



Kunal Jha

Course: GATE
Computer Science Engineering(CS)

HOME

MY TEST

BOOKMARKS

MY PROFILE

REPORTS

BUY PACKAGE

NEWS

TEST SCHEDULE

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

OVERALL ANALYSIS

COMPARISON REPORT

SOLUTION REPORT

ALL(65)

CORRECT(0)

INCORRECT(0)

SKIPPED(65)

Q. 1

Solution Video

Have any Doubt ?



Since the 60 km-per-hour speed limit was mandated on our highways, both money and human lives have been saved.
All of the following, if true, would strengthen the claim above EXCEPT:

- A Most highway users find that travel times are not appreciably lengthened by the 60 km-perhour speed limit.

Correct Option

Solution :

(a)
Correct answer is option (a), since all other options back up the claim that the new speed limit saves money and human lives, whereas (a) speaks about time-saving. Although the time saved could be an additional advantage, it isn't pertinent to the conclusion.

- B Highway driving at 60 km–per–hour or less is more fuel-efficient than high-speed driving.

- C Nearly all highway safety experts agree that more accidents occur at speeds over 60 km–per–hour than at lower speeds.

- D The percentage of fatalities occurring in highway accidents at speeds greater than 60 km–per–hour is higher than that for low-speed accidents.

QUESTION ANALYTICS



Q. 2

Solution Video

Have any Doubt ?



A part of the sentence given below is italicised and underlined. Below are given alternatives to the italicised part which may improve the sentence. Choose the correct alternative. In case no improvement is needed, option (d) is the answer.
Whenever my students come across new words, I ask them *to look for them* in the dictionary.

- A to look it up

- B to look them up

Correct Option

Solution :

(b)

- C to look at them

- D No improvement

QUESTION ANALYTICS



Q. 3

Solution Video

Have any Doubt ?



Choose the correct meaning of proverb/idiom.
To pick holes

- A An opening through something

- B To destroy something

- C To criticise someone

Correct Option

Solution :

(c)

- D To cut some part of an item

QUESTION ANALYTICS



Q. 4

Solution Video

Have any Doubt ?



The numerator of a fraction is 4 less than its denominator. If the numerator is decreased by 2 and the denominator is increased by 1, then the denominator is eight times the numerator. Find the fraction.

- A $\frac{3}{7}$

Correct Option

Solution :

(a) Let numerator be x and denominator be y .

then

$$x = y - 4 \quad \dots\dots(1)$$

$$8(x - 2) = (y + 1) \quad \dots\dots(2)$$

The above equations can be written as

$$\begin{aligned} \text{and } & \left. \begin{aligned} y - x &= 4 \\ y - 8x &= -17 \end{aligned} \right\} \dots\dots(3) \\ \Rightarrow & x = 3 \therefore y = 7 \\ \therefore \text{ the required fraction} &= \frac{x}{y} = \frac{3}{7} \end{aligned}$$

B $\frac{4}{8}$

C $\frac{2}{7}$

D $\frac{3}{8}$

QUESTION ANALYTICS



Q. 5

Solution Video

Have any Doubt ?



In an exam 60% of the candidates passed in Maths and 70% candidates passed in English and 10% candidates failed in both the subjects. 300 candidates passed in both the subjects. The total number of candidates appeared in the exam, if they took test in only two subjects viz-Maths and English are_____

750

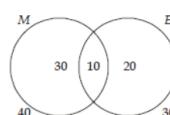
Correct Option

Solution :

750

Maths $\begin{array}{c} \leftarrow \text{Pass 60\%} \\ \leftarrow \text{Fail 40\%} \end{array}$ | English $\begin{array}{c} \leftarrow \text{Pass 70\%} \\ \leftarrow \text{Fail 30\%} \end{array}$

Fail in both subjects = 10%



Failed number of candidates

$$\therefore \text{Total number of candidates failed in atleast one subject} = 30 + 10 + 20 = 60\%$$

$$\therefore \text{Total number of candidates passed in both the subjects} = 100 - 60 = 40\%$$

Let total number of candidates appeared in exam = x

$$\therefore \frac{40x}{100} = 300 \Rightarrow x = 750$$

Hence, total 750 candidates appeared in exam.

QUESTION ANALYTICS



Q. 6

Solution Video

Have any Doubt ?



A researcher studying drug addicts found that, on average, they tend to manipulate other people a great deal more than non-addicts do. The researcher concluded that people who frequently manipulate other people are likely to become addicts.
Which of the following, if true, most seriously weakens the researcher's conclusion?

A After becoming addicted to drugs, drug addicts learn to manipulate other people as a way of obtaining drugs.

Correct Option

Solution :

(a)

Cause \Rightarrow Frequent Manipulation of People

Effect \Rightarrow becoming a Drug Addict.

- a) After becoming Drug Addicts, manipulation of people happens. This clearly reverses the causal effect relationship under question. Could be the answer
- b) This just says Drug Addicts have the ability to manipulate people.
- c) Non-addicts are not in picture.
- d) Unusual behaviour patterns is out of scope.

B When they are imprisoned, drug addicts often use their ability to manipulate other people to obtain better living conditions.

C Some non-addicts manipulate other people more than some addicts do.

D People who are likely to become addicts exhibit unusual behavior patterns other than frequent manipulation of other people.

QUESTION ANALYTICS



Q. 7

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

If $a + b + c = 3$, $a^2 + b^2 + c^2 = 6$ and $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 1$ where a, b, c are all non-zero, then abc is :

A $\frac{1}{3}$

B $\frac{2}{3}$

C $\frac{3}{2}$

Correct Option

Solution :
(c)

$$\begin{aligned} & \frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 1 \\ \Rightarrow & \frac{bc + ac + ab}{abc} = 1 \\ \Rightarrow & bc + ac + ab = abc \\ \text{Again,} & (a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ac) \\ & (a+b+c)^2 = a^2 + b^2 + c^2 + 2abc \\ & (3)^2 = 6 + 2abc \Rightarrow abc = \frac{3}{2} \end{aligned} \quad \dots\dots(1)$$

D 1

[QUESTION ANALYTICS](#)

Q. 8

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

Sonu and Anita working together completed a job in 8 days. If Sonu worked twice as efficiently as he actually did and Anita worked $\frac{1}{3}$ as efficiently as she actually did, the work would have been completed in 6 days. Find the time taken by Sonu to complete the job alone:

A 8 days

B $\frac{38}{35}$ days

C $\frac{15}{2}$ days

D $13\frac{1}{3}$ days

Correct Option

Solution :
(d)

Efficiency of Sonu and Anita (jointly) = 12.5%

Now, go through options and satisfy the conditions.

Consider option (d).

Sonu	Anita
Efficiency	$7.5\% \rightarrow 5\%$
Days	$\left[\frac{40}{3}, 20 \right]$

Now, the new efficiency of Sonu = 15%

and the new efficiency of Anita = $\frac{5}{3}\%$

$$\therefore \text{Combined efficiency} = \frac{50}{3}\%$$

$$\therefore \text{Number of days taken by them} = \frac{100}{\frac{50}{3}} = 6 \text{ days}$$

Hence, the presumed option (d) is correct.

Note : Without solving the complete problem we can say that only option (d) is true since other 3 options gives the efficiency of Sonu equal to or more than 12.5% which is inadmissible i.e. cannot be equal to or greater than the combined efficiency of both persons together.

[QUESTION ANALYTICS](#)

Q. 9

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

A train approaches a tunnel AB . Inside the tunnel a dog is located at a point i.e., $\frac{5}{12}$ of the distance AB measured from the entrance A . The train catches the dog exactly at the entrance. If the dog moves to the exit B , the train catches the dog at exactly the exit. The ratio of speed of the train to speed of the dog is

A 12 : 7

B 6 : 1

C 8:3

D 9:5

QUESTION ANALYTICS

+

Q. 10

Solution Video

Have any Doubt?

If x and y are both positive number, then minimum value of $(x+y)\left[\frac{1}{x} + \frac{1}{y}\right]$ is _____.

4

Correct Option

Solution :

4

 $x > 0$ and $y > 0$

$$(x+y)\left[\frac{1}{x} + \frac{1}{y}\right] = 2 + \frac{x}{4} + \frac{y}{x} = 2 + \left(k + \frac{1}{k}\right) \text{ where } k = \frac{x}{y}$$

Now minimum value of $k + \frac{1}{k}$ is 2.∴ Minimum value of given expression = $2 + 2 = 4$

QUESTION ANALYTICS

+

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



Kunal Jha
 Course: GATE
 Computer Science Engineering(CS)

[HOME](#)
[MY TEST](#)
[BOOKMARKS](#)
[MY PROFILE](#)
[REPORTS](#)
[BUY PACKAGE](#)
[NEWS](#)
[TEST SCHEDULE](#)

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

[OVERALL ANALYSIS](#) [COMPARISON REPORT](#) **SOLUTION REPORT**
[ALL\(65\)](#) [CORRECT\(0\)](#) [INCORRECT\(0\)](#) [SKIPPED\(65\)](#)
Q. 11
[Have any Doubt ?](#)


We are given a grammar G which is in CNF, and a string w which is a member of $L(G)$. If number of steps in the derivation of w in G is equal to 63, then the value of $|w|$, where $|w|$ is the length of the string, is equal to

A 24

B 32

Correct Option
C 64

D 128

QUESTION ANALYTICS

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


Assume X and Y are complete binary trees and also are max heaps each of size $\frac{n}{2}$. What will be efficient algorithm time complexity for merging X and Y in single max heap of size n ?

A $O(n)$
Correct Option
B $O(\log n)$
C $O(n \log n)$
D $O(n^{3/2})$
QUESTION ANALYTICS

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


Consider the following grammar:

 $S \rightarrow XY$
 $X \rightarrow YaY \mid a$ and $Y \rightarrow bbX$

Which of the following statements is/are true about the above grammar?
 I. Strings produced by the grammar can have consecutive three a's.
 II. Every string produced by the grammar have alternate a and b.
 III. Every string produced by the grammar have at least two a's.
 IV. Every string produced by the grammar have b's in multiple of 2.

A I only

B II and III only

C IV only

D III and IV only

Correct Option
Solution :

(d)

It generates strings which contains number of b's being multiple of 2 and number of a's being at least 2.
 Hence option (d) is correct.

QUESTION ANALYTICS


Q. 14

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

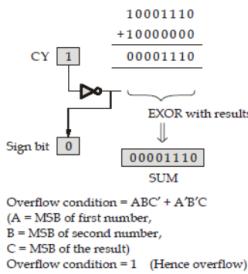
Consider the addition of the two numbers 10001110 and 10000000 in an 8-bit ALU. Which of the following best summarizes the result and the status of the Z(zero), S(sign), C(carry) and O(overflow) flags? Assume that the numbers are represented in 2's Complement format and that S = 1 if the result is negative.

 A Sum = 100001110, Z = 0, C = 0, O = 0, S = 1 B Sum = 00001110, Z = 0, C = 0, O = 1, S = 0 C Sum = 100001110, Z = 0, C = 0, O = 1, S = 0 D Sum = 00001110, Z = 0, C = 1, O = 1, S = 0

Correct Option

Solution :

(d)



Sum = 00001110, Z = 0, C = 1, O = 1, S = 0

QUESTION ANALYTICS



Q. 15

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

Match List-I (Sorting) with List-II (Average case running time) and select the correct answer using the codes given below the lists:

List-I (Sorting)

List-II (Average case running time)

- | | |
|-------------------|------------------|
| A. Insertion Sort | 1. $O(n)$ |
| B. Merge Sort | 2. $O(n^2)$ |
| C. Quick Sort | 3. $O(n \log n)$ |
| D. Bubble Sort | 4. $O(\log n)$ |

Codes:

	A	B	C	D
(a)	1	3	2	4
(b)	1	3	3	2
(c)	2	3	3	2
(d)	2	3	2	4

 A A B B C C

Correct Option

Solution :

(c)

Average case:

Insertion Sort: $O(n^2)$ Merge Sort: $O(n \log n)$ Quick Sort: $O(n \log n)$ Bubble Sort: $O(n^2)$ D D

QUESTION ANALYTICS



Q. 16

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

Consider the following sets:

I. Z^+ , the set of positive integers.II. Z^- , the set of negative integers.III. Z , the set of all integers.

where each of these sets denote the set of positive integers, the set of negative integers, and the set of all integers respectively. Then which of the above sets are partially ordered with respect to the 'divides' relation?

 A I only B All of the above C I and III but not II

D I and II but not III

Correct Option

Solution :

(d)
Both I and II are partially ordered. But III is not. The reason becomes apparent as soon as we discuss antisymmetry – a R b and b R a implies a = b. But in III, not only does 2 divide 2, but 2 divides -2 as well, and this ordered pair (2, -2) is the reason why III is not antisymmetric, and hence not partially ordered. The remaining properties like reflexivity and transitivity hold good in all the 3 cases. Why? Divides relation is always reflexive as every integer divides itself. Transitive, as a/b and b/c implies a/c.

QUESTION ANALYTICS



Q. 17

Solution Video

Have any Doubt ?



Which of the following conditions is not involved in Preventing the deadlock?

A No mutual exclusion

B No "hold and wait"

C No preemption

Correct Option

Solution :

(c)
To prevent deadlock, atleast one of the following conditions can not occur.
• Mutual exclusion
• Hold and wait
• No preemption
• Circular wait
No "mutual exclusion", No "Hold and wait", preemption or no circular wait condition occurs to prevent deadlock.
⇒ "No preemption" not occurs to prevent deadlock.

D No circular wait

QUESTION ANALYTICS



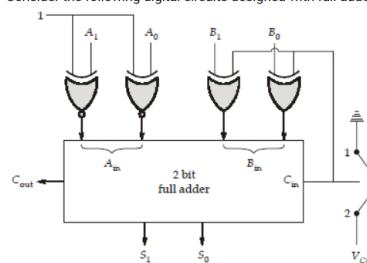
Q. 18

Solution Video

Have any Doubt ?



Consider the following digital circuits designed with full adders and logic gates.



Assume position 2 is connected to C_{in} , then which of the following operation done by the circuit?

A $A + B$

B $A + B + 1$

C 2's complement of $A + B$

D $A + 1$'s complement of $B + 1$

Correct Option

Solution :

(d)
The above circuit implements $A + 1$'s complement of $B + 1$.
Explanation: When switch 2 is connected, C_{in} becomes 1 (means adding +1). Also B's value we are EX-ORing with 1 thus each bit of B gets complemented. Hence B's value → 1's complement of B.
And A's value remains same as $A \odot 1 = A$ (anything EX-NOR with 1 remains same).
Hence option (d) is correct.

QUESTION ANALYTICS



Q. 19

Solution Video

Have any Doubt ?



Match the following TCP timers with their respective functionalities.

List-I

- A. RTO timer
- B. Keep alive timer
- C. Persistent timer
- D. Time WAIT timer

List-II

- 1. It runs for twice the maximum packet life time to make sure that all packets are died off when connection is closed.

2. It is designed to prevent deadlock.
3. After this timer goes off, the system will check if the other side system is still there or not.
4. If ACK failed to arrive before the timer goes off, then respective segment is retransmitted.

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	1	4	3	2
(d)	1	3	4	2

A a

B b

Correct Option

Solution :

(b)

Persistent timer: It is designed to prevent deadlock. The receiver sends an acknowledgment with a window size of 0, telling the sender to wait. Later the receiver updates the window, but the packet with update is lost. Hence both are waiting and are in deadlock. TIME WAIT: After this timer goes off the system will check if other side system is still there. RTO: If ACK failed to arrive before the timer goes off, then segment is retransmitted. Keep alive time: It runs for twice the maximum packet life time to make sure that all packets are died off when connection is closed.

C c

D d

 QUESTION ANALYTICS



Q. 20

 Have any Doubt ?



Consider the following program:

```
int main()
{
    int * P;
    P = function1();
    printf("%d", *P);
}

int * function1()
{
    int d = 1;
    int * x;
    x = &d;
    return x;
}
```

Which of the following statement is true?

- I. It results 9
 - II. Runtime error
 - III. Compilation error
- Assume all the header files and function definition correctly done.

A I only

B II only

Correct Option

Solution :

(b)

When the control returns to main after executing function1, all the local variable created inside the function gets deallocated and hence, P is then pointing to memory which does not belongs to itself.
Hence, segmentation fault comes which is runtime error.

C III only

D I followed by its address gets printed

 QUESTION ANALYTICS





Kunal Jha

 Course: GATE
 Computer Science Engineering(CS)

[HOME](#)
[MY TEST](#)
[BOOKMARKS](#)
[MY PROFILE](#)
[REPORTS](#)
[BUY PACKAGE](#)
[NEWS](#)
[TEST SCHEDULE](#)

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

[OVERALL ANALYSIS](#)
[COMPARISON REPORT](#)
[SOLUTION REPORT](#)
[ALL\(65\)](#)
[CORRECT\(0\)](#)
[INCORRECT\(0\)](#)
[SKIPPED\(65\)](#)
Q. 21
[▶ Solution Video](#)
[Have any Doubt ?](#)


The value of the integral $\int_{-1}^1 \frac{dx}{4-x^2}$ is

A $\frac{1}{2} \ln 3$

Correct Option

Solution :
 (a)

$$I = \int_{-1}^1 \frac{dx}{4-x^2}$$

Here $f(x) = \frac{1}{4-x^2}$ and $f(-x) = \frac{1}{4-x^2}$

So, $f(x) = f(-x)$

$\Rightarrow f$ is an even function.

$$\text{So } I = 2 \int_0^1 \frac{dx}{4-x^2}$$

Integrating by partial fractions we get,

$$\begin{aligned} I &= 2 \times \frac{1}{4} \left[\int_0^1 \frac{1}{2-x} dx + \int_0^1 \frac{1}{2+x} dx \right] \\ &= \frac{1}{2} \left[\ln \frac{2+x}{2-x} \right]_0^1 = \frac{1}{2} \ln 3 \end{aligned}$$

B 0

C π

D $-\pi$

[QUESTION ANALYTICS](#)

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


Consider the following statements:

I. Every set has at least one proper subset.

II. If a finite, non empty set has m subsets and n proper subsets, then $m - n \in N$, where N is the set of natural numbers.

Which of the above statements are true?

A Both I and II

B Only I

C Only II

Correct Option

Solution :

(c)
 Only II is true. I is clearly false, as the empty set has no proper subset.
 So let's see why II is true.

Assuming a non empty set S has k elements, then $m = 2^k$

Consequently, $n = 2^k - 1$ (excluding the set itself)

Thus $m - n = 1$, and 1 is a natural number, and therefore II holds true.

So (c) is the correct choice.

D None of these

[QUESTION ANALYTICS](#)

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


Consider the following relations:

$R(A, B)$ \underline{A} primary key

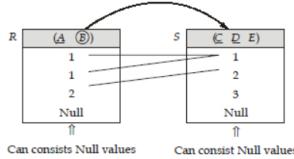
$S(\underline{C}, \underline{D}, E)$ \underline{C} primary key and \underline{D} alternative key. An attribute "B" of relation R is foreign key references to alternative key D of relation S. Which of the following statement is true?

A Every record of R must reference to some record of S.

B Each record of R can references to at most one record of S.

Correct Option

Solution :
(b)



Null value of B column record not references to any record of S. Remaining records of R references to atmost one record of S.

C Each record of R can references zero or more record of S.

D Each record of R must references one or more record of S.

QUESTION ANALYTICS

+

Q. 24

Solution Video

Have any Doubt ?

□

Consider the following functions defined from $Z \times Z$ to Z .

I. $f(x, y) = x^2 + y^2$

II. $f(x, y) = x - y$

Which of the above functions are onto?

A I only

B II only

Correct Option

Solution :
(b)

Only II is onto. I is not onto because there are many integers which cannot be expressed as sum of squares of two integers (for example, 3 is such an integer).
But II is onto. How? Let's show this constructively. Pick any integer k of your choice from the codomain. Then one of its preimages will be $(k+1, 1)$, as $f(k+1, 1) = (k+1) - 1 = k$. So given an integer k , we can always find its corresponding preimage in the domain this way, and there will be infinitely many such preimages we have just shown one such preimage which is enough to prove that II is onto.

C Both I and II

D None of these

QUESTION ANALYTICS

+

Q. 25

Solution Video

Have any Doubt ?

□

Which of the following circuits are equivalent (i.e., they produce the same output for all inputs)?

F = $ab + bc + ca$

G = $(a + b)(b + c)(c + a)$

H = NAND (NAND (a, b), NAND (b, c), NAND (c, a))

Consider the following statements:

I. F, G, and H are same.

II. Only G and H are same.

III. F and G are same.

Which of the above are correct statements?

A I only

B II only

C I and II only

D I and III only

Correct Option

Solution :
(d)

All F, G and H are equivalent.

So I and III are correct.

QUESTION ANALYTICS

+

Q. 26

Solution Video

Have any Doubt ?

□

Suppose that a direct-mapped cache has 29 cache lines, with 24 bytes per cache line. It caches items of a byte-addressable memory space of 2^{29} bytes. (Do not include bits for validity or other flags; only consider the cost of tags themselves.) How many bits of space will be required for storing tags? _____ bits.

8192

Correct Option

Solution :
8192

Of the 2^9 bits of the address space, 9 indicate the cache line index, and 4 indicate the offset within the cache line. That leaves $16 = 2^4$ bits for the tag. There are 2^9 tag entries, for a total of $2^9 + 4 = 2^{13} = 8192$ bits.

QUESTION ANALYTICS



Q. 27

Solution Video

Have any Doubt ?



The probability of a frame being sent successfully is $\frac{1}{50}$. What is the expected number of transmissions that sender should make, so that frame reaches successfully.

50

Correct Option

Solution :
50
Expected number of transmissions is given by

$$E(x) = \frac{1}{1-P}$$

Where 'P' is probability that frame is lost

$$P = 1 - \frac{1}{50} = \frac{49}{50}$$

$$\therefore E(x) = \frac{1}{1 - \frac{49}{50}} = 50 \text{ transmissions}$$

QUESTION ANALYTICS



Q. 28

Solution Video

Have any Doubt ?



$\lim_{x \rightarrow 0} \left(\frac{1 - \cos x}{x^2} \right)$ is _____. (Upto 1 decimal places)

0.5 [0.5 - 0.5]

Correct Option

Solution :
0.5 [0.5 - 0.5]

$$\begin{aligned} \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} &= \lim_{x \rightarrow 0} \frac{2 \sin^2 \frac{x}{2}}{4 \cdot \frac{x^2}{4}} \\ &= \lim_{x \rightarrow 0} \frac{1}{2} \left(\frac{\sin \frac{x}{2}}{\frac{x}{2}} \right)^2 = \frac{1}{2} \end{aligned}$$

QUESTION ANALYTICS



Q. 29

Solution Video

Have any Doubt ?



Consider a virtual memory system with physical memory of 8 GB, a page size of 8 KB and 46-bit virtual address. Assume last level page table exactly fits into a single page. If page table entry size is 4 bytes then how many levels of page tables would be required?

3

Correct Option

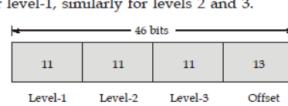
Solution :
3

Each page size = 8 KB = 2^{13} bytes
Page table entry size = 4 bytes
If page table exactly fits into a page, page table size = Page size.

$$\Rightarrow \text{number of page table entries} = \frac{\text{Page size}}{\text{Page table entry size}}$$

$$= \frac{2^{13}}{4} = 2^{11}$$

11-bits are required for level-1, similarly for levels 2 and 3.



\therefore 3-levels are required.

Q. 30

Solution Video

Have any Doubt ?



In how many ways can the integers x and y be chosen such that their product equals 512?

10

Correct Option

Solution :

10

We need to find number of integral solutions to the equation $xy = 512$.
512 equals 2^9 . So the thing reduces to $xy = 2^9$.

Now this problem can be reduced to the number of ways of distributing 9 identical balls to 2 distinct boxes, which can be reduced to finding the number of integral solutions to the equation, $X_1 + X_2 = 9$, where both X_1 and X_2 are at least 0.

Hence the number of solutions to this equation will be ${}^{n-1+r}C_r = {}^{2-1+9}C_9 = {}^{10}C_9 = 10$.
Hence 10 will be the answer.



Kunal Jha

 Course: GATE
 Computer Science Engineering(CS)

[HOME](#)
[MY TEST](#)
[BOOKMARKS](#)
[MY PROFILE](#)
[REPORTS](#)
[BUY PACKAGE](#)
[NEWS](#)
[TEST SCHEDULE](#)

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

[OVERALL ANALYSIS](#)
[COMPARISON REPORT](#)
[SOLUTION REPORT](#)
[ALL\(65\)](#)
[CORRECT\(0\)](#)
[INCORRECT\(0\)](#)
[SKIPPED\(65\)](#)
Q. 31
[Have any Doubt ?](#)

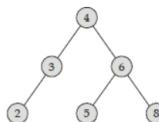

Suppose that six keys are inserted into an unbalanced binary search tree in the following order:
 4, 6, 3, 8, 2, and 5. Consider the following statements:

- Finding a key in the resulting tree requires examining 1, 2, or 3 nodes.
 - The resulting tree has equal numbers of internal nodes and leaf nodes.
 - The key 7 can now be inserted without adding another level to the tree.
- The number of correct statements are _____.

2
[Correct Option](#)
Solution :

2

The resulting tree appears below:



Finding 4 now takes one comparison (with the root), finding 3 and 6 take two comparisons, and finding the other nodes takes three comparisons. There are three leaf nodes and three interior nodes. If 7 is inserted, it will go onto a new level, as the left child of 8.

[QUESTION ANALYTICS](#)

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


Consider a table T in a relational database with a key field K. A B-tree of order p is used as an access structure on K, where p denotes the maximum number of tree pointers in a B-tree index node. Assume that K is 12 bytes long; disk block size is 1024 bytes; each data pointer P_D is 10 bytes along and each block pointer P_B is 7 bytes long in order for each B tree node to fit in a single disk block, the maximum value of p is _____.

36
[Correct Option](#)
Solution :

36

Typical structure of a B-tree non-leaf node is follows:

P_1	E_1	K_1	P_2	B_2	K_2	-	P_{m-1}	B_{m-1}	K_{m-1}	P_m
-------	-------	-------	-------	-------	-------	---	-----------	-----------	-----------	-------

in order for each B-tree node to fit in a single disk block the maximum value of p is.

$$\begin{aligned}
 (p \times P_B) + ((p - 1) \times (P_D + K)) &\leq B \\
 \text{Share disk block size} &= B = 1024 \text{ byte} \\
 \text{Block pointer} &= p = 7 \text{ B} \\
 \text{Record (data pointer)} &= P = 10 \text{ B} \\
 \text{Search field} &= K = 12 \text{ B} \\
 (p \times 7) + ((p - 1) \times (10 + 12)) &\leq 1024 \\
 7p + 22p - 22 &\leq 1024 \\
 29p &\leq 1046 \\
 p &\leq \left\lfloor \frac{1046}{29} \right\rfloor = 36
 \end{aligned}$$

[QUESTION ANALYTICS](#)

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


Consider the following SDT:

```

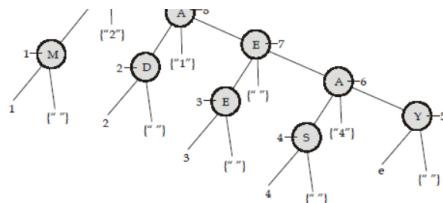
S → M { print "2" } A
M → 1 { print " " ; }
A → D { print "1" ; } E
D → 2 { print " " ; }
E → E { print " " ; } A
E → 3 { print " " ; }
A → S { print "4" ; } Y
S → 4 { print " " ; }
Y → ε { print " " ; }
    
```

If the bottom up parsing is used to parse the input string "1234" then the output number produced (without any spaces) is _____.

412
[Correct Option](#)
Solution :

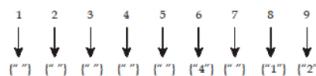
412





Bottom up parser uses the reverse of RMD. (Numbered from 1 to 9 for evaluation).

Input is 1234:



Output produced is 412.

QUESTION ANALYTICS



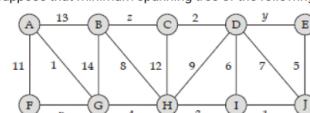
Q. 34

Solution Video

Have any Doubt?



Suppose that minimum spanning tree of the following edge weighted graph contains the edges with weights x , y and z



The maximum value of $x + y + z$ is _____.

25

Correct Option

Solution:
25

$$\begin{aligned}x &\leq 11 \\y &\leq 6 \\z &\leq 8\end{aligned}$$

QUESTION ANALYTICS



Q. 35

Have any Doubt?



Which of following is correct output for the 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)
{
    return (a == b);
}
int proc (pf P, int a, int b)
{
    return ((*P) (a, b));
}
```

The output of the program is _____.

1

Correct Option

Solution:
1

QUESTION ANALYTICS



Q. 36

Solution Video

Have any Doubt?



Which one of the choice given below would be printed when the following programs is executed?

```
#include <stdio.h>
int a1[ ] = {6, 7, 8, 18, 34, 67};
int a2[ ] = {23, 56, 28, 29};
int a3[ ] = {-12, 27, -31};
int * x[ ] = {a1, a2, a3};
void print (int * a[ ])
{
    printf("%d", a[0][2]);
    printf("%d", *a[2]);
```

```

    printf("%d", *++ a[0]);
}
main()
{
    print(x);
}

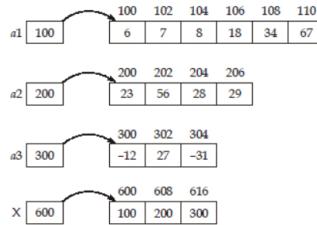
```

A 8 -12.7

Correct Option

Solution :

(a)



1st printf

```

a[0][2]
*(a + 0) + 2
*(600 + 0) + 2
*(100 + 2 * size of (int))
*(100 + 2 * 2)
*(100 + 4)
*(104) = 8

```

2nd printf

```

*a[2]

*(a + 2)
*(600 + 2 * size of (int *))
*(600 + 2 * 8)
*(616)
*(300)
-12
-12

```

Only option (a) is matching.

B 8 8 7

C -12 -12 27

D -12 -12 27

QUESTION ANALYTICS

+

Q. 37

Solution Video

Have any Doubt ?

Q

Identify the true statements from the following:

- I. In STOP AND WAIT ARQ if the receiver replies with ACK 0, then the sender will send next frame with sequence number as 1.
- II. Physical layer recognizes the frames sent by sender and arranges them in particular order and gives it to layer-2 (Data link layer).
- III. ACK sent by receiver also contains CRC.
- IV. Stop and wait flow control gives inefficient line utilization for very high data rates over long distance.
- V. In sliding window protocol ACK includes the number of next frames to be send.

A I and IV only

B II, III and IV only

C III, IV and V only

Correct Option

Solution :

- (c)
- I is wrong because if frame 0 is sent then receiver will send ACK-1 for requesting frame 1.
 - II is wrong because physical layer only transmits and receives bits. DLL recognizes the frames.
 - III is true, because no data but complete header is used.
 - IV is true, as,
When high data rates that is high bandwidth.
When high bandwidth → low transmission time.
Long distance → high RTT
Low transmission time and high RTT → less utilization
 - V is true.

D I, II, IV and V only

QUESTION ANALYTICS

+

Q. 38

Solution Video

Have any Doubt ?

Q

India is all set to go against West Indies in their test match encounter during the upcoming week, and the selectors have to fix the batting order of the squad. Keeping in mind the most recent performances, the selectors have decided that Jadeja must bat before Pandya, and Pandya must bat before Azhar in the playing eleven. Then how many such batting orders of the team are possible?

A ${}^{11}C_3 \times 8!$

Correct Option

Solution :

(a)
We have the constraint between Jadeja, Pandya and Azhar, that they must come in the order Jadeja, Pandya and Azhar. To maintain this order, first choose 3 places out of the 11 places, which can be done in ${}^{11}C_3$ ways, and then place them in exactly this order, which can be done in only one way. And then the remaining 8 players can occupy the 8 positions in $8!$ Ways.
Therefore total number of ways = ${}^{11}C_3 \times 1 \times 8!$
Hence (a) is the answer.

B $(8!)^2$ **C** 5040**D** None of these

QUESTION ANALYTICS

**Q. 39****Solution Video****Have any Doubt ?**

Assume two processes P_0 and P_1 shares the one global boolean array "flag[]" and integer variable "turn". Initially flag[0] and flag[1] are false.

Consider the following code is executed by process P_i where $i = 0$ or 1 .
while (true)

```
{
    flag [i] = True;
    turn = i;
    while (flag [j])
    {
        if (turn == j)
        {
            flag [i] = False;
            while (turn == j);
            flag [i] = True;
        }
    }
    <critical section>
    turn = j;
    flag [i] = False;
    <Remainder section>
}
```

If current process is P_i and $turn = i$ then other process is assumed as P_j where $j = 1 - i$. Which of the following conditions are satisfied by the given algorithm?

A Mutual exclusion**B** Mutual exclusion, progress**C** Mutual exclusion, progress and bounded waiting

Correct Option

Solution :

(c)
Mutual exclusion is ensured with the "turn" variable. If both processes are ready then their flags are true. Only one can succeed to enter the critical section depends on turn value. Progress and bounded waiting are also satisfied by the given code. It ensures other process will enter the critical section next.

D None of these

QUESTION ANALYTICS

**Q. 40****Solution Video****Have any Doubt ?**

Suppose the process P has been running for several days when a new process Q starts up and begins contending with P for resources. Which of the following is true?

A In a wait-die system, if P needs a resource held by Q , then P waits.

Correct Option

Solution :

(a)
In wait-die scheme, when transaction T_i request a data items currently held by T_j , T_i is allowed to wait only if it has a time stamp smaller than that of T_j , otherwise T_i is rolled back (die). Here process P is running so it has time stamp less than process Q now if process P need a resource held by process Q then process P has to wait.

B In a wait-die system, if Q needs a resource held by P , then Q waits.**C** In a wound-wait system, if P needs a resource held by Q , then Q yields and waits.**D** In a wound-wait system, if Q needs a resource held by P , then Q dies.

QUESTION ANALYTICS





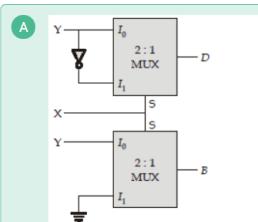
Kunal Jha
 Course: GATE
 Computer Science Engineering(CS)

[HOME](#)
[MY TEST](#)
[BOOKMARKS](#)
[MY PROFILE](#)
[REPORTS](#)
[BUY PACKAGE](#)
[NEWS](#)
[TEST SCHEDULE](#)

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

[OVERALL ANALYSIS](#)
[COMPARISON REPORT](#)
[SOLUTION REPORT](#)
[ALL\(65\)](#)
[CORRECT\(0\)](#)
[INCORRECT\(0\)](#)
[SKIPPED\(65\)](#)
Q. 41
[▶ Solution Video](#)
[⌚ Have any Doubt ?](#)


If X and Y are inputs and the Difference ($D = X - Y$) and the Borrow (B) are the outputs, which one of the following diagrams implements a half-subtractor?


[Correct Option](#)

Solution :
 (a)

X	Y	D	B
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

$$\therefore \text{Difference} = \bar{X}Y + X\bar{Y} = X \oplus Y$$

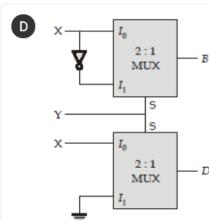
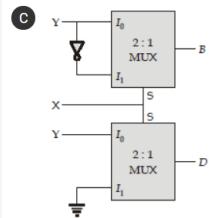
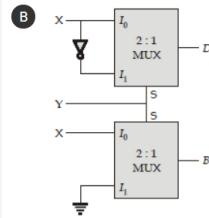
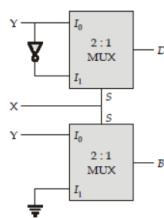
$$\text{Borrow} = \bar{X}Y$$

Also using the state equation of MUX if X is used as a select line and Y as input, we get

$$D = \bar{X}Y + X\bar{Y}$$

$$B = \bar{X}Y$$

Option (a) satisfies


[QUESTION ANALYTICS](#)

Q. 42
[▶ Solution Video](#)
[⌚ Have any Doubt ?](#)


Imagine a TCP connection is transferring a 10,000 bytes. First byte is numbered as 2099. What is the number of the last byte of 4th segment sent, if data is sent in 5 segments with the first 4 segments carrying 1500 bytes each and last segment carrying 4000 bytes?

A 6598

B 9067

C 8098

Correct Option

Solution :

(c) 1st segment : 2099 to 3598

(2099 + 1499 = 3598)

2nd segment : 3599 to 5098

3rd segment : 5099 to 6598

4th segment : 6599 to 8098

5th segment : 8099 to 12098

Last byte of 4th segment is 8098

D None of these

QUESTION ANALYTICS



Q. 43

Solution Video

Have any Doubt ?



Consider the following regular expressions:

I. $0(0+1)^*$

II. $0^* 10^* 1(0+1)^*$

III. $(0+10)^*(1+\epsilon)$

IV. $((0^* 10^* 10^*)^* + 0^*)10^*$

A language L having regular expression r is said to be reverse isomorphic if and only if $L(r) = [L(\bar{r})]^R$. How many of the above regular expressions are reverse isomorphic?

A 0

B 1

C 2

D None of these

Correct Option

Solution :

(d)

I. Denotes strings starting with 0.

But its reversal contains strings ending with 0.

So $L \neq L^R$. So I is not reverse isomorphic.

II.

$L = \{w \mid w \text{ contains at least 2 1's}\}$

$L^R = \{w \mid w \text{ contains at least 2 1's}\}$

$L = L^R$, so II is reverse isomorphic

III.

$L = \{w \mid w \text{ contains no 2 consecutive 1's}\}$

$L^R = \{w \mid w \text{ contains no consecutive 1's}\}$

$L = L^R$, so III satisfies given property.

IV.

$L = \{w \mid w \text{ contains odd number of 1's}\}$

$L^R = \{w \mid w \text{ contains odd number of 1's}\}$

So,

$L = L^R$, so IV also satisfies the given property.

Hence 3 language are reverse isomorphic, so option (d) is the answer.

QUESTION ANALYTICS



Q. 44

Solution Video

Have any Doubt ?



Given an array S containing n real numbers, and a real number x . We want to find any two elements p and q in the array such that their sum is greater than the real number x . What is the best possible time complexity to find p and q ?

A $O(1)$

B $O(n^2 \log n)$

C $O(n)$

Correct Option

Solution :

(c)

The first pass of bubble sort will give 1st maximum element in $O(n)$. The second pass of bubble sort will give 2nd maximum element in $O(n)$.

\Rightarrow Therefore it takes $O(n)$ in total.

If (1st maximum + 2nd maximum) is not greater than 'x', then no other pair of elements in the array 'S' would satisfy the condition.

D $O(n \log n)$

Q. 45

Have any Doubt ?



Consider the following program:

```
#include <stdio.h>
int main ()
{
    int i;
    if (i = 0, 1, 2)
        printf("GATE 2020\n");
    if (i = (2, 3, 0))
        printf("HOWDY\n");
    else
        printf("BYE\n");
    return 0;
}
```

Which of the following is correct output?

A GATE 2020
BYE

Correct Option

Solution :

(a) The above code prints

GATE 2020

BYE

- At first zero will assign in 'i' then comma operator return the last value which is 2 and condition becomes true and it prints "GATE 2020".
- At second "if" because of priority of parenthesis bracket is greater than equal to (=) operator. Hence comma () operator return last value "0" and then if condition becomes false and else condition is executed and prints "BYE".

B HOWDY
BYE

C GATE 2020
HOWDY

D Compilation Error

Q. 46

▶ Solution Video

Have any Doubt ?



Which of the following statement false of relation R is in 3NF but not BCNF?

A Relation R must consist atleast two over-lapped candidate keys.

B Relation R must consist proper subset of candidate key determines proper subset of some other candidate key.

C Relation R must consist atmost one compound candidate key and other candidate keys simple candidate key.

Correct Option

Solution :

(c)

If relation R in 3NF but not BCNF then atleast two compound keys must exists where non-trivial FD with determinant not superkey.

D Relation R must consist atleast two compound candidate keys.

Q. 47

▶ Solution Video

Have any Doubt ?



The designers of a computer must select a cache system. They have two options.

Design #1 uses a direct-mapped cache containing 2 words per cache line. It would have an instruction miss rate of 3% and a data miss rate of 8%.

Design #2 uses a 2-way set associative cache containing 8 words per cache line. It would have an instruction miss rate of 1% and a data miss rate of 4%.

For each design, there will be approximately 0.5 data references on average per instruction. The cache miss penalty in clock cycles is 8 + cache line size in words; for example, the penalty with 1-word cache lines would be $8 + 1 = 9$ clock cycles.

Let D1 = cycles wasted by Design #1 on cache miss penalties (per instruction) Let D2 = cycles wasted by Design #2 on cache miss penalties (per instruction).

On average, how many clock cycles will be wasted by each on cache miss penalties?

A D1 = 0.45, D2 = 0.48

B D1 = 0.70, D2 = 0.40

C D1 = 0.70, D2 = 0.48

Correct Option

Solution :

(c)

Design 1:

Instruction miss rate = 0.03
 Data miss rate = 0.08
 Miss penalty = $0.03 \times 10 + 0.08 \times 0.5 \times 10 = 0.70$
Design 2:
 Instruction miss rate = 0.01
 Data miss rate = 0.04
 Miss penalty = $0.01 \times 16 + 0.04 \times 0.5 \times 16 = 0.48$
 Hence option (c) is true.

D 1 = 1.10, D2 = 0.40

QUESTION ANALYTICS



Q. 48

Have any Doubt?



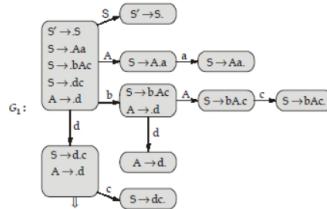
Identify the SLR (1) grammar from the following:
 $G_1 : S \rightarrow Aa \mid bAc \mid dc$ $G_2 : E \rightarrow E + T \mid T$
 $A \rightarrow d$ $T \rightarrow T * F \mid F$
 $F \rightarrow id$

A G_1 only

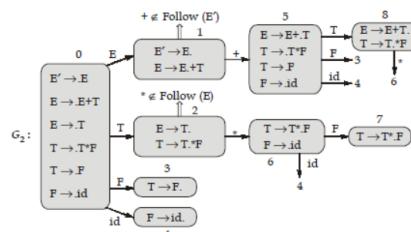
B G_2 only

Correct Option

Solution:
(b)



SR conflict in SLR (1) c ∈ follow (A)



G_2 is SLR (1) grammar.

C Both (a) and (b)

D Neither (a) nor (b)

QUESTION ANALYTICS



Q. 49

Have any Doubt?



Let A be a square matrix, whose characteristic polynomial is

$$p(\lambda) = \lambda^2 - \frac{3}{4}\lambda - \frac{1}{4}$$

What is the determinant of A?

A $\frac{3}{4}$

B $-\frac{3}{4}$

C 0

D $-\frac{1}{4}$

Correct Option

Solution:

(d)

The constant term in any characteristic polynomial is always $|A|$.

$$\text{So } |A| = -\frac{1}{4}$$

Q. 50

Consider the following code which sort all elements of an array 'A' in descending order:

```
For (i = n; X; i--)
{
    max = i;
    for (K = i - 1; Y; K--)
    {
        If (Z)
            max = K;
    }
    Swap (a[i], a[max]);
}
```

Which of the following will represents correct value of X, Y, Z in above code for selection sort?

A $i > 0, K > 0, a[K] > a[\max]$

B $i > 0, K < 0, a[K] < a[\max]$

C $i < 0, K > 0, a[K] > a[\max]$

D $i > 0, K > 0, a[K] < a[\max]$

Correct Option

Solution :

(d)

1. $X = i > 0$; 1st loop run until i is greater than 0 i.e. reach for 1st element from last element.
2. $Y = K > 0$; 2nd run $(n - i)$ time every time where $i = 1, 2, 3, 4, \dots, n$.
3. $Z = a[K] < a[\max]$; if condition checks $a[K]$ less than $a[\max]$ them update $\max = K$.
At last swap ($a[i]$ and $a[\max]$).



Kunal Jha
 Course: GATE
 Computer Science Engineering(CS)

HOME

MY TEST

BOOKMARKS

MY PROFILE

REPORTS

BUY PACKAGE

NEWS

TEST SCHEDULE

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

OVERALL ANALYSIS COMPARISON REPORT **SOLUTION REPORT**

ALL(65) CORRECT(0) INCORRECT(0) SKIPPED(65)

Q. 51

Have any Doubt?



Let $L_1 = (aa + aaaaa)^*$ and $L_2 = aa$. Then the number of states in the minimal DFA corresponding to $L_1 \setminus L_2$, where ' \setminus ' represents the right quotient operation is equal to

A 2

B 3

Correct Option

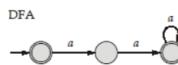
Solution:

(b)

$$\begin{aligned} L_1 &= \{a^2, a^4, a^5, a^6, a^7, a^8, a^9, \dots\} \\ &= aa + aaaaa^* \end{aligned}$$

Now,

$$\begin{aligned} L_1 \setminus L_2 &= (aa + aaaaa^*) / aa \\ &= aa / aa + aaaaa^* / aa \\ &= \epsilon + (a^*aaaa / aa) \\ &= \epsilon + a^*aa = \epsilon + aaa^* \end{aligned}$$



For which we need (3) states.

Hence option (b) is the correct answer.

C 4

D 5

QUESTION ANALYTICS



Q. 52

Have any Doubt?



A Computer uses a memory unit with 256 K words of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code, a register code part to specify one of 64 registers and an address part. How many bits are there in the operation code, the register code part and the address part?

A 7, 6, 18

Correct Option

Solution:

(a)

$$256 \text{ K} = 2^8 \times 2^{10} = 2^{18}$$

$$64 = 2^6$$

Address : 18 bits

Register code : 6 bits

Indirect bit : 1 bit

$$\frac{25}{25}$$

$32 - 25 = 7$ bits for opcode.



Data : 32 bits; address : 18 bits

B 6, 6, 19

C 8, 5, 19

D 9, 6, 17

QUESTION ANALYTICS

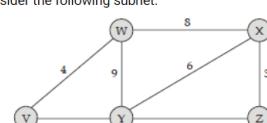


Q. 53

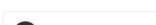
Have any Doubt?



Consider the following subnet:



Find the link state routing table for node V using OSPF.



A

	Cost	Via
V	0	V
W	4	V
X	16	Y
Y	10	V
Z	22	Y

B

	Cost	Via
V	0	V
W	4	V
X	12	W
Y	10	V
Z	22	X

C

	Cost	Via
V	0	V
W	4	V
X	12	W
Y	10	V
Z	15	X

Correct Option

Solution :

(c)

Routing table for 'V' by using Dijkstra's Algorithm.

V to V = 0

V to W = 4 (Via V)

V to Y = 10 (Via V)

V to X = 12 (Via W)

V to Z = 15 (Via X)

D

	Cost	Via
V	0	V
W	4	W
X	16	X
Y	10	Y
Z	22	Z

QUESTION ANALYTICS



Q. 54

Have any Doubt ?



Consider the partially ordered set $(P(S), \supseteq)$ where $S = \{1, 2, 3, 4, \dots, 256\}$. Let A, B, C and D be subsets of S such that A contains all multiples of 8, and B contains multiples of 12, C consists of multiples of 18 and D consists of all perfect squares respectively. Then the cardinality of $\text{LUB}(\text{LUB}(A, B), \text{LUB}(B, C))$ is equal to _____.

3

Correct Option

Solution :

3

In case of the superset relation, the LUB and GLB of any 2 sets equals the intersection and the union of those 2 sets respectively.

We need to find $\text{LUB}(A, B)$ which is the intersection of A and B - therefore the $\text{LUB}(A, B)$ will contain all the multiples of 24 (as $\text{LCM}(8, 12) = 24$) upto 256. Similarly $\text{LUB}(B, C)$ will contain all the multiples of 36 which are less than or equal to 256. Finally the LUB of these two will contain all multiples of 72 which are less than or equal to 256. Hence we get the set {72, 144, 216}. Therefore the answer will be equal to 3.

QUESTION ANALYTICS



Q. 55

Have any Doubt ?



Consider a string w of the form $(10)^n$, where $n \geq 0$. For example, if $n = 2$, then $w = 1010$. Let $\text{prefix}(w)$ denotes the set of all prefixes of w , $\text{suffix}(w)$ denotes the set of all suffixes. Then the cardinality of $\text{prefix}(w) \cup \text{suffix}(w)$ for $n = 128$ will be _____.

385

Correct Option

Solution :

385

Let's first find $|\text{prefix}(w) \cup \text{suffix}(w)|$ and then use inclusion exclusion to get the union

$$\text{prefix}(1010) = \{\epsilon, 1, 10, 101, 1010\}$$

$$\text{suffix}(1010) = \{\epsilon, 0, 10, 010, 1010\}$$

$$\Rightarrow |\text{prefix}(w) \cap \text{suffix}(w)| = \{\epsilon, 10, 1010\}$$

$$\Rightarrow |\text{prefix}(w) \cap \text{suffix}(w)| = 2 + 1 = 3$$

Take $n = 3$ in a similar fashion,

$$\Rightarrow |\text{prefix}(w) \cap \text{suffix}(w)| = 3 + 1 = 4$$

Now take $n = 128$

$$\Rightarrow |\text{prefix}(w) \cap \text{suffix}(w)| = 128 + 1 = 129$$

Now, we need $|\text{prefix}(w) \cup \text{suffix}(w)|$ for $n = 128$,

$$= |\text{prefix}(w)| + |\text{suffix}(w)| - |\text{prefix}(w) \cap \text{suffix}(w)|$$

$$= (256 + 1) + (256 + 1) - 129$$

$$= 385$$

QUESTION ANALYTICS



Q. 56

Have any Doubt ?



Two gate aspirants talking to each other use the RSA algorithm to encrypt their messages. They encrypt the message character by character. The value of p, q and d are 5, 17 and 13 respectively, where p, q and d are their integers having usual meaning in the RSA algorithm. Identify the sum of integers in cipher text for corresponding characters in plain text: "IIT". Assume that corresponding cipher characters are placed in their corresponding plain text character places. Also each character is converted to ASCII value before applying RSA (ASCII value of A, B, C,... and so on are 1, 2, 3,..., respectively).

119

Correct Option

Solution :

119

Given,

$$p = 5, q = 17, d = 13$$

$$n = 85$$

$$z = (5 - 1)(17 - 1) = 64$$

Here

$d = 13$ is relatively prime to z

Now,

$$(e \times d) \bmod 64 = 1$$

\Rightarrow

$$e = 5$$

P	$P^e \bmod n$	Cipher Character
I	$9^5 \bmod 85$	59
I	$9^5 \bmod 85$	59
T	$20^5 \bmod 85$	1

\therefore Sum of integers in cipher text message: $59 + 59 + 1 = 119$

QUESTION ANALYTICS

Q. 57

Have any Doubt ?



Consider a demand paging environment where the page fault service time is 7 ms if the free frame is available or the page to be replaced is NOT modified. And if it takes 15 ms if the page to be replaced is modified. The main memory access time is 200 ns. The effective access time if the page fault rate is 5% and the page to be replaced is modified 60% of the time _____ (in usec). (Upto 2 decimal places)

590.19 [590.15 - 590.24]

Correct Option

Solution :

590.19 [590.15 - 590.24]

$$E \text{ MAT} = P \times S + (1 - P) \times M$$

$$= 0.05 (0.4 \times 7 \text{ ms} + 0.6 \times 15 \text{ ms}) + 0.95 \times 200 \text{ ns}$$

$$= 0.05 (0.4 \times 7 \times 10^6 \text{ ns} + 0.6 \times 15 \times 10^6 \text{ ns}) + 0.95 \times 200 \text{ ns}$$

$$= 590190 \text{ ns}$$

$$= 590.19 \text{ usec}$$

QUESTION ANALYTICS

Q. 58

Have any Doubt ?



Consider the following adjacency matrix 'D' represented the directed graph with distances (costs) between every pair of vertices.

$$A \ B \ C \\ D = \begin{bmatrix} 0 & 3 & 2 \\ 1 & 0 & 2 \\ 4 & 1 & 0 \end{bmatrix}$$

If Warshall's algorithm is applied on D to compute the shortest distances then following resultant matrix is obtained.

$$A \ B \ C \\ D^* = \begin{bmatrix} 0 & 3 & 2 \\ 1 & 0 & 2 \\ 2 & 1 & 0 \end{bmatrix}$$

If the edge from C to B in the given directed graph is removed then the number of shortest distances will be changed in D^* is _____.

2

Correct Option

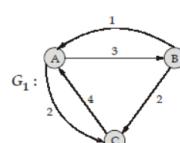
Solution :

2

$$A \ B \ C \\ D = \begin{bmatrix} 0 & 3 & 2 \\ 1 & 0 & 2 \\ 4 & 1 & 0 \end{bmatrix} \Rightarrow \begin{array}{c} \text{Graph: } \\ \text{A---B (3)} \\ \text{A---C (4)} \\ \text{B---C (2)} \\ \text{B---A (1)} \\ \text{C---A (1)} \\ \text{C---B (2)} \end{array}$$

$$A \ B \ C \\ D^* = \begin{bmatrix} 0 & 3 & 2 \\ 1 & 0 & 2 \\ 2 & 1 & 0 \end{bmatrix}$$

After removal of (C, B) edge, the graph is:



$$\Rightarrow \begin{array}{c} \text{Graph: } \\ \text{A---B (1)} \\ \text{A---C (2)} \\ \text{B---C (2)} \end{array} \Rightarrow \begin{bmatrix} 0 & 3 & 2 \\ 1 & 0 & 2 \\ 2 & 1 & 0 \end{bmatrix} \Rightarrow D_1^* = \begin{bmatrix} 0 & 3 & 1 \\ 1 & 0 & 2 \end{bmatrix}$$

C[4 < 0] C[4 7 0]
 ⇒ "C to A" and "C to B" shortest path distances are changed.

QUESTION ANALYTICS

Q. 59

Have any Doubt ?



Consider the following characteristics of a disk system.

- 10 GB disk rotates at 10,000 rpm
- Data transfer rate of 10^7 bytes/sec
- Average seek time is 8 ms
- Block size is 32 KB

The average service time to retrieve a single disk block from a random location on the disk is _____ (in ms). (Upto 2 decimal places)

14.28 [14.26 - 14.29]

Correct Option

Solution :

$$\begin{aligned} T_{\text{seek}} &= 8 \text{ ms} \\ T_{\text{rotational}} &= \frac{1}{2} \text{ rotational latency} = \frac{1}{2} \left(\frac{60}{10000} \right) \text{ sec} = 3 \text{ ms} \\ T_{\text{transfer}} &= \frac{32 \times 1024}{10^7} = 3.2768 \text{ ms} = 3.28 \text{ ms} \\ T_{\text{service}} &= T_{\text{seek}} + T_{\text{rotational}} + T_{\text{transfer}} \\ T_{\text{service}} &= 8 \text{ ms} + 3 \text{ ms} + 3.28 \text{ ms} = 14.28 \text{ ms} \end{aligned}$$

QUESTION ANALYTICS

Q. 60

Have any Doubt ?



A bag A contains 4 black and 6 red balls and bag B contains 7 black and 3 red balls. A dice is thrown. If 1 or 2 appears on it, then bag A is chosen, otherwise bag B. If two balls are drawn at random (without replacement) from the selected bag, the probability of one of them being red and another black is _____ (Upto 2 decimal places)

0.49 [0.45 - 0.52]

Correct Option

Solution :

0.49 [0.45 - 0.52]

Given,

Bag A = 4 black and 6 red balls.

Bag B = 7 black and 3 red balls.

Let

E_1 = The event that dice show 1 or 2.

E_2 = The event that dice show 3 or 4 or 5 or 6.

E = The event that among two drawn balls.

One of them is red and other is black.

Here

$$P(E_1) = \frac{2}{6} \text{ and } P(E_2) = \frac{4}{6}$$

$$\therefore P\left(\frac{E}{E_1}\right) = P(\text{getting one red and one black from bag A}).$$

$$= \frac{^4C_1 \times ^6C_1}{^{10}C_2} = \frac{4 \times 6 \times 2}{10 \times 9} = \frac{48}{90}$$

$$P\left(\frac{E}{E_2}\right) = P(\text{getting one red and one black from bag B})$$

$$= \frac{^7C_1 \times ^3C_1}{^{10}C_2} = \frac{7 \times 3 \times 2}{10 \times 9} = \frac{42}{90}$$

Now, by theorem of total probability

$$\begin{aligned} P(E) &= P(E_1) \cdot P\left(\frac{E}{E_1}\right) + P(E_2) \cdot P\left(\frac{E}{E_2}\right) \\ &= \frac{2}{6} \times \frac{48}{90} + \frac{4}{6} \times \frac{42}{90} = \frac{96}{540} + \frac{168}{540} \\ &= \frac{264}{540} = \frac{22}{45} = 0.4888 \end{aligned}$$

QUESTION ANALYTICS



Kunal Jha

 Course: GATE
 Computer Science Engineering(CS)

[HOME](#)
[MY TEST](#)
[BOOKMARKS](#)
[MY PROFILE](#)
[REPORTS](#)
[BUY PACKAGE](#)
[NEWS](#)
[TEST SCHEDULE](#)

FULL SYLLABUS TEST-8 (ADVANCE LEVEL) GATE 2020 - REPORTS

[OVERALL ANALYSIS](#)
[COMPARISON REPORT](#)
[SOLUTION REPORT](#)
[ALL\(65\)](#)
[CORRECT\(0\)](#)
[INCORRECT\(0\)](#)
[SKIPPED\(65\)](#)
Q. 61
[Have any Doubt ?](#)


The following C function takes a singly linked list as input argument:
`struct node {int value, struct node * next};`

```
int find (Node * head)
{
    Node * P1 = head, * P2 = head;
    if (head → next! = NULL)
    {
        P1 = head → next;
        P2 = (head → next)? head → next → next : NULL;
    }
    while ((P1 != NULL) && (P2 != NULL))
    {
        if (P1 == P2) return 1;
        P1 = P1 → next;
        P2 = (P2 → next != NULL)? P2 → next → next : NULL;
    }
    return 0;
}
```

Function is called on the following linked list,



The value returned by the code is _____.

 0

[Correct Option](#)
Solution :

0

Above code returns '1' if there is a cycle in a linked list. Since, the linked list which is given as an argument does not contain any cycle. Hence, value '0' will be returned.

Q. 62
[Have any Doubt ?](#)


There is a database of the dealers of a Products_deal. Following is the snapshot.

Product_deal

Dealer-no	Part-no	Color-id
D ₆	P ₂	C ₁
D ₂	P ₁	C ₂
D ₇	P ₄	C ₃
D ₅	P ₃	C ₄
D ₂	P ₃	C ₅
D ₇	P ₂	C ₆

Consider the following query:

```
SELECT DISTINCT A.Color-id, A.Dealer-no
FROM Product_deal A,Product_deal B
WHERE A.Dealer-no = B.Dealer-no
and A.Part-no < > B.Part-no;
```

The number of tuples contained in the output will be _____.

 4

[Correct Option](#)
Solution :

4

The output Table will be

Dealer-No.	Color-id
D ₂	C ₂
D ₇	C ₃
D ₂	C ₅
D ₇	C ₆

QUESTION ANALYTICS

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


Which of the following circuits are equivalent (i.e., they produce the same output for all inputs)?

$$F = ab + bc + ca$$

$$G = (a + b)(b + c)(c + a)$$

$$H = \text{NAND}(\text{NAND}(a, b), \text{NAND}(b, c), \text{NAND}(c, a))$$

Consider the following statements:

I. F, G, and H are same

II. Only G and H are same

III. F and G are same

The number of correct statements are _____.

 2

[Correct Option](#)

Solution :
2
All F, G and H are equivalent.
So I and III are correct.

QUESTION ANALYTICS

Q. 64

Have any Doubt ?



Find the minimum number of temporary variables are created in 3-address code for the following expression
 $a + b * c + d - e - a + b * c$

Consider following grammar for precedence and associativity _____.

$$\begin{aligned} S &\rightarrow ES \\ E &\rightarrow E - F \mid F \\ F &\rightarrow F + G \mid T \\ G &\rightarrow G * H \mid H \\ H &\rightarrow id \mid \epsilon \end{aligned}$$

2

Correct Option

Solution :

2

As, according to given grammar,

Precedence order is: $*$ > $+$ > $-$

$-$, $+$, $*$ all are left associative.

$$\begin{aligned} &= a + b * c + d - e - a + b * c \\ &= ((a + (b * c)) + d) - e - (a + (b * c)) \end{aligned}$$

Equivalent 3-address code is:

$$\begin{aligned} t_1 &= b * c \\ t_2 &= a + t_1 \\ t_1 &= t_2 + d \\ t_1 &= t_1 - e \\ t_1 &= t_1 - t_2 \end{aligned}$$

∴ Only two temporary variables are used.

QUESTION ANALYTICS

Q. 65

Have any Doubt ?



Two processors, M-5 and M-7, implement the same instruction set. Processor M-5 uses a 5-stage pipeline and a clock cycle of 10 nanoseconds. Processor M-7 uses a 7-stage pipeline and a clock cycle of 7.5 nanoseconds. Consider the following statements:

- I. M-7's pipeline has better maximum throughput than M-5's pipeline.
- II. The latency of a single instruction is shorter on M-7's pipeline than on M-5's pipeline.
- III. Programs executing on M-7 will always run faster than programs executing on M-5.

The number of the true statement(s) is/are _____.

2

Correct Option

Solution :

2

M-5	M-7
$K = 5$	$K = 7$
$T_p = 10 \text{ ns}$	$T_p = 7.5 \text{ ns}$

I is true, since for large number of instructions M-7 give better throughput than M-5.

For e.g.

$$\text{Take } n = 100$$

Thus, M-5 execution time

$$(K + n - 1)T_p = (5 + 99) \times 10 = 1040$$

and M-7 execution time

$$(7 + 99) \times 7.5 = 795$$

⇒ Thus M-7 is better.

Only I is true.

QUESTION ANALYTICS