave is edge triggered and change in the output affected when master is affected.

B Master is edge triggered and slave is level triggered.

C Master is positive edge triggered and slave is negative edge triggered and change in the output occurs when the state of the slave is affected.

Correct Option

Solution :

(c)

Master-slave flip-flop does not react at the same time. Master is positive edge triggered and slave is negative edge triggered. Output change whenever slave is affected.

D Change in the output occurs when in the state of the master is affected.

QUESTION ANALYTICS +

Q. 19

Solution Video

Have any Doubt ?



Consider a error free satellite channel of 84 Kbps used to send 256 byte data frames in one direction, with very short acknowledgments coming back the other way, propagation time is 150 msec, what is the minimum window size to that the channel is fully utilized _____.

A 12

B 13

Correct Option

Solution :

(b)

$$RTT = 2 \times 150 = 300 \text{ msec}$$

10³ msec 84 Kb

$$300 \text{ msec} \cdot \frac{84 \text{ Kb} \times 300}{10^3} = 25200 \text{ bit}$$

$$\text{Number of frames in } 300 \text{ msec} = \left\lceil \frac{25200}{256 \times 8} \right\rceil = \left\lceil 12.304 \right\rceil = 13$$

Minimum window size = 13

C 10

D 14

Q. 20

Have any Doubt?



Consider the following function:
`EXPL(int n)`

```
{
    if (n <=2) then return 1
    return (EXPL (n/2) * lg(n));
}
```

What does EXPL(n) return, if n is a power of 2?

A $n \cdot \lg(n)$

B $n \cdot \lg(n)$

C $n! \cdot \lg(n)$

D $(\lg(n))!$

Correct Option

Solution :

(d)

Perhaps the easiest way to see the answer to this problem is simply to write out EXPL(n) for a few n :

n	EXPL(n)
1	1
2	1
4	2
8	6
16	24
32	120

The function represents $(\lg(n))!$



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Q. 21
[Have any Doubt ?](#)


At a telephone enquiry system the number of phone calls received regarding relevant inquiry follows probability distribution with an average of 5 phone calls during 10 minute time interval. The probability that there is at the most one phone call during a 10 minute period is_____

A $\frac{5}{e^5}$

B $\frac{5}{e^5}$

C $\frac{6}{e^5}$

D $\frac{6}{e^5}$

Correct Option

Solution:
 (d)

$$\begin{aligned} P(X = r) &= \frac{e^{-m} m^r}{r!} \\ P(X \leq 1) &= P(X = 0) + P(X = 1) \\ &= e^{-5} + 5 \times e^{-5} = \frac{6}{e^5} \end{aligned}$$

[QUESTION ANALYTICS](#)

Q. 22
[Solution Video](#)
[Have any Doubt ?](#)


Let X, Y and Z be three sets such that X consists of all positive divisors of $2^6 \cdot 3^3 \cdot 5^3$, consists of all positive divisors of $2^8 \cdot 3^5 \cdot 5^4$, and Z consists of all positive divisors of $3^4 \cdot 5^2$. Then the cardinality of $X \cup Y \cup Z$, will be equal to _____.

A 135

B 95

C 220

D 270

Correct Option

Solution:
 (d)

Applying inclusion exclusion principle,

$$n(X \cup Y \cup Z) = n(X) + n(Y) + n(Z) - [n(X \cap Y) + n(Y \cap Z) + n(X \cap Z)] + n(X \cap Y \cap Z)$$

 Since X contains all divisors of $2^6 \cdot 3^3 \cdot 5^3$, $n(X) = (6+1)(3+1)(3+1) = 112$

 Similarly, $n(Y) = (8+1)(5+1)(4+1) = 270$

 And in the same way, $n(Z) = (4+1)(2+1) = 15$

 Now in order to find $X \cap Y$, we simply need to find the number of divisors of gcd of X and Y i.e.

$$\text{gcd}(2^6 \cdot 3^3 \cdot 5^3, 2^8 \cdot 3^5 \cdot 5^4) = 2^6 \cdot 3^3 \cdot 5^3$$

 Now the number of factors of this (i.e. $2^6 \cdot 3^3 \cdot 5^3$), will be $(6+1)(3+1)(3+1) = 112$.

 Hence $n(X \cap Y) = 112$

 Similarly, $n(Y \cap Z) = \text{Number of divisors of GCD of Y and Z}$

$$= \text{Number of divisors of } 3^4 \cdot 5^2$$

$$= (4+1)(2+1) = 15$$

 And, $n(X \cap Z) = \text{Number of divisors of GCD of X and Z}$

$$= \text{Number of divisors of } 3^3 \cdot 5^2 = 12$$

 Lastly, $n(X \cap Y \cap Z) = \text{Number of divisors of } 3^3 \cdot 5^2 = 12$

Putting all these, we get

$$n(X \cup Y \cup Z) = 112 + 270 + 15 - (112 + 15 + 12) + 12 = 270$$

Hence 270 is the answer.

[QUESTION ANALYTICS](#)

Q. 23
[Solution Video](#)
[Have any Doubt ?](#)


Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I

List-II

- | | |
|----------------------------------|-----------------------------------|
| A. Natural join | 1. B tree |
| B. Secondary index | 2. Functional dependency |
| C. Non procedural query language | 3. Domain calculus |
| D. Closure of set of attributes | 4. Relational algebraic operation |
- Codes:
- | | | | |
|-------|---|---|---|
| A | B | C | D |
| (a) 4 | 1 | 3 | 2 |
| (b) 3 | 1 | 4 | 2 |
| (c) 1 | 4 | 2 | 3 |
| (d) 2 | 1 | 3 | 4 |

A a

Correct Option

Solution :

(a)
Natural join is one of the operations used in relational algebra.
Domain calculus is non procedural query language.
B tree has secondary index.
We can find closure of set of attributes using given functional dependencies.

B b

C c

D d

 QUESTION ANALYTICS

+

Q. 24

 Solution Video

 Have any Doubt?

□

Let G be a cyclic group such that $O(G) = 100$. Then elements are picked from G one by one without replacement. Then how many draws are necessary to guarantee that at least 2 elements out of the elements drawn are generators of G _____.

A 60

B 40

C 62

Correct Option

Solution :

(c)
Let's find number of generators first.

$$\begin{aligned}\text{Number of generators} &= \phi(100) = \phi(2^2 \times 5^2) \\ &= (2^2 - 2)(5^2 - 5) \\ &= 2 \times 20 = 40\end{aligned}$$

$$\text{Number of non-generators} = (100 - 40) = 60$$

Hence we may end up picking 60 non-generators in the worst case scenario. But now that all non generators are over, the next 2 draws will definitely result in 2 generators. Hence in the worst case, 62 draws are necessary to guarantee the same.

So the answer is 62.

D 120

 QUESTION ANALYTICS

+

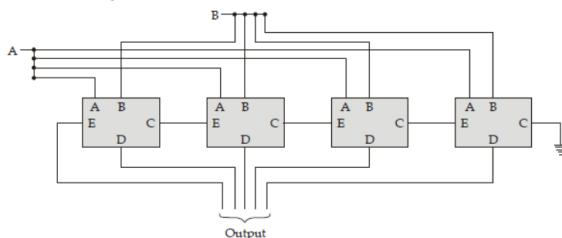
Q. 25

 Solution Video

 Have any Doubt?

□

Consider the following circuit:



Assume A, B and C are inputs while D and E are output from the four boxes. Where $D = A \oplus B \oplus C$ and $E = BC + \bar{A}C + \bar{A}B$, In the circuit act as

A 4 bit adder adding $A + B$

B 4 bit adder adding $A + B + C$

C 4 bit subtractor subtracting $A - B$

Correct Option

Solution :

(c)
4 bit subtractor subtracting $A - B$, where given D is for difference and E is for borrow.

D 4 bit subtractor subtracting $B - A$

Q. 26

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following sequence of assembly code:

I_1 : ADD R_3, R_2, R_4

I_2 : LOAD $R_5, 0(R_3)$

I_3 : ADD R_6, R_4, R_3

I_4 : ADD R_7, R_6, R_4

The number of data hazards in the above code are _____.

4

Correct Option

Solution :

4

3 RAW hazards and 1 WAR hazards.

RAW hazards:

are taken only $I_1 - I_2$

for consecutive $I_2 - I_3$

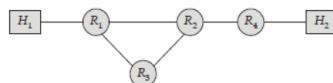
statements $I_3 - I_4$

WAR Hazards: $I_1 - I_2$

Q. 27

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider that two host H_1 and H_2 are connected via routers as shown below, number of times each packet has to visit the network layer is A and data link layer is B in worst case during transmission from H_1 to H_2 the value of $A + B$ is _____.



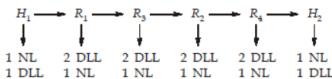
16

Correct Option

Solution :

16

In worst case packet may be transferred from all routers.



Total network layer visited = 6

Total DLL visited = 10

$$A + B = 10 + 6 = 16$$

Q. 28

[Have any Doubt ?](#)

Value of $\lim_{x \rightarrow 0} \frac{x^2 \cos x}{1 - \cos x}$ is _____.

2

Correct Option

Solution :

2

$$\text{Given } \lim_{x \rightarrow 0} \frac{x^2 \cos x}{1 - \cos x} = \lim_{x \rightarrow 0} \frac{x^2 \cos x}{2 \sin^2 \frac{x}{2}}$$

$$= \lim_{x \rightarrow 0} \frac{x^2}{4} \times \frac{4 \cos x}{2 \sin^2 \frac{x}{2}} = \lim_{x \rightarrow 0} \left(\frac{x}{2}\right)^2 \times \frac{4 \cos x}{2}$$

$$\Rightarrow \because \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$\Rightarrow \lim_{x \rightarrow 0} \left(\frac{x}{2}\right)^2 \times \frac{4 \cos x}{2} = 2$$

Consider a simple paging system a page table containing 256 entries of 16 bits (including valid/ invalid bit) each and a page size 512 bytes, the number of bits in physical address is _____.

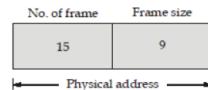
24

Correct Option

Solution :
 24

$$\text{Page size} = 512 \text{ bytes} = 2^9$$

There is 16 bits in page table entry size and 1 bit for valid/invalid, number of bits for frame number = $16 - 1 = 15$



Number of bits in physical address = 24

QUESTION ANALYTICS

+

A graph G with n vertices is said to be a void graph if and only if there's no edge between any pair of vertices belonging to G. Let X be a void graph on $2^k + 1$ vertices. Then if it is known that the minimum number of edge insertions required in the best case in order to make it connected is equal to 512, then the value of $k^{1/2}$ is equal to _____.

3

Correct Option

Solution :
 (3)

In the best case, we need to form a tree with n vertices, for which we need $n - 1$ edges.
 Hence minimum number of edge insertions = $(2^k + 1) - 1$
 Which is equal to 512, as mentioned in the problem statement.
 Hence $2^k = 512$, meaning k equals 9. Thus, square root of $k = 3$.

QUESTION ANALYTICS

+



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Q. 31
[Have any Doubt ?](#)


Consider the following code:

```
int x[] = {1, 4, 8, 5, 1, 4};
int *ptr, y;
ptr = x + 4;
y = ptr - x;
```

The y in the above sample code is _____.

4
[Correct Option](#)
Solution :

4

(ptr - x) will give number of elements between addresses pointed by ptr and x.
 Here x points to first element i.e. 1 and ptr points to 5th element i.e. also 1.
 Hence number of elements between them is 4.

Q. 32
[Solution Video](#)
[Have any Doubt ?](#)


Consider the following three relations:

$R(a, b) = \{(0, 1), (4, 5), (8, 9)\}$
 $S(b, c) = \{(1, 2), (5, 2), (5, 6), (5, 10), (13, 10)\}$
 $T(c, d) = \{(2, 3), (6, 7), (10, 11), (10, 31)\}$

 The number of tuples $R \bowtie S \bowtie T$ will return _____.

5
[Correct Option](#)
Solution :

5

a	b
0	1
4	5
8	9
13	10

R

b	c
1	2
5	2
5	6
5	10
13	10

S

a	b	c
0	1	2
4	5	2
4	5	6
4	5	10
4	5	10

c	d
2	3
6	7
10	11
10	31

T

a	b	c	d
0	1	2	3
4	5	2	3
4	5	6	7
4	5	10	3
4	5	10	11

Total 5 tuples will be returned and also it must be noted natural join is commutative as well as associative.

4
[Correct Option](#)
Q. 33
[Have any Doubt ?](#)

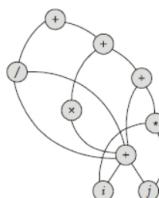

Consider the following expression:

 $((i+j) + (i \times j) + ((i+j) \times (i+j))) + (((i+j) / (i \times j)))$

 The number of nodes in direct acyclic graph is a and edges is b, the value of $2a - b$ is _____.

4
[Correct Option](#)
Solution :

4

 $((i+j) + (i \times j) + ((i+j) \times (i+j))) + (((i+j) / (i \times j)))$

 Number of nodes = 9
 Number of edges = 14

number of edges = 14
 $2a - b = 9 \times 2 - 14 = 4$

QUESTION ANALYTICS

Q. 34

[▶ Solution Video](#)

[Have any Doubt ?](#)



Consider a array A = {8, 22, 7, 9, 31, 5, 13} the number of swapping needed to sort the number in ascending order using bubble sort is _____.

10

Correct Option

Solution :

10

Array A = {8, 22, 7, 9, 31, 5, 13}

1. 8 22 7 9 31 5 13
2. 8 7 22 9 31 5 13
3. 8 7 9 22 31 5 13
4. 8 7 9 22 5 31 13
5. 8 7 9 22 5 13 31
6. 7 8 9 22 5 13 31
7. 7 8 9 5 22 13 31
8. 7 8 9 5 13 22 31
9. 7 8 5 9 13 22 31
10. 7 5 8 9 13 22 31

Total 10 swap required.

QUESTION ANALYTICS

Q. 35

[Have any Doubt ?](#)



Consider the following C program:

```
int x[6] = {1, 2, 3, 4, 5, 6};
int *ptr = (int*) (&x + 1);
printf("%d%d", *(x + 1), *(ptr - 1));
```

Assume program executed successfully. The output of the above program is _____.

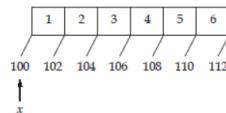
26

Correct Option

Solution :

26

Assume int is of 2 Bytes and starting location is 100



Note: ($\&x + 1$) and ($x + 1$) are different as former will point to location next to the end of an array and later will point to the second position of array.

```
ptr = (&x + 1) = 112
*(x + 1) = *(102) = 2
*(ptr - 1) = *(110) = 6
The above program will print '26'.
```

QUESTION ANALYTICS

Q. 36

[▶ Solution Video](#)

[Have any Doubt ?](#)



The character a to h have the set of frequencies based on the first 8 Fibonacci numbers $a = 1, b = 1, c = 2, d = 3, e = 5, f = 8, g = 13, h = 21$, Huffman coding is used to represent the characters, what is the sequence of characters corresponding to the code 110111100111010?

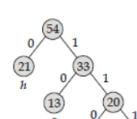
A ecgdf

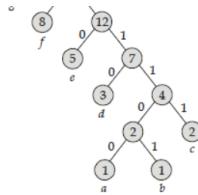
Correct Option

B fdheg

Solution :

(b)





$h = 0, g = 10, f = 110, e = 1110, d = 11110, a = 1111100, b = 1111101, c = 111111$

110 11110 0 1110 10
 ↓ ↓ ↓ ↓ ↓
 f d h e g

C fehdg

D dcchfg

QUESTION ANALYTICS



Q. 37

Solution Video

Have any Doubt?



Consider the following statements:

- I. Firewall works on application layer not on network layer.
 - II. In URG flag data received may be out of order.
 - III. IMAP protocol not always synchronized with the mail server but POP protocol always synchronized.
- Which of the above statement(s) is/are not correct?

A I and II only

B I only

C I and III only

Correct Option

Solution :

(c)

- Firewall works on network layer also called as packet filters.
- URG flag is used to notify the receiver to process the urgent packets before processing all other packet so data received may be out of order.
- IMAP protocol, whenever user changes anything on the client side same time it changes on server side because of synchronization.

D II and III only

QUESTION ANALYTICS



Q. 38

Solution Video

Have any Doubt?



Let $f: \{x, y, z\} \rightarrow \{a, b, c\}$ be a one to one function, such that the following conditions hold true.

- I. $f(x) \neq a$
- II. $f(y) = c$
- III. $f(z) \neq b$

Then the value of $f^{-1}(a)$ will be equal to

A x

B y

C z

Correct Option

Solution :

(c)

We are given in the question, that $f(y)$ equals c , and f is a one to one function. Which means that no 2 elements in the co-domain can share the same preimage. So every element in the domain must get mapped to a unique element in the co-domain.

So looking at the first condition, $f(x) \neq a$ means that $f(x)$ equals either b or c . But since $f(y)$ equals c , we now know that $f(x)$ cannot be equal to c since it's already taken by $f(y)$, and therefore will be equal to b instead. Similarly $f(z) \neq b$ says it can take either a or c , but again, as c is already taken by $f(y)$, $f(z)$ will have only one choice left i.e. $f(z) = a$.

Hence $f(x) = b, f(y) = c, f(z) = a$

The required answer, $f^{-1}(a)$ will be equal to z .

Therefore option (c) will be the correct choice.

D Does not exist

QUESTION ANALYTICS



Q. 39

Solution Video

Have any Doubt?



Consider the following thread with 3 semaphore $S_1 = 1$, $S_2 = 0$, $S_3 = 0$. X is shared variable.

```
Void thread1( )           Void thread2( )           Void thread3( )
{
    A                           C                           P(S3)
    X = X + 1;                 V = X + 2;           X = X * 2;
    B                           V(S3)                     D
}
|
```

All threads are executing concurrently what is the value of A, B, C, D respectively to only result in the valid of $X = 6$?

A $P(S_1), V(S_1), P(S_2), V(S_2)$

B $P(S_1), V(S_2), P(S_2), V(S_1)$

Correct Option

Solution :

(b)
If second and third threads states first, they get block. When first thread start, S_1 value becomes 0 after P operation and X value will be initialized to 1, then it signals to thread 2 which is waiting on S_2 . Thread 2 changes X value to 3 then signal thread 3 which is turn double X value.
Now final value of X became 6.

C $P(S_2), V(S_1), P(S_1), V(S_2)$

D $P(S_2), V(S_2), P(S_1), V(S_1)$

 QUESTION ANALYTICS

+

Q. 40

 Solution Video

 Have any Doubt ?

QUESTION

Consider the following schedule:

$r_1(A) r_2(B) w_1(C) w_3(B) r_3(C) w_2(B) w_3(A)$

Which of the following time stamp ordering allows to execute above schedule using Thomas write rule time stamp ordering protocol?

A $(T_1, T_2, T_3) = (10, 30, 20)$

B $(T_1, T_2, T_3) = (30, 10, 20)$

C $(T_1, T_2, T_3) = (30, 20, 10)$

D $(T_1, T_2, T_3) = (10, 20, 30)$

Correct Option

Solution :

(d)

$T_1 (10)$	$T_2 (20)$	$T_3 (30)$
$r(A)$		
$w(C)$	$r(B)$	
	$w(B)$	$w(B)$
		$r(C)$
	$w(A)$	

$w_3(B), w_2(B)$ is allowed in TWR.

 QUESTION ANALYTICS

+

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ALL(65)

CORRECT(0)

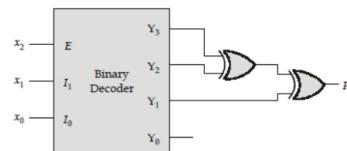
INCORRECT(0)

SKIPPED(65)

Q. 41

Solution Video

Have any Doubt ?

In the shown circuit, given "X" is a 3-bit binary number ($x_2 x_1 x_0$), where E represents enable circuit

- A $F = 1$ when "X" is greater equal to 4
- B $F = 1$ when "X" is an even number
- C $F = 1$ when "X" is greater than 4
- D None of the above

QUESTION ANALYTICS



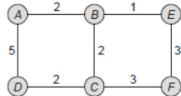
Q. 42

Solution Video

Have any Doubt ?



Consider the network given below:



Each node in the graph represents the router. Each node maintains its routing table to send a packet to its destination with minimum cost. Initially routing table is empty. The table is filled as every node knows only the distance to the immediate neighbour. What will be the routing table 'F' after each node has twice reported the information it had in the proceeding steps in its immediate neighbours?

- A A B C D E F
 $\infty \quad 3 \quad \infty \quad 3 \quad 3 \quad 0$
- B A B C D E F
 $\infty \quad 4 \quad 3 \quad 5 \quad 3 \quad 0$
- C A B C D E F
 $6 \quad 4 \quad 3 \quad 5 \quad 3 \quad 0$

Correct Option

Solution :

(c)

Initially the routing table of router F.

A	B	C	D	E	F
∞	∞	3	∞	3	0

Now on 1st exchange

A	B	C	D	E	F
∞	4	3	5	3	0

Now on 2nd exchange

A	B	C	D	E	F
6	4	3	5	3	0

- D A B C D E F
 $6 \quad 4 \quad 5 \quad 3 \quad 5 \quad 0$

QUESTION ANALYTICS



Q. 43

Solution Video

Have any Doubt ?

Let G be a cyclic group of order 60. Let g be a generator of the cyclic group G. What is the order of the element g^{20} ?

- A 1
- B 2

Solution :
(c)

$$\begin{aligned} O(g^x) &= \frac{n}{\gcd(x, n)} \\ O(2^{20}) &= \frac{60}{\gcd(20, 60)} = \frac{60}{20} = 3 \end{aligned}$$

QUESTION ANALYTICS



Q. 44



Consider an array $a[]$ with n elements $a[i]$ contain all distinct natural number, if the number of inversion in a is m , then what is the time complexity of most efficient algorithm to compute the number of inversion where every element of $a[]$ is made negative of that number?

A $O(n)$

B $O(1)$

Solution :
(b)

An array have maximum number of inversion = ${}^n C_2$.
Number of inversion in array = m
Modified array has number of inversion = ${}^n C_2 - m$
Time complexity = $O(1)$

C $O(n \log n)$

D $O(\log n)$

QUESTION ANALYTICS



Q. 45



Suppose you are given an array A of size n that either contains all zeros or $\frac{2n}{3}$ zeros and $\frac{n}{3}$ ones in some arbitrary order. You have to determine whether A contains any ones. Give an exact lower bound in terms of n (not using asymptotic notation) on the worst-case running time of any deterministic algorithm that solves this problem.

A $\frac{2n}{3}$

B $\frac{n}{3}$

C $\frac{2n+3}{3}$

Solution :
(c)

Any correct deterministic algorithm must look at $\frac{2n}{3} + 1$ entries, because if it didn't, it could see all zeros even when there was a one somewhere.

D $\frac{n}{3+1}$

QUESTION ANALYTICS



Q. 46



Consider the following queries on relation $R(a,b)$ and $S(c,d)$:

Query 1: Select a FROM R where NOT EXISTS
(Select * FROM S where $R.a \leq S.c$)

Query 2: $\Pi_a(R) - \Pi_a(R \bowtie_{a \leq c} S)$

Query 3: Select a FROM R where $a \leq \text{ANY } (\text{Select } c \text{ from } S)$

Which of the above queries give same result?

A Query 1 and Query 3

B Query 1 and Query 2

Solution :
 (b)
 Query 1 gives result same as query 2 which is set of all values which are greater than every value of S .
 Query 3 result set of all values which are less than or equal to ANY values of S .

C Query 2 and Query 3

D All of Query 1, Query 2 and Query 3

QUESTION ANALYTICS

Q. 47

Solution Video

Have any Doubt ?



Consider the following program segment. Here $R1$, $R2$ and $R3$ are the general purpose registers.

Instruction	Operation	Instruction size (number of words)
MOV R1, 3000	$R1 \leftarrow M[3000]$	2
LOOP:		
MOV R2, (R3)	$R2 \leftarrow M[[R3]]$	1
ADD R2, R1	$R2 \leftarrow R1 + R2$	1
MOV (R3), R2	$M[[R3]] \leftarrow R2$	1
INCR3	$R3 \leftarrow R3 + 1$	1
DEC R1	$R1 \leftarrow R1 - 1$	1
BNZ LOOP	Branch on not zero	2
HALT	Stop	1

Assume that the content of memory location 3000 is 10 and the content of the register R3 is 2000. The content of each of the memory locations from 2000 to 2010 is 100. The program is loaded from the memory location 1000. All the numbers are in decimal. Assume that the memory is word addressable. The number of memory references required to execute the program completely is

A 10

B 62

C 94

Correct Option

Solution :

(c)

Given,

$$R_1 = M[3000] = 10 \text{ (loop runs 10 times)}$$

$$\text{Total memory references} = 3 + 10 \times (2 + 1 + 2 + 1 + 1 + 2) + 1 = 94$$

D 21

QUESTION ANALYTICS

Q. 48

Have any Doubt ?



Consider the following statements:

- I. Operator grammar does not allow unit production.
 - II. Directed acyclic graph can be used to eliminate the common sub expression.
 - III. A flow graph is a directed graph in which the flow control information is added to basic block.
- Which of the above statement(s) is/are correct?

A I and II only

B II and III only

Correct Option

Solution :

(b)

Operator grammar allows unit production it does not have any restriction on unit production. Directed acyclic graph can be used to eliminate the common sub expression. A flow graph is a directed graph in which the flow control information is added to basic block.

C I and III only

D II only

QUESTION ANALYTICS

Q. 49

Have any Doubt ?



If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then A^{2013} is equal to

A $2^{2012} A$

Correct Option

Solution :

(a)

Given $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

$$\Rightarrow A^2 = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$$

$$\begin{aligned} & \quad [1 \ 1] [1 \ 1] [2 \ 2] \\ \Rightarrow A^3 &= \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix} \\ \Rightarrow A^n &= 2^{n-1} A \\ \Rightarrow A^{2013} &= 2^{2012} A \end{aligned}$$

B $2^{1006} A$

C $-2^{2013} A$

D I

 QUESTION ANALYTICS



Q. 50

 Have any Doubt?



What does the following function `f()` do?

```
bool f(const int a[], const unsigned int SIZE)
{
    for (unsigned int i = 0; i < SIZE-1; ++i)
    {
        if (a[i+1] ≤ a[i])
            return false;
    }
    return true;
}
```

A It returns true whether the array is sorted in descending order.

B It returns true whether the last element of the array is the min of all the elements.

C It returns true whether the array is sorted in ascending order.

D None of the above

Correct Option

Solution :

(d)

The function will return false if the given array is sorted in ascending order and some values are repeated. Example: 1 2 2 3 will return false.

 QUESTION ANALYTICS



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ALL(65)

CORRECT(0)

INCORRECT(0)

SKIPPED(65)

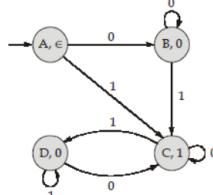
Q. 51

Solution Video

Have any Doubt ?



Consider the following Moore Machine:

Note that the input string is scanned from LSB to MSB then the output obtained when the output $(01)^{128} 0$ is supplied to the machine isA $(10)^{128} 0$ B $(01)^{127} 10$ C $(10)^{127} 110$

Correct Option

Solution :

(c)

Given Moore Machine simply performs 2's complement of the given input.

We have $(01)^{128} 0 \equiv (01)^{127} 010$ 2's complement of the above string will be, $(10)^{127} 110$.

Hence, clearly option (c) is the answer.

D $(10)^{128} 0$

QUESTION ANALYTICS



Q. 52

Solution Video

Have any Doubt ?

Consider a disk drive with the following specifications: 16 surfaces, 512 tracks/surface, 512 sectors/track, 1 KB/sector, rotation speed 3000 rpm. The disk is operated in cycle stealing mode whereby whenever two byte word is ready it is sent to memory. Memory cycle time is 40 μ s. The maximum percentage of time that the CPU gets blocked during DMA operation is

A 10

B 33.8

Correct Option

Solution :

(b)

X :

$$\begin{aligned} 3000 \text{ revolution} &\dots 60 \text{ sec} \\ 1 \text{ revolution} &\dots ? \end{aligned}$$

$$\Rightarrow \frac{60}{3000} = 20 \text{ ms}$$

$$20 \text{ ms} \dots 512 \text{ KB}$$

$$? \dots 2B$$

$$\Rightarrow \frac{20 \text{ ms} \times 2B}{512 \text{ KB}} = 78.125 \mu\text{s}$$

$$\text{Percentage of time the CPU gets blocked during DMA operation} = \frac{40}{118.125} \times 100 \approx 33.86$$

C 40.5

D 50

QUESTION ANALYTICS



Q. 53

Solution Video

Have any Doubt ?



A server wants to perform following operation, while TCP connection establishment. What primitive will be used for them respectively?

- (i) Create a new communication end point.
- (ii) Attach local address to a socket.
- (iii) Announce willingness to accept connection.
- (iv) Block the caller until a connection attempt arrives.

A Bind, Socket, Listen, Close

B Socket, Accept, Listen, Receive

C Socket, Bind, Accept, Close

D Socket, Bind, Listen, Accept

Correct Option

Solution :

(d)

Socket: Create a new end point allocated table space for it within transport entity.

Bind: Created sockets are assigned address.

Listen: It allocate space to queue incoming calls for the case that several clients try to connect at same time.

Accept: To block, waiting for an incoming connection, server execute accept primitive.

QUESTION ANALYTICS



Q. 54

Solution Video

Have any Doubt ?



Let X denote the number of ways of distributing 7 identical balls to 3 children such that each child gets at least one ball. Then the value of X is equal to _____.

15

Correct Option

Solution :

15

Let's first find the value of X.

Distribution of 7 identical balls to 3 children can be found by finding the number of solutions to the equation,

$$x_1 + x_2 + x_3 = 7, \text{ where each } x_i \text{ is at least 1.}$$

Giving one ball to each child to satisfy the 'at least 1' constraint, we now have,

$$x_1 + x_2 + x_3 = 4$$

$$\begin{aligned} \text{Number of solutions} &= {}^{n-1+r}C_r, \text{ where } n = 3 \text{ and } r = 4; \\ &= {}^{3-1+4}C_4 = 15 \end{aligned}$$

QUESTION ANALYTICS



Q. 55

Solution Video

Have any Doubt ?



Consider the following grammar G_1 and G_2 :

$G_1 : S \rightarrow aSa \mid bSb \in$

$G_2 : S \rightarrow Saa \mid Sbb \in$

Let X be the length of the shortest string that belongs to $L(G_1)$ but not $L(G_2)$ and Y be the length of the shortest string that belongs to $L(G_2)$ but not $L(G_1)$. Then the value $\left(\frac{X}{Y}\right)$ is _____.

1

Correct Option

Solution :

1

Take the string $w_1 = abba$

Now $w_1 \in L(G_1)$, but $w_1 \notin L(G_2)$.

Therefore $X = 4$

Take another string $w_2 = aabb$

Clearly $w_1 \notin L(G_2)$, but $w_2 \notin L(G_1)$.

Hence $Y = 4$

$$\text{Therefore the required value } \left(\frac{X}{Y}\right) = \frac{4}{4} = 1$$

Hence 1 is the answer.

QUESTION ANALYTICS



Q. 56

Solution Video

Have any Doubt ?



Assume on an ethernet there are two active channel both has a queue of frames to sent, to get control on channel binary exponential algorithm is used, the probability that both are successfully allowed to send the frame on 5th round and earlier attempts both collides is _____. (Upto 3 decimal places)

0.014 [0.014 - 0.016]

Correct Option

Solution :

0.014 [0.014 - 0.016]

At first attempt both collides.

At second attempt number of slots will be 2 (0, 1).

At n attempt number of slots = 2^n (0 to $2^n - 1$)

$$\text{Probability of collision at attempts } n = \frac{1}{2^{n-1}}$$

$$\begin{aligned} \text{Successfully transmission at 5th attempt} &= \frac{1}{2^{(1-1)}} \times \frac{1}{2^{(2-1)}} \times \frac{1}{2^{(3-1)}} \times \frac{1}{2^{(4-1)}} \times 1 - \frac{1}{2^{(5-1)}} \\ &= [1 \times 0.5 \times 0.25 \times 0.125 \times 0.9375] = 0.014 \end{aligned}$$

Q. 57

[▶ Solution Video](#)[Have any Doubt ?](#)

Assume a demand paging system where integers are stored in 4 byte and size of page is 256 bytes, LRU algorithm is used for page replacement each process is allocated with 3 frames, a process executes the following code:

```
int p1[200] [300];
    int j = 0;
    int i = 0;
    while (i ++ < 200) {
        j = 0;
        while (j ++ < 200)
            p1[i] [j] = 0;
    }
```

The code occupies page 0 and since a location from page 0 is referenced each instruction, page 0 is always swapped in, the number of page fault this program generates is _____.

626

Correct Option

Solution :

626

The array has $200 \times 200 = 40000$ elements
Each require 4 byte = $40000 \times 4 = 160000$ bytes
Page size = 256 bytes

Total 625 pages.

The program access the locations in the array in the order they are stored thus it will swap in the instruction page and each of the 625 data pages plus one total 626 page faults.

Q. 58

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider an array $A = \{8, 10, 3, 9, 5, 15, 4, 7\}$, quick sort is applied to the array A , in which the partition algorithm is modified such that at each pass of quick sort pivot element is chosen such that it divides the array in worst case and continues till the array is sorted, consider a list L , once a pivot is chosen during an iteration insert it into the List L and repeat the procedure, how many such lists are possible _____.

128

Correct Option

Solution :

128

In order to get worst case split we need to always choose the maximum or minimum element. We have two choices for every iteration.

 $A = \{8, 10, 3, 9, 5, 15, 4, 7\}$

For last element there is one choice.

Total number of possible lists = $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 1 = 2^7 = 128$

Q. 59

[▶ Solution Video](#)[Have any Doubt ?](#)

The virtual address generated by a CPU is 36 bits, the Translation Look-aside Buffer (TLB) can hold 512 entries and a 8-way set associative, page size is 4 KB the size of the TLB tag is _____.

18

Correct Option

Solution :

18

Virtual address space = 36 bits
Page size = 4 KB = 12 bit

TLB can hold 512 entries.

$$\text{Number of sets} = \frac{2^9}{2^3} = 2^6$$

TAG	No. of set	Page size
18	6	12

Size of TLB tag is = 18 bit

Q. 60

[Have any Doubt ?](#)

A probability density function can be given as $\frac{1}{x}$ on the interval $[1, b]$ and outside this interval the value of function is zero. The value of b is _____.

(Up to 2 decimal places)

2.71 [2.69 - 2.73]

Correct Option

Solution :
2.71 [2.69 - 2.73]

Given, probability density function

$$f(x) = \begin{cases} \frac{1}{x} & 1 \leq x \leq b \\ 0 & \text{elsewhere} \end{cases}$$

also $\int_{-\infty}^{\infty} f(x) dx = 1$

$$\Rightarrow \int_{-\infty}^1 0 dx + \int_1^b \frac{1}{x} dx + \int_b^{\infty} 0 dx$$

$$\Rightarrow [\ln|x|]_1^b = 1$$

$$\Rightarrow \ln b - \ln 1 = 1$$

$$\Rightarrow \ln b = 1$$

$$\Rightarrow b = e = 2.718$$

 QUESTION ANALYTICS



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Kunal Jha

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Q. 61
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Consider the following program given below:

```
# include <stdio.h>
int fun (int, int);
typedef int (*pf) (int , int);
int proc (pf, int, int);
int main()
{
    printf("%d\n", Proc (fun, 6, 6));
    return 0;
}
int fun (int a, int b)
{
    int temp = 2;
    printf("%d", temp);
    return (a == b);
}
int proc (Pf P, int a, int b)
{
    return ((*P) (a, b));
}
```

The output of the above program is _____.

21
[Correct Option](#)
Solution:

21

• fun() first will print 2 of temp and then it will return 1 as (6 == 6) is true. The value 1 then will be printed by the caller main() function.

[QUESTION ANALYTICS](#)

Q. 62
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Let R(A, B, C, D, E) be a relation which has 500000 records. Size of each record is 200 B. Size of attribute A is 16 B. Size of pointer is 4 B and size of the block is 2400 B (assume elements are stored in sorted order of key). On the execution of the query,

Select * from R where A = 'GATE'

The difference of the cost in term of number of block transfer from the disk when multilevel index used and when binary search applied without indexing is _____.

12
[Correct Option](#)
Solution:

12

Calculating the blocking factor of the relation,

$$\text{Blocking factor} = \left\lceil \frac{2400}{200} \right\rceil = 12$$

$$\text{Number of blocks in file} = \left\lceil \frac{500000}{12} \right\rceil = 41667$$

$$\text{Blocking factor of index file} = \left\lceil \frac{2400}{20} \right\rceil = 120$$

$$\text{Number of blocks of 1st level index} = \left\lceil \frac{41667}{120} \right\rceil = 348$$

$$\text{Number of blocks of 2nd level index} = \left\lceil \frac{348}{120} \right\rceil = 3$$

$$\text{Number of blocks of 3rd level index} = \left\lceil \frac{3}{120} \right\rceil = 1$$

Cost of query using index = Height of index + 1 block for file = 3 + 1 = 4

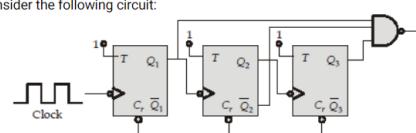
 Cost of query using binary search = $\lceil \log_2 41667 \rceil = 16$

Difference = 16 - 4 = 12

[QUESTION ANALYTICS](#)

Q. 63
[Solution Video](#)
[Have any Doubt?](#)


Consider the following circuit:



The circuit is Mod-n counter then n = _____.

5

Correct Option

Solution :

5

To reset all the flip-flops,

$$Q_1 = 1, Q_2 = 0, Q_3 = 1 \quad (101)_2 = (5)_{10}$$

The given circuit is a mod-5 up counter because after the counter state 101, the counter resets and starts counting again from 000.

QUESTION ANALYTICS



Q. 64

Have any Doubt ?



Consider the following grammars:

$$G_1: S \rightarrow aSbS \mid bSaS \mid \epsilon$$

$$G_2: S \rightarrow AB \mid aaB$$

$$A \rightarrow a \mid Aa$$

$$B \rightarrow b$$

I. G_1 is ambiguous grammar.II. G_2 is ambiguous grammar.

The number of correct statement(s) _____.

2

Correct Option

Solution :

2

$$G_1: S \rightarrow aSbS \mid bSaS \mid \epsilon$$

It generate two parse tree for $W = abab$ so it is ambiguous.

$$G_2: S \rightarrow AB \mid aaB$$

$$A \rightarrow a \mid Aa$$

$$B \rightarrow b$$

It generate two parse tree for string $W = aab$ so G_2 is ambiguous.

Both the statements are correct.

QUESTION ANALYTICS



Q. 65

▶ Solution Video

Have any Doubt ?



A 17 way set associative cache has 16 byte blocks and 32 bit byte addressable memory. The cache size is 17408 bytes. The total bits required for both tag and word offset for any CPU reference is _____.

26

Correct Option

Solution :

26

16 bytes per block, so there are $\log_2 16 = 4$ bits.

Cache size = 17408 bytes

$$\therefore \frac{17408}{16} = 1088 \text{ blocks}$$

The cache is 17 way associative, so, there are $\frac{1088}{17} = 64$ sets $\therefore \log_2 64 = 6$ bits (set number)Number of tag bits is $32 - 6 - 4 = 22$ tag bits.

$$22 + 4 = 26$$

QUESTION ANALYTICS



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