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Course: GATE
Computer Science Engineering(CS)

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# GATE MOCK TEST 4 GATE 2019 - REPORTS

OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

ALL(65) | CORRECT(33) | INCORRECT(17) | SKIPPED(15)

**Q. 1**

Choose the correct meaning of proverb/idiom
'To end in smoke'

Solution Video | Have any Doubt ?

A To completely understand

B To ruin oneself — Your answer is **Correct**

**Solution :**
(b)

C To give applause

D To overpower someone

QUESTION ANALYTICS +

**Q. 2**

Choose the correct alternative to the underlined part of the sentence
If the room had been brighter, I would have been able to read for a while before bed time.

Solution Video | Have any Doubt ?

A If the room was brighter

B If the room are brighter

C Had the room been brighter — Correct Option

**Solution :**
(c)

D No improvement — Your answer is **Wrong**

QUESTION ANALYTICS +

**Q. 3**

Choose the option which can be substituted for the given word/sentence.
'One who dabbles in fine arts for the love of it and not for monetary gains'

Solution Video | Have any Doubt ?

A Connoisseur

B Amateur — Correct Option

**Solution :**
(b)

C Professional

D Dilettante

QUESTION ANALYTICS +

**Q. 4**

If 's' denotes the sum of the integers from 1 to 30, inclusive and 't' denotes the sum of the integers from 31 to 60 inclusive. What is 't-s'?

Solution Video | Have any Doubt ?

A 800

B 900 — Your answer is **Correct**

**Solution :**
(b)

$$t = 31 + 32 + ..+ 59 + 60$$
$$s = 1 + 2 + ... + 29 + 30$$
So $t - s = (31 - 1) + (32 - 2) + ... + (59 - 29) + (60 - 30)$ i.e.
30 terms and each equals 30
Hence $t - s = 30 \times 30 = 900$

C 1000

D 1100

QUESTION ANALYTICS +

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**Q. 5**

What is the remainder when $2^{28}$ is divided by 3?

Solution Video | Have any Doubt ?

1 — Your answer is **Correct**1

**Solution :**
1

$$\text{Remainder of } \frac{2^{28}}{3} = \text{Remainder of } \frac{((3-1)^{28})}{3} = \text{Remainder of } \frac{(-1)^{28}}{3} = \text{Remainder of } \frac{1}{3} = 1$$

QUESTION ANALYTICS +

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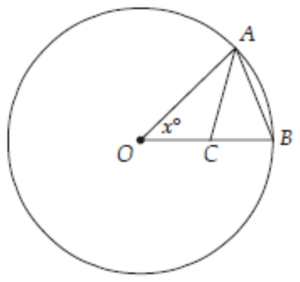
**Q. 6**

In the figure below, point O is the center of the circle and $OC = AC = AB$. What is the value of $x$?




Solution Video | Have any Doubt ?

A 40

B 36 — Correct Option

**Solution :**
(b)

In triangle OAB, Angle O + Angle A + Angle B = 180 -------1

OA = OB (Radius)

⇒ Angle A = Angle B

In triangle ACB,

Angle C = Angle O + Angle OAC (Sum of interior opposite angles)

⇒ Angle ACB = $2x$;

Also, AC = AB

⇒ Angle ACB = Angle ABC = $2x$ each

Thus, Angle A = Angle B = $2x$ each.

So, substituting in 1

$5x = 180$

⇒ $x$ = 36 degrees

C 34

D 32

QUESTION ANALYTICS +

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**Q. 7**

An empty swimming pool is being filled by a hose that runs at 3 cubic feet per minute for 60 minutes. The square swimming pool is 12 feet wide. How deep is the water in the pool?

Solution Video | Have any Doubt ?

A 25 inches

B 1 ft. 2.5 inches

C 1 ft. 3 inches — Correct Option

**Solution :**
(c)

Total water filled in 60 mins = 60 × 3 = 180 cubic feet

Volume of the swimming pool = $x \times x \times h$

$180 = 12 \times 12 \times h$

$$h = \frac{180}{144} = 1.25 \text{ feet} = 1 \text{ ft and } 3 \text{ inches}$$

D 1 ft. 4 inches

QUESTION ANALYTICS +

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**Q. 8**

How many 5 letter words (with or without meaning) can be formed using all the following 5 letters A, B, C, D and E so that letter A is to the left of letter B?

Solution Video | Have any Doubt ?

A 120

B 60 Correct Option

**Solution :**
(b)
Total ways of arranging 5 letters in any possible order = 5 × 4 × 3 × 2 × 1 = 5! = 120
In half of the cases A will be to the left of B and in other half A will be to the right of B

Hence, desired outcome $= \frac{120}{2} = 60$

C 48

D 24 Your answer is **Wrong**

QUESTION ANALYTICS +

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**Q. 9**

It takes 60 days to fill a laboratory dish with bacteria. If the size of the bacteria doubles each day, how long did it take for the bacteria to fill one half of the dish?

Solution Video | Have any Doubt ?

A 20 days

B 30 days

C 48 days

D 59 days Correct Option

**Solution :**
(d)
Since it takes 60 days to fill the dish and the population doubles each day, then the dish will be half full after 59 days. 1 day later (so after 60 days) the population will double again and the dish will be full.

QUESTION ANALYTICS +

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**Q. 10**

On Monday, Viraat started training for a marathon and ran one mile that day. On Tuesday, Viraat ran one mile more than he did on Monday. He continues this training process for 12 days. The sum of the total number of miles Viraat ran has how many distinct prime factors?

Solution Video | Have any Doubt ?

3 Your answer is **Correct**3

**Solution :**
3
Distance travelled 1 to 12 days = { 1, 2, 3, 4, 5, 6, 7, ..., 12}

$$\text{Total distance} = \frac{[12(12+1)]}{2} = \frac{12 \times 13}{2} = 6 \times 13 = 2 \times 3 \times 13$$

Thus, 3 prime factors

QUESTION ANALYTICS +

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**Q. 11**

The number of strings in $\{0, 1\}^+$ which satisfies $w^k = w^{k+1}$ for all $k >= 0$ is

Have any Doubt ?

A 1 Your answer is **Wrong**

B 2

C 0 Correct Option

**Solution :**
(c)
The only string which satisfies the above condition is $\in$, but since $\in$ does not belong to $(0, 1)^+$, therefore the number of such strings will be 0.

D 3

QUESTION ANALYTICS +

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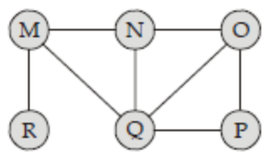
**Q. 12**

Consider the following undirected graph.




BFS algorithm is run on the above graph. Which of the following is possible orders of visiting the nodes in the graph?

Have any Doubt ?

A MNOPQR Correct Option

**Solution :**
(c)

(a)
Out of the given options, only (d) is the correct order in which the nodes can be visited using BFS algorithm.
Hence option (a) order is correct.

B NQMPOR

C QMNROP

D POQNMR — Your answer is **Wrong**

QUESTION ANALYTICS +

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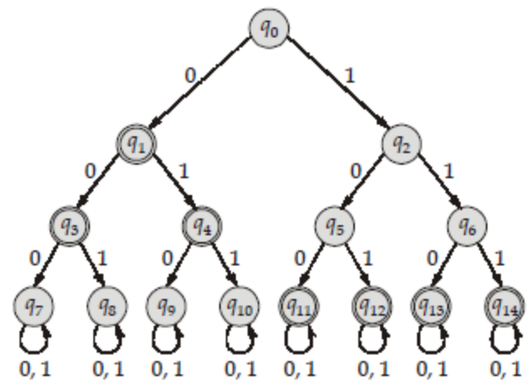
**Q. 13**

Consider the following DFA in the form of a complete binary tree, having $\Sigma = \{0, 1\}$ and has 15 states as shown below:




Let $L(x)$ be the language accepted by the DFA if the starting state is $q_2$. Similarly let $L(y)$ be the language accepted if starting state is $q_1$. Then the number of states in the minimal DFA accepting $L(x) \cup L(y)$ will be equal to

Have any Doubt ?

A 0

B 1 — Correct Option

**Solution :**
(b)

$$L(x) = \{w \mid w \in (0, 1)^*;\ |w| \geq 2\}$$
$$L(y) = \{w \mid w \in (0, 1)^*;\ |w| \leq 1\}$$
$$L(x) \cup L(y) = L[(0 + 1)^*]$$

Therefore we need only one state.
So answer will be option (b).

C 2 — Your answer is **Wrong**

D 3

QUESTION ANALYTICS +

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**Q. 14**

In a 16-bit instruction the size of address field is 7 bits. The computer uses expanding opcode techniques. It has 2, two address instruction and 250 one address instruction. How many zero address instruction can be formulated.

Have any Doubt ?

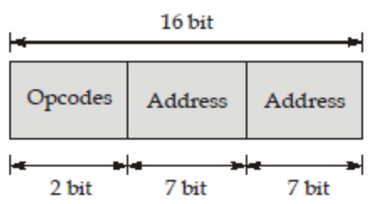
A 5120

B 15304

C 768 — Your answer is **Correct**

**Solution :**
(c)

2-address instruction




Number of free opcodes = $2^2 - 2 = 2$
Total number of one address instruction = $2 \times 2^7 = 256$
Number of free opcodes = $(256 - 250) = 6$
Number of zero address instruction = $6 \times 2^7 = 768$

D 1024

QUESTION ANALYTICS +

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**Q. 15**

Consider two sorted arrays which are having sizes M and N. To combine those arrays into a single array then total comparisons and movements required respectively are

Have any Doubt ?

A $O(M^2)$ and $O(M + N)$

B O(M) and O(M + N) — Your answer is **Wrong**

C $O(M+N)$ and $O(N)$

D $O(M+N)$ and $O(M+N)$ — Correct Option

**Solution :**
(d)
The comparisons required in the worst case is $O(M+N)$ using merge procedure. Similarly all $(M+N)$ elements need to be moved in to new array using merge procedure.
Therefore movements are of $O(M+N)$.

QUESTION ANALYTICS

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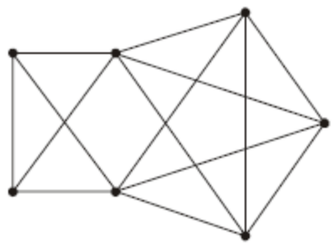
**Q. 16**

The vertex connectivity of the given graph is equal to

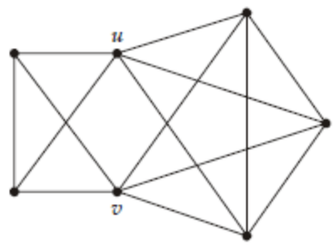


Have any Doubt ?

A 1

B 2 — Correct Option

**Solution :**
(b)




The above two vertices $u$ and $v$ shown in the figure when removed at the same time, disconnect the graph. So VC = 2.

C 3

D None of these — Your answer is **Wrong**

QUESTION ANALYTICS

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**Q. 17**

Consider the following statements:
$S_1$ : Paging suffers flow external fragmentation.
$S_2$ : Segmentation does not suffer from external fragmentation.
Which of the above is correct?

Have any Doubt ?

A Only $S_1$

B Only $S_2$

C Both $S_1$ and $S_2$

D None of the above — Your answer is **Correct**

**Solution :**
(d)
$S_1$ : Paging does not suffers external fragmentation.
$S_2$ : Segmentation suffer from external fragmentation.

QUESTION ANALYTICS

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**Q. 18**

Let $f(A,B)=\overline{A}+\overline{B}$, then the value of $f(f(x+y,y),z)$ = ?

Have any Doubt ?

A $\overline{y}+z$

B $\overline{y}+\overline{z}$

C $y+\overline{z}$ — Your answer is **Correct**

**Solution :**
(c)

$$A = x+y$$
$$B - y$$
$$f(x+y,y) = \left(\overline{x+y}\right)+\overline{y} = \overline{x}.\overline{y}+\overline{y}$$
So, $$f(\overline{y},z) = \overline{\overline{y}}+\overline{z} = y+\overline{z}$$

D $\overline{y+z}$

QUESTION ANALYTICS

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**Q. 19**

The best effort delivery services such as an IP does not include

Have any Doubt ?

A error checking

B datagram acknowledgment

C error correction — Your answer is **Wrong**

D All of these — Correct Option

**Solution :**
(d)
Option (a) : Error Checking is only for header part.
Option (b) : There is no acknowledgment for packets reaching the destination.
Option (c) : IP has minimal error control and there is no concept of error correction for IP datagram.
All the options are correct.

QUESTION ANALYTICS

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**Q. 20**

Consider the following statements:
$S_1$ : In an undirected simple graph in which each edge has distinct edge weight. If a cycle is encountered in the graph while MST construction then MST will contain each edge whose weight is minimum in any cycle.
$S_2$ : In an undirected simple graph in which each edge has distinct edge weight. If a cycle is encountered in the graph while MST construction then MST will exclude each edge whose weight is maximum in any cycle.
Which of the following is true?

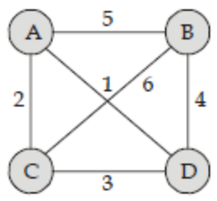
Have any Doubt ?

A Only $S_1$

B Only $S_2$ — Your answer is **Correct**

**Solution :**
(b)

- Let $G'$ be graph:




Since '3' is minimum in cycle BCD but it can't be included in MST because it will create cycle.

- $S_2$ is true since every edge with maximum weight in any cycle must be exclude in MST construction.

C Both $S_1$ nor $S_2$

D Neither $S_1$ nor $S_2$

QUESTION ANALYTICS

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**Q. 21**

If $A^3 - 2A^2$ is singular then one of the eigen of A is

Have any Doubt ?

A 2 — Your answer is **Correct**

**Solution :**
(a)

B 3

C 4

D 5

QUESTION ANALYTICS

---

**Q. 22**

Let $(D_n, /)$ be a Boolean Algebra where ' / ' stands for the usual 'divides' relation. It is known that $n = 5^{p-r}\,6^{p+r}\,7^{r+q+2s}\,11^{q-2s+r}$, for some $p, q, r, s \in Z$. Then the value of the expression $(2p + r + 2q + s)$ is equal to

Have any Doubt ?

A 256

B 49

C 4 — Correct Option

**Solution :**

(c)

We know that $(D_n, /)$ is a Boolean Algebra iff n can be broken into product of distinct primes ($n$ is square free).

So let's first break n into primes as, $n = 2^{p+r}\,3^{p+r}\,5^{p-r}\,7^{q+r+2s}\,11^{q+r-2s}$

So for $D_n$ to be a Boolean Algebra, the following equations must hold.

$$p + r = 1$$
$$p - r = 1$$
$$q + r + 2s = 1$$
$$q + r - 2s = 1$$

Solving these four equations, we get $p = 1, q = 1, r = 0, s = 0$

So the value of $2p + q + 2r + s = 4$

D 998

QUESTION ANALYTICS +

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**Q. 23**

Given relation R(A, B, C, D, E) with functional dependencies:

$F = \{AB \rightarrow C, AB \rightarrow D, D \rightarrow A, BC \rightarrow D, BC \rightarrow E\}$

What is the strongest normal form of relation R?

Have any Doubt ?

A 2 NF

B 3 NF — Your answer is **Correct**

**Solution :**

(b)

R(A, B, C, D, E)

$F = \{AB \rightarrow C, AB \rightarrow D, D \rightarrow A, BC \rightarrow D, BC \rightarrow E\}$

Closure of $(AB)^+ = \{ABCDE\}$

Closure of $(BC)^+ = \{ABCDE\}$

Closure of $(BD)^+ = \{ABCDE\}$

{AB, BC, BD} one keys of R

$D \rightarrow A$, A is prime attribute so it is in 3 NF but not in BCNF.

C BCNF

D None of the above

QUESTION ANALYTICS +

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**Q. 24**

Consider the following in the domain of integers.

$P(x) = x = 2$ or $x = 3$

$Q(x) = x$ is prime

$R(x) = x$ is even

I. $(R(x) \wedge Q(x)) \Rightarrow P(x)$

II. $P(x) \Rightarrow (R(x) \wedge Q(x))$

Which of the above statements is valid?

Have any Doubt ?

A I only — Your answer is **Correct**

**Solution :**

(a)

I is true

Clearly $R(x) \wedge Q(x) \Rightarrow P(x)$ means $x$ is even and $x$ is prime $\Rightarrow x = 2$ or $x = 3$ which is true.

II is false

B II only

C III only

D Neither I nor II

QUESTION ANALYTICS +

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**Q. 25**

The Boolean function can be expressed in canonical SOP and POS forms. So, for $Y = A\overline{B} + B\overline{C}$, the SOP and POS forms will be

Have any Doubt ?

A $Y = \Sigma\,(0, 2, 4, 6);\ Y = \pi\,(1, 3, 7)$

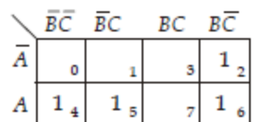
B $Y = \Sigma\,(1, 2, 5, 7);\ Y = \pi\,(0, 3, 4, 6)$

C $Y = \Sigma\,(2, 4, 5, 6);\ Y = \pi\,(0, 1, 3, 7)$ — Your answer is **Correct**

**Solution :**

(c)

Plotting the K-map for $Y = A\overline{B} + B\overline{C}$



So, $\Sigma m\ (2, 4, 5, 6) = \text{SOP}$

$\Sigma\pi\ (0, 1, 3, 7) = \text{POS}$

D $Y = \Sigma\ (1, 2, 4, 5);\ Y = \pi\ (0, 3, 6)$

QUESTION ANALYTICS +

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**Q. 26**

Consider a non-pipelined processor with a clock rate of 3 GHz and each instructions requires on an average 4 cycles. The same processor is upgraded to a pipelined processor with 8 stages, but due to the internal pipeline delay, the clock speed is reduced to 2 GHz. Assume that there are no stalls in the pipeline. The speed up achieved in this pipelined processor is _____. (Upto 2 decimal places)

Have any Doubt ?

2.66 (2.50 - 2.70)

2.66
Your answer is **Correct**

**Solution :**
2.66 (2.50 - 2.70)

Cycle time for non-pipelined setup $= \frac{1}{3}$ ns

Execution time for an instruction $= 4 \times 0.33$ ns $= 1.332$ ns

Execution time for an instruction using pipeline $= \frac{1}{2}$ ns $= 0.5$ ns

$$\text{Speed up} = \frac{\text{Time without pipeline}}{\text{Time with pipeline}} = \frac{1.332}{0.5} = 2.664$$

QUESTION ANALYTICS +

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**Q. 27**

In the network 242.20.51.200/28, the fourth octet (in decimal) of the last IP address of the network which can be assigned to a host is _____.

Have any Doubt ?

206

Your answer is **Correct**206

**Solution :**
206

242.20.51.200/28

255.255.255.240

240 → 1111 0000

200 → 1100 1000

**Network Id**

First IP → 1100 0001

.

.

Last IP → 1100 1110

i.e. last IP is 242.20.51.206

∴ 206 is the fourth octet of the last IP address.

QUESTION ANALYTICS +

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**Q. 28**

Consider the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 4 \\ -1 & -1 & -2 \end{bmatrix}$ whose eigen values are 1, –1 and 3. Then trace of $A^4 - 4A^3$ is _____.

Have any Doubt ?

-25

Your answer is **Correct**-25

**Solution :**
-25

Eigen values of given matrix A are 1, –1, 3

Eigen values of $A^4 = 1, 1, 81$

Eigen values of $4A^3 = 4, -4, 108$

Eigen values of $A^4 - 4A^3 = -3, 5, -27$

∴ Trace of $A^4 - 4A^3 = -3 + 5 - 27 = -25$

QUESTION ANALYTICS +

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**Q. 29**

Consider the following code segment:

| $P_0$ ( ) | $P_1$ ( ) |
|---|---|
| { | { |
| P(S) | P(S) |
| $a = a + 3;$ | $a = b + 5;$ |
| V(S) | V(S) |
| } | } |

Initial value of a = 0, b = 10 and S = 1 (where S is semaphore variable, P and V are usual semaphore operation $a$ and $b$ are shared variable between $P_0$ and $P_1$)

The numbers of distinct values that a can possibly take after the execution when $P_0$ and $P_1$ both concurrently executing _____.

Have any Doubt ?

2

Correct Option

**Solution :**
2

If $P_0$ is executed first then $P_1$

$a = 0 + 3$

$a = 3$

$a = 10 + 5$

$a = 15$

At the end of execution a can take 15

If $P_1$ is executed first then $P_0$.

$a = 10 + 5$

$a = 15$

$a = 15 + 3$

$a = 18$

$a$ can take 18

Total 2 different values.

QUESTION ANALYTICS

**Q. 30**

Consider the following sets I, II, III and IV as follows:

I. {0, 1, 1, 1, 2, 2, 2, 2, 2}

II. {2, 0, 1}

III. {{2}, {2}, {{2}}, {{2}}}

IV. {2, {2}}

Let X, Y, Z, W denote the cardinality of the sets I, II, III and IV respectively. Then X + Y + Z + W will be equal to _____.

Have any Doubt ?

10

Your answer is **Correct**10

**Solution :**

10

In a set, the order of the elements as well as repetition does not matter. So I and II both have cardinality 3. The set III has 2 distinct elements, i.e. {2} and {{2}} respectively. IV also has 2 elements namely, 2 and {2}. Therefore both III and IV have cardinality equal to 2 each.

So $X + Y + Z + W = 3 + 3 + 2 + 2 = 10$

QUESTION ANALYTICS

**Q. 31**

Let T be a tree with 25 vertices. Then the sum of degrees of all vertices in T is equal to _____.

Have any Doubt ?

48

Correct Option

**Solution :**

48

Given, $n = 25$

Since T has $n - 1$ edges, therefore $e = 25 - 1 = 24$

Required degree sum $= 2e = 2.24 = 48$

Your Answer is 30

QUESTION ANALYTICS

**Q. 32**

Consider the following statements:

$S_1$ : A functional dependency X → Y is allowed in 3NF iff X is a superkey and Y is prime attribute.

$S_2$ : Every relation in relational model must be in 1NF.

$S_3$: Relational calculus is a non procedural language.

The number of correct statement are _____.

Have any Doubt ?

2

Correct Option

**Solution :**

2

$S_1$: A functional dependency X → Y is allowed in 3NF iff X is a superkey or Y is prime attribute.

$S_2$: Every relation in relational model must be in 1NF and all other normal form are optional.

$S_3$: Relational calculus is a non procedural language.

Your Answer is 1

QUESTION ANALYTICS

**Q. 33**

Consider the following statements:

$S_1$ : LR(1) grammar can be LR(0) but can not be LL(1).

$S_2$ : Every regular language is LL(1).

$S_3$ : Three address code is a linearized representation of syntax tree.

Which of the above statements are correct _____.

Have any Doubt ?

2

Correct Option

**Solution :**

2

$S_1$: Some LR(1) grammar can also be LL(1) grammar.

$S_2$: For every regular language there exist a regular grammar which is LL(1) so every regular language is LL(1).

$S_3$: Three address code is a linearized representation of syntax tree.

$S_2$ and $S_3$ is correct.

Your Answer is 3

QUESTION ANALYTICS

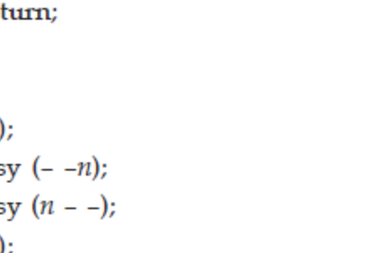
**Q. 34**

Max-heap is constructed by inserting the following integer in the order into an empty tree. The sum of minimum integer value present at every level of max heap tree _____.
Input: 20, 32, 1, 3, 4, 5, 6, 7, 10, 23, 50

Have any Doubt ?

60 — Your answer is **Correct**60

**Solution :**
60




$min_0$ = Minimum element present at 0 level = 50
$min_1$ = Minimum element present at 1 level = 6
$min_2$ = Minimum element present at 2 level = 1
$min_3$ = Minimum element present at 3 level = 3
Sum = $min_0 + min_1 + min_2 + min_3$
= 50 + 6 + 1 + 3 = 60

QUESTION ANALYTICS

**Q. 35**

Consider the following function:

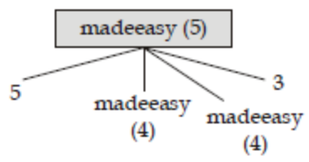
```
void madeeasy (int n)
{
    if (n < 0) return;
    else
    {
        printf(n);
        madeeasy (– –n);
        madeeasy (n – –);
        printf(n);
    }
}
```

The sum of all values printed by madeeasy (5) _____.

Have any Doubt ?

52 — Correct Option

**Solution :**
52




madeeasy (1) = 1 – 1 = 0
madeeasy (2) = 2 + 0 + 0 + 0 = 2
madeeasy (3) = 3 + 2 + 2 + 1 = 8
madeeasy (4) = 4 + 8 + 8 + 2 = 22
madeeasy (5) = 5 + 22 + 22 + 3 = 52

QUESTION ANALYTICS

**Q. 36**

An array '$S$' contain n distinct elements. Consider a function '$f_i$' which is defined as:

$f_i = \{\max(a, b, c) \mid \forall_{a,b,c} \in S \text{ and } a \neq b \neq c\}$

What is the worst case time complexity to find set of all possible elements which are returned by function '$f_i$' when array '$S$' is passed as an argument?

Have any Doubt ?

A $O(n)$ — Your answer is **Correct**

**Solution :**
(a)
If we observe their are ${}^nC_3$ sets of 3-elements possible. Out of $n$ elements only 2-smallest element cannot be present in "max-element set". So we can use 2-pass of selection sort to find 2-smallest elements, other than these two elements all will be present in "max-element set". So it will take $O(n)$ time.

B $O(n \log n)$

C $O(n^2)$

D $O(n^3)$

QUESTION ANALYTICS

**Q. 37**

Consider an error-free 64-Kbps satellite channel used to send 512-byte data frames in one direction, with very short acknowledgments coming back the other way. Assume the earth-satellite propagation time is 270 msec. What is the minimum window size so that the channel is fully utilized?

Have any Doubt ?

A 1

B 7

C 10 — Your answer is **Correct**

**Solution :**
(c)

$$T_p = 270 \text{ msec}$$
$$\text{R.T.T.} = 2 \times T_p$$
$$= 540 \text{ msec}$$

$10^3$ msec _____ 64 KB
540 msec _____ ?

$$= \frac{64 \text{ KB}}{10^3} \times 540$$

$$540 \text{ msec} = 34560 \text{ bit}$$

$$\text{Number of frames in 540 msec} = \frac{34560 \text{ bit}}{512 \times 8 \text{ bit}} = \lceil 8.43 \rceil = 9$$

So to fully utilized minimum size of window = 9
Hence option (c) is more close matching.

D 15

QUESTION ANALYTICS +

**Q. 38**

The number of vertices, edges and colors required for proper coloring in the tripartite graph $K_{3, 2, 5}$ will be

Have any Doubt ?

A 10, 31 and 3 respectively — Correct Option

**Solution :**
(a)

$$v(K_{m, n, p}) = m + n + p$$
$$= 3 + 2 + 5 = 10$$
$$e(K_{m, n, p}) = mn + np + mp$$
$$= 3 \times 2 + 2 \times 5 + 3 \times 5 = 31$$

B 10, 30 and 2 respectively

C 10, 30 and 3 respectively

D None of the above

QUESTION ANALYTICS +

**Q. 39**

Consider the following snapshot of three processes in the system.

| Process | Allocated | | | Remaining Need | | |
|---|---|---|---|---|---|---|
| | $R_1$ | $R_2$ | $R_3$ | $R_1$ | $R_2$ | $R_3$ |
| $P_1$ | 2 | 1 | 0 | 1 | 0 | 0 |
| $P_2$ | 2 | 3 | 2 | 0 | 1 | 1 |
| $P_3$ | 0 | 0 | 1 | 0 | 0 | 1 |

Assume $R_1$, $R_2$ and $R_3$ has 4, 4 and 5 instances respectively available before the above allocations. Which of the following options is correct ?

Have any Doubt ?

A System is in safe state and $P_1$ process will finish the execution last

B System is in safe state and $P_2$ process will finish the execution last

C System is not in safe state — Your answer is **Correct**

**Solution :**
(c)

| Process | Allocated | | | Remaining Need | | |
|---|---|---|---|---|---|---|
| | $R_1$ | $R_2$ | $R_3$ | $R_1$ | $R_2$ | $R_3$ |
| $P_1$ | 2 | 1 | 0 | 1 | 0 | 0 |
| $P_2$ | 2 | 3 | 2 | 0 | 1 | 1 |
| $P_3$ | 0 | 0 | 1 | 0 | 0 | 1 |

| | $R_1$ $R_2$ $R_3$ |
|---|---|
| Total = | (4 4 5) |
| Allocated | (4 4 3) |
| Available | (0, 0, 2) |

By this available instance of resources only the need of $P_3$ can be fulfilled. Hence $P_3$ will be executed and available resources [0 0 1] + [0 0 2] = [0 0 3]
Now, no process can execute further and hence, system is not in safe state.

D None of these

QUESTION ANALYTICS +

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**Q. 40**

Consider a database with block pointer size 10 bytes, search key is 14 bytes and record pointer is 8 bytes and database uses either B tree or $B^+$ tree for index. Order of $B^+$ tree internal node is P and B tree is Q then what is the value of P – Q, if block size is 1024 bytes? (Assume order is the maximum child pointer a node can have)

Have any Doubt ?

A 10

B 11 — Your answer is **Correct**

**Solution :**
(b)

Order of $B^+$ tree internal node is P

$$P \times 10 + (P - 1)\,14 \le 1024$$
$$10P + 14P - 14 \le 1024$$
$$24P \le 1038$$
$$P \le 43.25$$

Order of B tree is Q

$$Q \times 10 + (Q - 1)\,(14 + 8) \le 1024$$
$$10Q + (Q - 1)\,22 \le 1024$$
$$10Q + 22Q \le 1024 + 22$$
$$32Q \le 1046$$
$$Q \le 32$$
$$P - Q = 43 - 32 = 11$$

C 12

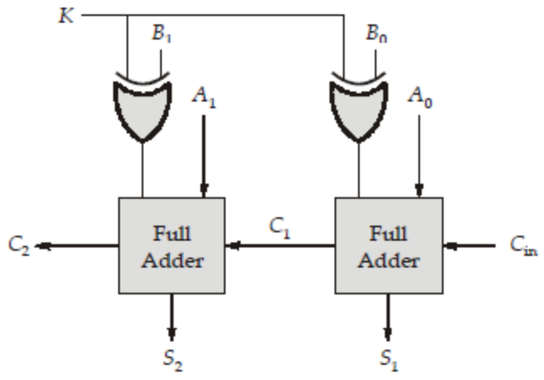
D 13

QUESTION ANALYTICS +

---

**Q. 41**

Assume the operands $A$ and $B$ are available in 2's complement representation. To decrement $A$ by 1 lines $K$, $C_{in}$ and $B$ should be




Have any Doubt ?

A $K = 1, C_{in} = 1, B = 1$

B $K = 0, C_{in} = 1, B = 1$

C $K = 0, C_{in} = 1, B = 0$

D $K = 1, C_{in} = 0, B = 0$ — Correct Option

**Solution :**
(d)

| $K$ | $C_0$ | $B$ | Operations |
|---|---|---|---|
| 0 | 0 | B | A + B (addition |
| 0 | 1 | B | A + B + 1 (addition with carry) |
| 0 | 1 | 0 | A + 1 (increment) |
| 1 | 0 | B | A + B (1's complement addition) |
| 1 | 1 | B | A + B + 1 (2's complement subtraction) |
| 1 | 0 | 0 | A – 1 (decrement) |

QUESTION ANALYTICS +

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**Q. 42**

A computer on a 10-Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 2 Mbps. It is initially filled to capacity with 20 Megabits. How long can the computer transmit at the rate of 10 Mbps (in seconds) upto two decimal places?

Have any Doubt ?

A 2.5 sec — Correct Option

**Solution :**
(a)

Burst length of computer is given by

$$S = \frac{C}{M - e}$$

C: Bucket capacity; M: Output rate; e: Bucket fill rate

$$\frac{20 \times 10^6}{}$$

$$S = \frac{}{10\times10^6 - 2\times10^6} = 2.5 \text{ seconds}$$

B 3 sec

C 4 sec

D 3.5 sec

QUESTION ANALYTICS

---

**Q. 43**

The number of distinct subwords possible for the word 'LAPPEELLAAN' is

Have any Doubt ?

A 59 — Correct Option

**Solution :**
(a)
1 letter subwords: (L, A, P, E, N) = 5
2 letter subwords: (LA, AP, PP, PE, EE, EL, LL, AA, AN) = 9
3 letter subwords: (LAP, APP, PPE, PEE, EEL, ELL, LLA, LAA, AAN) = 9
4 letter subwords: (LAPP, APPE, PPEE, PEEL, EELL, ELLA, LLAA, LAAN) = 8
5 letter subwords = 7
6 letter subwords = 6
⋮
9 letter subwords = 3
10 letter subwords = 2
11 letter subwords = 1
Hence number of subwords = 5 + 9 + (9 + 8 + 7 + 6 + … + 2 + 1)

$$= 14 + \frac{9\times10}{2} = 59$$

B 26

C 32

D 48

QUESTION ANALYTICS

---

**Q. 44**

Consider the following code:

```
int P = 0;
for (i = 1; i < 2n; i++)
{
    for (j = 1, j<=n; j++)
    {
        if (j < i) P = P +1;
    }
}
printf("%d", P);
```

What is the output printed by the above code in terms of $n$?

Have any Doubt ?

A $\frac{4n^2 - n}{2}$

B $\frac{3n^2 - n}{2}$ — Your answer is **Correct**

**Solution :**
(b)

$$\sum_{i=1}^{2n}\sum_{j=1}^{n}1 - \sum_{j=1}^{n}j = \sum_{i=1}^{2n}n - \frac{n(n+1)}{2}$$

$$= 2n^2 - \frac{n^2}{2} - \frac{n}{2} = \frac{3}{2}n^2 - \frac{n}{2} = \frac{3n^2 - n}{2}$$

C $\frac{n^2 - 4n}{2}$

D $\frac{n^2 - 3n}{2}$

QUESTION ANALYTICS

---

**Q. 45**

Consider a new sorting algorithm similar to the bubble sort algorithm, called RumbleSort. Given an array as input, RumbleSort attempts to sort the array and produces a sorted array as output. Here's the pseudocode for RumbleSort.

```
RumbleSort(L):
    let sorted = false
    while not sorted:
        sorted = true
```

```
for i: = 0; i < len(L) – 2; i++:
if L[i] > L[i + 2]:
        sorted = false
        reverse the given list from L[i]  to L[i + 2] (inclusive)
```

With regards to the above Rumble Sort algorithm, consider the following statements.
$S_1$ : RumbleSort works correctly for all inputs.
$S_2$ : The time complexity of determining if the RumbleSort algorithm will work correctly for a given input is $O(n^2)$.
Which of the above statements is/are true?

Have any Doubt ?

A Both $S_1$ and $S_2$

B Only $S_1$

C Only $S_2$

D None of these — Correct Option

**Solution :**
(d)
Both are false statements.
Justification:
RumbleSort is actually Bubble Sort being applied separately to odd and even positions. We can see the way the element comparisons are done as follows.
Element 0 - Element 2
Element 1 - Element 3
Element 2 - Element 4
Element 3 - Element 5
Element 4 - Element 6
And so on. And it can be see that (even, odd) and (odd, even) positions are never compared. Hence we can conclude that RumbleSort gives two sorted sublists, such that one sublist which contains elements at even positions is sorted, as well as the other sublists containing elements at odd positions is also sorted.
Hence, $S_1$ is clearly false.
Now since we know how the algorithm works, the algorithm actually sorts the odd and even sublists separately. Hence we can mimic the action of this algorithm by using the best sorting technique which takes $O(n \log n)$ time to sort the odd and even positions separately first. And to check if the given array is sorted takes $O(n)$. Hence overall time complexity to check if the algorithm will work correctly for a given input, is $O(n \log n)$ - thus $S_2$ is also false.

QUESTION ANALYTICS +

---

**Q. 46**

Consider the following schedule
S : $R_1(x)$, $R_2(x)$, $W_2(x)$, $W_3(y)$, $W_3(x)$, $R_1(z)$, $W_1(x)$
(Where $R(x)$, $W(x)$ are read, write operation on data item $x$)
Which of the following is true about the above schedule?

Have any Doubt ?

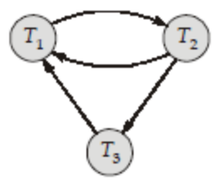
A Only conflict serializable

B Only view serializable — Your answer is **Wrong**

C Both conflict and view serializable

D None of the above — Correct Option

**Solution :**
(d)




Precedence graph of S contain cycle so not conflict serializable.
For view serializable
Final write: $x = T_1, y = T_3$
Initial read: $x = T_1, T_2, y = T_3, z = T_1$
Write read conflict
$(T_2, T_3) \rightarrow T_1$
$T_1 \rightarrow T_2, T_3$
It is not possible at same time.
So not view serializable.

QUESTION ANALYTICS +

---

**Q. 47**

Consider a micro program control unit and list of corresponding properties in control unit design:

| Micro program control unit | Properties |
|---|---|
| P. Horizontal μ Control unit | 1. Control signals are in decoded binary format |
| Q. Vertical μ Control unit | 2. Control signals are in encoded binary format |
| | 3. Shorter Control Word |
| | 4. Longer Control Word |
| | 5 Low degree of parallelism |
| | 6. High degree of parallelism |

Which of the following is the correct match between the Micro program control unit and their properties?

Have any Doubt ?

A (P-1, 4, 6) and (Q-2, 3, 5) — Your answer is **Correct**

**Solution :**
(a)

- In **Horizontal μ Control unit** design Control signals are in decoded binary format, Longer Control Word and High degree of parallelism.
- In **Vertical μ Control unit** design Control signals are in encoded binary format, Shorter Control Word and Low degree of parallelism.

B (P-1, 4, 5) and (Q-2, 3, 6)

C (P-2, 4, 6) and (Q-1, 3, 5)

D (P-2, 3, 6) and (Q-1, 4, 5)

QUESTION ANALYTICS +

---

**Q. 48**

Consider the following grammar G:

$S \rightarrow aA \mid CB$
$A \rightarrow BaA \mid \in$
$B \rightarrow bB \mid AaC \mid \in$
$C \rightarrow B$

Which of the following is true about the above grammar?

Have any Doubt ?

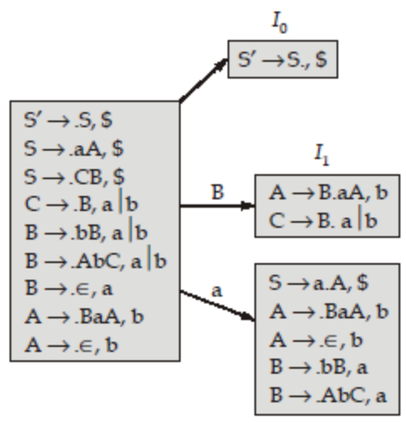
A LL(1) and LR(0)

B Not in LL(1) but LR(0)

C Only SLR(1)

D Not LL(1) and SLR(1) — Your answer is **Correct**

**Solution :**
(d)




While constructing DFA parser we see $I_1$ has S-R conflict.
For SLR Follow(C) = {b, a, $}
{a} ∩ {b, a, $}
= {a}
It is not in SLR(1) and LR(0).
For LL(1)
In the S production
First (aA) ∩ First (CB)
{a} ∩ {b, ∈, a}
{a} ≠ ϕ
So it is not in LL(1).

QUESTION ANALYTICS +

---

**Q. 49**

Consider the following linear system:

$x + 2y - 3z = c$
$2x + 3y + 3z = b$
$5x + 9y - 6z = a$

This system is consistent if $a$, $b$ and $c$ satisfy the equation

Have any Doubt ?

A $7a - b + c = 0$

B $3a + b - c = 0$

C $7a + b + c = 0$

D $a - 3c - b = 0$ — Correct Option

**Solution :**
(d)

Given, $[A : B] = \begin{bmatrix} 1 & 2 & -3 & | & c \\ 2 & 3 & 3 & | & b \\ 5 & 9 & -6 & | & a \end{bmatrix}$

$R_2 \rightarrow R_2 - 2R_1$
$R_3 \rightarrow R_3 - 5R_1$

$= \begin{bmatrix} 1 & 2 & -3 & | & c \\ 0 & -1 & 9 & | & b-2c \\ 0 & 1 & 9 & | & a-5c \end{bmatrix}$

$$R_3 \to R_3 - R_2$$

$$= \begin{bmatrix} 1 & 2 & -3 & | & c \\ 0 & -1 & 9 & | & b-2c \\ 0 & 0 & 0 & | & a-3c-b \end{bmatrix}$$

For consistency of system $a - 3c - b = 0$

QUESTION ANALYTICS

**Q. 50**

Assume that the following values are inserted into binary search tree in the given order: 40, 50, 70, 20, 30, 10, 60, 90, 80, 100. Consider the following function:

```
void find (Node * root)
{
    if (root == NULL) return;
    find (root → left);
    find (root → right);
    printf ("%d", root → data);
}
struct node
{
    int data;
    struct node * left;
    struct node * right;
} Node;
```

Find the output printed by the above function, if the root of the binary search tree is passed to the "tree" function.

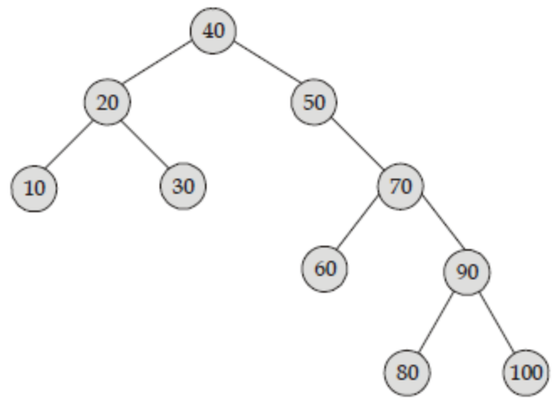
Have any Doubt ?

A 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

B 30, 20, 10, 60, 80, 100, 90, 70, 50, 40

C 10, 30, 20, 60, 80, 100, 90, 70, 50, 40 — Correct Option

**Solution :**
(c)
Binary search tree of given sequence is




The given function perform post order traversal on the binary search tree.
So output is 10, 30, 20, 60, 80, 100, 90, 70, 50, 40.

D 30, 20, 100, 80, 90, 60, 70, 50, 10, 40

QUESTION ANALYTICS

**Q. 51**

Consider the following languages M and N.

$M = \{ww^R ww^R \mid w \in (0, 1)^*\}$

$N = \{w_1 w_1{}^R w_2 w_2{}^R \mid w \in (0, 1)^*\}$

Then which of the above languages are CFLs?

Have any Doubt ?

A Both M and N

B Only M

C Only N — Your answer is **Correct**

**Solution :**
(c)
M will be a CSL and N will be context free.
Therefore option (c) is the answer.

D None of these

QUESTION ANALYTICS

**Q. 52**

Consider 4 stage instruction pipeline executed on a system:

| | $S_1$ | $S_2$ | $S_3$ | $S_4$ |
|---|---|---|---|---|
| $I_1$ | 1 | 3 | 1 | 1 |
| $I_2$ | 2 | 1 | 2 | 1 |
| $I_3$ | 1 | 2 | 1 | 2 |

| | | | | |
|---|---|---|---|---|
| $I_4$ | 2 | 1 | 2 | 1 |

If all instructions are executed only once, what is the throughput of system?

Have any Doubt ?

A $\frac{4}{9}$ cycles

B $\frac{4}{10}$ cycles

C $\frac{4}{12}$ cycles

D $\frac{4}{11}$ cycles

Your answer is **Correct**

**Solution :**
(d)

| | $c_1$ | $c_2$ | $c_3$ | $c_4$ | $c_5$ | $c_6$ | $c_7$ | $c_8$ | $c_9$ | $c_{10}$ | $c_{11}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $S_4$ | | | | | | $I_1$ | | $I_2$ | $I_3$ | $I_3$ | $I_4$ |
| $S_3$ | | | | | $I_1$ | $I_2$ | $I_2$ | $I_3$ | $I_4$ | $I_4$ | |
| $S_2$ | | $I_1$ | $I_1$ | $I_1$ | $I_2$ | $I_3$ | $I_3$ | $I_4$ | | | |
| $S_1$ | $I_1$ | $I_2$ | $I_2$ | | $I_3$ | $I_4$ | $I_4$ | | | | |

$$\text{Throughput} = \frac{\text{Number of task completed}}{\text{Total time taken to process the tasks}}$$

$$= \frac{4}{11} \text{ cycles}$$

QUESTION ANALYTICS

**Q. 53**

If TCP round trip time RTT is currently 20 millisec and the following acknowledgments come in after 22, 24 and 23 millisec respectively, what is new RTT estimate? ($\alpha$ =0.9)

Have any Doubt ?

A 28.527

B 28.82

Correct Option

**Solution :**
(b)

$$\begin{aligned}
\text{I.R.T.T} &= 20 \text{ ms} \\
\text{N.R.T.T} &= 22 \text{ ms } (\alpha = 0.9) \\
\text{E.R.T.T} &= \alpha \times \text{I.R.T.T} + (1 - \alpha) \times \text{N.R.T.T} \\
&= 0.9 \times 20 + 0.1 \times 22 = 20.2 \text{ ms} \\
\text{I.R.T.T} &= 20.2 \text{ ms} \\
\text{N.R.T.T} &= 24 \text{ ms} \\
\text{E.R.T.T} &= 0.9 \times 20.2 + 0.1 \times 24 = 20.58 \text{ ms} \\
\text{I.R.T.T} &= 23.58 \text{ ms} \\
\text{N.R.T.T} &= 23 \text{ ms} \\
\text{E.R.T.T} &= 0.9 \times 20.58 + 0.1 \times 23 \\
&= 20.82 \text{ ms}
\end{aligned}$$

C 29.527

D None of these

Your answer is **Wrong**

QUESTION ANALYTICS

**Q. 54**

Consider the following instance of boolean matrix M of order 4 × 5.

| | | | | |
|---|---|---|---|---|
| False | True | False | True | False |
| False | False | True | False | False |
| False | True | True | True | False |
| True | True | True | True | True |

Each entry M[$i$, $j$] is assigned either true or false. Also assume that the rows are indexed from 1 to 4 and columns are indexed from 1 to 5 in the matrix. Now consider the following predicate logic statements over the matrix M.

I. $\forall i \forall j \; [(i + j = 3) \Rightarrow (\text{M}[i, j] = \text{true})]$

II. $\forall i \; \exists j \; [\text{M}[i, j] = \text{false}]$

III. $\exists i \; \forall j \; [\text{M}[i, j] = \text{true}]$

The number of the above statements hold true for the above matrix instance M is _____.

Have any Doubt ?

1

Correct Option

**Solution :**
1

I says if $(i + j = 3) \Rightarrow (\text{M}[i, j] = \text{true})$, M[1, 2] and M[2, 1] are both satisfies $(i + j = 3)$ and M[1, 2] is true but M[2, 1] is false. So I is false

III is the easiest to start with. It says "there's a row such that all the entries in that row are true." The last row satisfies this claim hence III is true.

II says "Every row has at least one entry which is false" which is not true, as the last row has all the entries true. Also, II is actually the negation of III if you notice clearly. So III being true makes II false implicitly.

QUESTION ANALYTICS

Q. 55

The length of the shortest string not in the language generated by the regular expression r = (1 + 01)*00(1 + 10)* + (1 + 01)*(0 + ∈) over {0, 1} is equal to _____.

Have any Doubt ?

3 — Correct Option

**Solution :**
3

We have two ways to solve this, the first way being, check every string starting from 0 length if it is generated by the regular expression or not.
But if we observe the regular expression carefully, $r$ is actually broken into two parts.

= (Exactly 1 pair of consecutive zeroes) + (No pair of consecutive zeroes)
= (At most 1 pair of consecutive zeroes)

So if we can recognize the language, we already know that the shortest string not generated will be the shortest string having more than one pair of consecutive 0's and it is none other than 000.
So the length will be equal to 3.

Your Answer is 4

QUESTION ANALYTICS

Q. 56

In a RSA cryptosystem, a participant uses two prime number $p$ and $q$ is 11 and 13 respectively. If the public key is 7 then the private key in this cryptosystem is _____.

Have any Doubt ?

103 — Correct Option

**Solution :**
103

$$\begin{aligned} p &= 11, q = 13 \\ n &= p \times q \\ &= 11 \times 13 = 143 \\ \phi(n) &= (p-1) \times (q-1) \\ &= 10 \times 12 = 120 \\ e &= 7 \\ d &= e^{-1} \bmod \phi(n) \\ &= 7^{-1} \bmod \phi(n) \\ &= 103 \end{aligned}$$

[Note: Trick here is to check multiple of 7 is 120 × 1 + 1, 120 × 2 + 1, 120 × 3 + 1..... and so on]

Your Answer is 17

QUESTION ANALYTICS

Q. 57

Consider a computer system with three processes A, B, C using SRTF scheduling algorithm. The process 'A' is known to be scheduled first, where 'A' has been running for '9' units of time, then the process 'B' has arrived. The process 'B' has run for '3' units of time, then the process 'C' has arrived and completed running in '4' units of time, then what could be the minimum burst time of process 'A' _____.

Have any Doubt ?

18 — Correct Option

**Solution :**
18

$$\begin{aligned} A &\rightarrow 9 + 9 = 18 \\ B &\rightarrow 3 + 5 = 8 \\ C &\rightarrow 4 \end{aligned}$$

Your Answer is 14

QUESTION ANALYTICS

Q. 58

Let A, B, C, D, E are sorted sequences having length 70, 74, 80, 85, 102 respectively. They are merged into a single sequence by merging together two sequences at a time. The minimum number of comparison that will be needed by best algorithm for doing merging is _____.

Have any Doubt ?

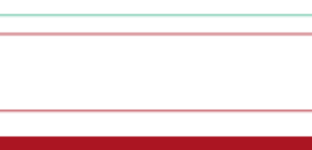
417 — Correct Option

**Solution :**
417

Given file size: 70, 74, 80, 85, 102 create min heap.
Algorithm: Take 1st 2 min element, merge it, and put back result into heap, again find next two min element, merge them, repeat until one element left.

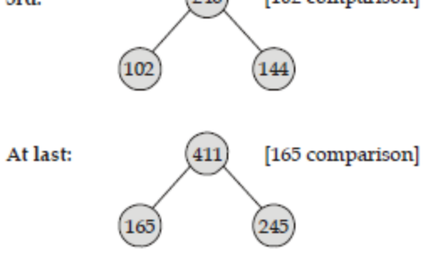
1st: 

[70 comparison]
[min(70, 74) comparison]

2nd: 

[80 comparison]

3rd: [102 comparison]




At last:




[165 comparison]

So, total comparison = [70 + 80 + 102 + 165]
= 417

Your Answer is 983

QUESTION ANALYTICS

**Q. 59**

Consider a system with main memory access time is 150 ns and page fault service time is 5 μs, if one page fault is generated for every $10^3$ memory access what is the effective memory access time _____ (in ns). (Upto 2 decimal places)

Have any Doubt ?

154.85 (154.82 - 154.86)

154.85
Your answer is **Correct**

**Solution :**
154.85 (154.82 - 154.86)

Let P is the page fault rate Effective Access Time = (1 – P) × Memory access time + P × Page fault service time

$$= \left(1-\frac{1}{10^3}\right)\times 150\text{ ns}+\frac{1}{10^3}\times 5\times 10^3\text{ ns}$$

$$= 0.999 \times 150 = 149.85 + 5$$

$$= 154.85\text{ ns}$$

QUESTION ANALYTICS

**Q. 60**

A determinant of the second order is made with the element 0 and 1. The probability that the determinant made is non negative is _____. (Upto 2 decimal places)

Have any Doubt ?

0.81 (0.70 - 0.90)

0.81
Your answer is **Correct**

**Solution :**
0.81 (0.70 - 0.90)

Let $s$ be the sample space,

then, $n(s)$ = Total number of determinants that can be made with 0 and 1

$= 2 \times 2 \times 2 \times 2 = 16$

$\{\because \begin{vmatrix} a & b \\ c & d \end{vmatrix}$; each element can be replaced by two types i.e. 0 and 1 only$\}$

and let $E$ be the event that the determinant made is non negative also $E'$ be the event that the determinant is negative.

$$\therefore \quad E' = \left\{\begin{vmatrix} 1 & 1 \\ 1 & 0 \end{vmatrix}, \begin{vmatrix} 0 & 1 \\ 1 & 1 \end{vmatrix}, \begin{vmatrix} 0 & 1 \\ 1 & 0 \end{vmatrix}\right\}$$

$$\therefore \quad n(E') = 3$$

$$\text{then} \quad P(E') = \frac{n(E')}{n(s)} = \frac{3}{16}$$

Hence, the required probability,

$$P(E) = 1 - P(E') = 1 - \frac{3}{16} = \frac{13}{16} = 0.81$$

QUESTION ANALYTICS

**Q. 61**

Consider a binary tree where for every node $|P - Q| \leq 2$. P represents number of nodes in left sub tree for node S and Q represents the number of nodes in right sub tree for node S for h > 0. The minimum number of nodes present in such binary tree of height h = 4 _____. (Assume root is at height 0)

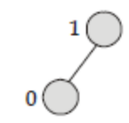
Have any Doubt ?

9

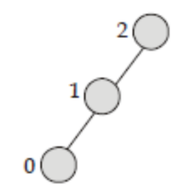
Your answer is **Correct**9

**Solution :**
9

For height ($h$ = 1) minimum number of node is 2 by using formula $2^{h-1} + 1$ i.e.




For height ($h$ = 2) minimum number of node is 3 by using formula $2^{h-1} + 1$ i.e.




For height ($h$ = 3) minimum number of node is 5 by using formula $2^{h-1} + 1$ i.e.

So for height ($h = 4$) minimum number of node will be 9 by using formula $2^{h-1} + 1$.

QUESTION ANALYTICS

**Q. 62**

Consider the following relations:

| ENo | Sname |
|---|---|
| 2 | Arun |
| 3 | Rahul |
| 5 | Vinay |
| 8 | Rahul |
| 9 | Arun |

**Student**

| ENo | Course | Grade |
|---|---|---|
| 2 | OS | 80 |
| 3 | CN | 55 |
| 2 | DBMS | 65 |
| 5 | CO | 85 |
| 8 | OS | 70 |
| 5 | DBMS | 68 |
| 8 | OS | 52 |
| 9 | CO | 65 |

**Enroll**

Consider the following SQL query:
SELECT S.sname, sum (E.Grade) FROM Student S Enroll E WHERE S.ENo = E.ENo GROUP BY S.sname
The number of tuples returned by the SQL query is _____.

Have any Doubt ?

3 Your answer is **Correct**3

**Solution :**
3

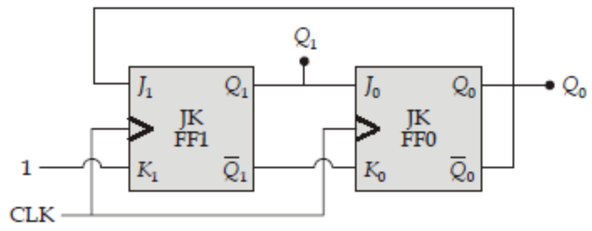
SQL query group the tuples by Sname, in the student relation there is 3 group of Sname (Arun, Rahul, Vinay)
Relation returned by the SQL query

| Sname | Grade |
|---|---|
| Arun | 210 |
| Rahul | 177 |
| Vinay | 153 |

QUESTION ANALYTICS

**Q. 63**

If the initial state of counter ($Q_1\ Q_0$) = (00) of the given figure. Then the modulus of the counter is _____.

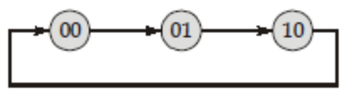



Have any Doubt ?

3 Your answer is **Correct**3

**Solution :**
3

| | | | FF1 | | FF0 | |
|---|---|---|---|---|---|---|
| CLK | $Q_1$ | $Q_0$ | $J_1 = \overline{Q}_0$ | $K_1 = 1$ | $J_0 = Q_1$ | $K_0 = \overline{Q}_1$ |
| | 0 | 0 | 1 | 1 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 3 | 0 | 0 | | | | |




Modulus of counter = 3

QUESTION ANALYTICS

**Q. 64**

Consider the following statements:
$S_1$ : If a grammar G be LL(1) then it will not left recursive and not left factored.
$S_2$ : Consider the grammar G:

S → AB | ba
A → abA | B
B → bB | Aa | e

It contain left recursion.
How many number of statements are correct _____.

Have any Doubt ?

1 Your answer is **Correct**1

**Solution :**
1

$S_1$: If a grammar G be LL(1) then it will not left recursive and left factored. $S_1$ is not correct
$S_2$: S → AB | ba
A → abA | B
B → bB | Aa | e
In the production A → B and B → Aa then it will become A → Aa so it contain left recursion.

QUESTION ANALYTICS

**Q. 65**

Consider the following statements:
I. Compulsory misses can be reduced by increasing the block size.
II. A direct mapped cache of size N has the miss rate of half of the 2-way cache of size N/2.
III. Conflict misses can be reduced by increasing block size.
The number of correct statements are _____.

Have any Doubt ?

2

Your answer is **Correct**2

**Solution :**
2

I. Larger blocks reduce compulsory misses by improving spatial locality. So, this statement is correct.
II. Higher associativity reduces conflict misses. A direct mapped cache of size N has the same miss rate as a 2-way cache of size N/2. So, this statement is correct.
III. Conflict misses in fact will increase by increasing block size because there will be less number of lines. So, this statement is incorrect.

QUESTION ANALYTICS