Kunal Jha
Course: GATE
Computer Science Engineering(CS)

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FULL SYLLABUS TEST-5 (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 ?

There is much difficulty_____getting_____this place and it is not possible to reach_____without the grace of God.
The option that best fills the blanks in the above sentence would be :

A in; to; it — Correct Option

Solution :
(a)
'In' is used with difficulty and 'to' is used with getting. The word after 'reach' will refer to place, so it must be 'it'.
Hence, option (a) is the correct answer.

B to; to; it

C to; in; it

D in; in; in

QUESTION ANALYTICS +

Q. 2 Solution Video | Have any Doubt ?

All who studied commerce enjoy sports. No tax consultant enjoys sports. All those who enjoy sports love classical music.
If the above sentences are true, which of the following must be true?

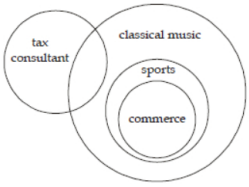
A No one who enjoys classical music is a tax consultant by profession.

B Every tax consultant enjoys classical music.

C No tax consultant enjoys classical music.

D No tax consultant studied commerce. — Correct Option

Solution :
(d)



From the venn diagram, we can see that only option (d) is possible.

QUESTION ANALYTICS +

Q. 3 Solution Video | Have any Doubt ?

The first day of the release of the movie saw a great turnout. However, a significant proportion of viewers came out of the movie theaters disappointed. Clearly, the movie won't fare well in terms of viewership.
Which one of the following, if true, would most seriously weaken the conclusion above?

A The reaction of movie critics who watched the movie on the first day will be available to those who are still to watch the movie.

B Among the movies whose first day performance was disappointing, hardly any movie went on to become successful.

C People differed in their opinions regarding which part of the movie was most disappointing.

D People who go to watch a movie on the first day are movie enthusiasts who are quick to watch new movies but also as quick to disparage them for trivial reasons. — Correct Option

Solution :
(d)
What is meant by option (d) is that the first day goers may have critiqued the movie as a disappointing one for trivial reasons; thus, the same might not help us make a conclusion about the overall viewership. A majority of people (not the first day goers) may find the movie worth a watch without any complaints (this can be said because of the usage of the word "trivial")

QUESTION ANALYTICS

Q. 4 Solution Video | Have any Doubt ?

Four persons enter the lift of a seven storey building at the ground floor. In how many ways can they get out of lift on any floor other than the ground floor?

A 720

B 1296 — Correct Option

Solution :
(b)
Each person out of 4 has 6 floors (options) to get out of (since no one gets out on the ground floor), hence total ways is $6 \times 6 \times 6 \times 6 = 6^4 = 1296$.

C 1540

D 1478

QUESTION ANALYTICS

Q. 5 FAQ | Solution Video | Have any Doubt ?

Ajay's mother asks him to buy 100 pieces of sweets worth ₹100. The sweet shop has 3 kinds of sweets, A, B and C. A costs ₹10 per piece, B costs ₹3 per piece and C costs 50 paise per piece. If Ajay decides to buy at least one sweet of each type , the number of sweets B he should buy is _____.

1 — Correct Option

Solution :
1

Let Ajay buy x, y and z pieces of A, B and C respectively. $(x, y, z \geq 1)$

$\Rightarrow x + y + z = 100$ .....(i)

Also, $10x + 3y + \frac{1}{2}z = 100$

$\Rightarrow 20x + 6y + z = 200$ .....(ii)

Sustracting equation (i) from (ii), we get :

$\Rightarrow 19x + 5y = 100$

$\Rightarrow y = \frac{100 - 19x}{5}$

If $x = 1$, y will not be natural. The only value of x for natural value of y is $x = 5$.

$\Rightarrow y = \frac{100 - 95}{5} = 1$

$\therefore$ Ajay must buy 1 piece of sweet B.

QUESTION ANALYTICS

Q. 6 Solution Video | Have any Doubt ?

A, *B*, *C* and *D* can finish a task in 10, 12, 15 and 18 days respectively. They can either choose to work or remain absent on a particular day. If 50 percent of the total work gets completed after 3 days, then, which of the following options is possible?

A Each of them worked for exactly 2 days.

B *B* and *D* worked for 1 day each. *C* worked for 2 days and *A* worked for all 3 days.

C *A* and *C* worked for 2 days each, *D* worked for 1 day and *B* worked for all 3 days.

D *A* and *C* worked for 1 day each, *B* worked for 2 days and *D* worked for all 3 days. — Correct Option

Solution :
(d)
Let us assume the amount of work to be finished = LCM of {10, 12, 15, 18} = 180 units.

The amount of work which A can complete in a day = $\frac{180}{10}$ = 18 units.

The amount of work which B can complete in a day = $\frac{180}{12}$ = 15 units.

The amount of work which C can complete in a day = $\frac{180}{15}$ =12 units.

The amount of work which D can complete in a day = $\frac{180}{18}$ =10 units.

It is given that 50 percent of the total work gets completed after 3 days. Therefore, we can say that 90 units of work was completed in 3 days.
Let us check options.
Option (a) : Each of them worked for exactly 2 days.
In this case amount of work completed = 2 × (10 + 15 + 12 + 18) = 110 units.
Option (b) : *B* and *D* worked for 1 day each, *C* worked for 2 days and *A* worked for all 3 days. In this case amount of work completed = 1 × (10 + 15) + 2 × (12) + 3 × (18) = 103 units.
Option (c) : *A* and *C* worked for 2 days each, *D* worked for 1 day and *B* worked for all 3 days. In this case amount of work completed = 2 × (18 + 12) + 1 × (10) + 3 × (15) = 115 units.
Option (d) : *A* and *C* worked for 1 day each, *B* worked for 2 days and *D* worked for all 3 days.

In this case amount of work completed = 1 × (18 + 12) + 2 × (15) + 3 × (10) = 90 units.
Therefore, we can say that option (d) is the correct answer.

QUESTION ANALYTICS +

Q. 7

Solution Video | Have any Doubt ?

In how many ways a cricketer can make a century with fours and sixes only?

A 6

B 9 Correct Option

Solution :
(b)
The possible ways are
i. (25 × 4)
ii. (22 × 4 + 2 × 6)
iii. (19 × 4 + 4 × 6)
iv. (16 × 4 + 6 × 6)
v. (13 × 4 + 8 × 6)
vi. (10 × 4 + 10 × 6)
vii. (7 × 4 + 12 × 6)
viii. (4 × 4 + 14 × 6)
ix. (1 × 4 + 16 × 6)
Hence there are total 9 ways.

C 8

D 10

QUESTION ANALYTICS +

Q. 8

Solution Video | Have any Doubt ?

x, 17, $3x - y^2 - 2$ and $3x + y^2 - 30$, are four consecutive terms of an increasing arithmetic sequence.
The sum of the four numbers is divisible by :

A 2 Correct Option

Solution :
(a)
The terms x, 17, $3x - y^2 - 2$ and $3x + y^2 - 30$ are in A.P.

Common difference : $d = 17 - x$ .....(i)

$d = 3x - y^2 - 19$ .....(ii)

$d = 2y^2 - 28$ .....(iii)

From equation (i) & (ii),

$17 - x = 3x - y^2 - 19$

$\Rightarrow 4x - y^2 = 36$ .....(iv)

From equation (ii) & (iii),

$3x - y^2 - 19 = 2y^2 - 28$

$\Rightarrow x - y^2 = -3$ .....(v)

Solving equation (iv) & (v), we get :

$x = 13, y^2 = 16$

$\Rightarrow$ Terms are = 13, 17, 21, 25

$\therefore$ Sum = 13 + 17 + 21 + 25 = 76

Which is divisible by 2. (among the given options)

B 3

C 5

D 7

QUESTION ANALYTICS +

Q. 9

Solution Video | Have any Doubt ?

The Maximum Retail Price (MRP) of a product is 55% above its manufacturing cost. The product is sold through a retailer, who earns 23% profit on his purchase price. What is the profit percentage (expressed in nearest integer) for the manufacturer who sells his product to the retailer? The retailer gives 10% discount on MRP.

A 31%

B 22%

C 15%

D 13% Correct Option

Solution :
(d)

Let Manufacturing Cost of the product = ₹100

$\Rightarrow$ Maximum Retail Price (MRP) = $100+\frac{55}{100}\times 100 = ₹\ 155$

Retailer gives 10% discount on MRP

$\Rightarrow$ Retailer's selling price = $155-\frac{10}{100}\times 155 = ₹\ 139.5$

It is given that the Retailer earned 23% profit on his purchase price, say ₹x

$\Rightarrow \quad \frac{123x}{100} = 139.5$

$\Rightarrow \quad x = \frac{13950}{123} = 113.41$

Now, the purchase price of Retailer = x = selling price of Manufacturer
$\therefore$ Profit earned by Manufacturer = 113.41 – 100 = ₹13.41 = 13%

QUESTION ANALYTICS +

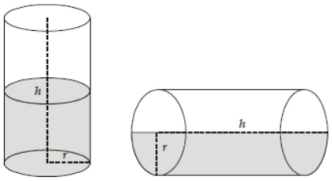
Q. 10

Solution Video | Have any Doubt ?

A closed cylindrical tank contains 36π cubic feet of water and is filled to half its capacity. When the tank is placed upright on its circular base on level ground, the height of the water in the tank is 4 feet. When the tank is placed on its side on level ground, the height (in feet), of the surface of the water above the ground is_____.

3 — Correct Option

Solution :
3



Since the tank is half full when placed upright then naturally it'll also be half full when placed on its side, so the level of the water (when placed that way) will be half of the diameter.
Now, given than $V_{water} = \pi \times r^2 \times H_{water}$
$\Rightarrow \quad 36\pi = \pi r^2 \times 4$
$\Rightarrow \quad r = 3$

QUESTION ANALYTICS +

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Q. 11 Solution Video | Have any Doubt ?

L_1 and L_2 be 2 languages over an arbitrary alphabet Σ.
Also $L_3 = [(L_1 \cup L_2) - (L_1 \cap L_2)] \cup [(L_1 \cup L_2') \cap (L_1' \cup L_2)]$.
Consider the following statements:

I. L_3 is regular only if L_1 and L_2 are finite languages.
II. There exist language L_1 and L_2 for which L_3 is non regular.

Which of the above statements are true?

A I only

B II only

C Both I and II

D None of these — Correct Option

Solution :
(d)

Actually, $L_3 = [L_1 \oplus L_2] \cup [\overline{L_1 \oplus L_2}] = \Sigma^*$

So irrespective of the nature of L_1 and L_2, L_3 is always regular. Hence both I and II are wrong.
Therefore option (d) is the correct answer.

QUESTION ANALYTICS +

Q. 12 Have any Doubt ?

A binary search tree with n nodes is constructed. Along with key each node store the number of elements in the sub tree rooted at that node. We have given two elements a and b such that $a < b$. What will be the number of comparisons and additions respectively to find the number of elements m such that $a \le m \le b$?

A O(logn) and O(n)

B O(logn) and O(logn)

C O(logn) and O(loglogn)

D O(n) and O(n) — Correct Option

Solution :
(d)
O(n) comparisons for finding a and b since it is a binary search tree.
Now, in order to find the number of elements between a and b we need to find the inorder. For this again O(n) comparisons.
Then, starting from index a upto b calculate total number thus O(n) additions.
Hence option (d) is correct.

QUESTION ANALYTICS +

Q. 13 Solution Video | Have any Doubt ?

Consider the equation r = p* + rq*. Then r equals

A pq*

B qp*

C p*q* — Correct Option

Solution :
(c)

We have, $r = p^* + rq^*$

Putting (c) in place of r,

$$p^*q^* = p^* + (p^*q^*)q^*$$
$$p^*q^* = p^* + p^*(q^*q^*)$$
$$p^*q^* = p^* + p^*q^* \quad [q^*q^* = q^*]$$
$$= p^* (\in + q^*)$$
$$= p^*q^* \quad [\text{as} \in + q^* = q^* \text{ because} \in \text{belongs to } q^*]$$

D p*q

QUESTION ANALYTICS +

Q. 14 Solution Video | Have any Doubt ?

In a microprocessor, the service routine for a certain interrupt starts from a fixed location of memory which cannot be externally set, but the interrupt can be delayed or rejected. Such an interrupt is

A Maskable and Non-vectored

B Non-maskable and Non-vectored

C Non-maskable and vectored

D Maskable and vectored — Correct Option

Solution :
(d)
Interrupt which has fixed address location is said to be vectored and which can be delayed on rejected is known as maskable.

QUESTION ANALYTICS +

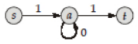
Q. 15 Solution Video | Have any Doubt ?

Which of the following is true?

A The running time of Radix Sort is effectively independent of whether the input is already sorted. — Correct Option

Solution :
(a)

- In Radix Sort, all input orderings give the worst-case running time, the running time does not depend on the order of the inputs in any significant way.
- The parent pointers may not lead back to the source node if a zero length cycle exists.
  In the example below, relaxing the (s, a) edge will set $d[a] = 1$ and $\pi[a] = s$. Then, relaxing the (a, a) edge will set $d[a] = 1$ and $\pi[a] = a$
  Following the π pointers from t will no longer give a depth to s, so the algorithm is incorrect.



B Changing the RELAX function to update is d[v] ≥ d[u] + w (u, v) (instead of strictly greater than) may produce shortest path, but will not effect the correctness of Bellman-Ford algorithms outputs.

C Both (a) and (b)

D None of these

QUESTION ANALYTICS +

Q. 16 Solution Video | Have any Doubt ?

Consider a single graph G which has 10 vertices. Which of the following represents the minimum number of edges required to guarantee that the graph G is connected?

A 36

B 37 — Correct Option

Solution :
(b)
The answer is 37, as a consequence of a theorem which states "If in a graph G with n vertices, the number of edges is one more than ${}^{n-1}C_2$, then G will be connected".
Hence (b) will be the answer.

C 9

D 45

QUESTION ANALYTICS +

Q. 17 Solution Video | Have any Doubt ?

Which of the following is not correct about "monitors"?

A Mutual exclusion is not satisfied in monitor. — Correct Option

Solution :
(a)
Monitor uses condition variables for synchronization, prevents multiple processes from executing monitor code at the same time. It hides the mutual exclusion details from calling function.

B Prevents multiple processes from executing monitor code at the same time.

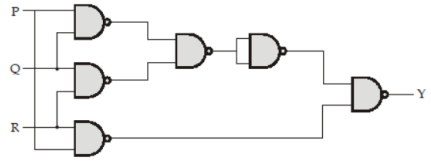
C Uses condition variables for synchronization.

D Both (a) and (c)

QUESTION ANALYTICS +

Q. 18 Solution Video | Have any Doubt ?

The output Y in the circuit below is always "1" when



A Any odd number of the inputs P, Q, R, is "1".

B Any odd number of the inputs P, Q, R, is "0".

C Two or more of the inputs P, Q, R, is "0".

D Two or more of the inputs P, Q, R, is "1". Correct Option

Solution :
(d)

$$Y = \overline{\overline{PQ}\,\overline{RQ}\,\overline{PR}}$$
$$= PQ + QR + PR$$

So, two or more of the inputs P, Q, R are "1" the output Y will be "1".

QUESTION ANALYTICS +

Q. 19 Solution Video | Have any Doubt ?

Which of the following is correct about "telnet"?

A It transfer web pages from web servers to clients.

B It provide remote access to servers and networking devices. Correct Option

Solution :
(b)
Telnet provide remote access to servers and networking devices, its port number is 23.

C It transfers e-mail messages and attachments.

D Both (a) and (b)

QUESTION ANALYTICS +

Q. 20 Have any Doubt ?

Consider the following C program:

```
# include <stdio.h>
int main (int argc, char ** argv)
{
    Printf("%s\n", argv[0]);
    return 0;
}
```

If the program is compiled to an executable file name "hello". What will be the output of the program when executed with the following command.

```
./hello hi Johnny
```

A hi

B Johnny

C Segmentation fault

D ./hello Correct Option

Solution :
(d)
The above program Prints "./hello" because at 0th place ./hello will be stored and so on.
Hence option (d) is correct.

QUESTION ANALYTICS +

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Q. 21 Solution Video | Have any Doubt ?

Value of $\lim_{n\to\infty}\left(\sqrt{n^2-n}-\sqrt{n^2-1}\right)$ is

A -1

B $\frac{1}{2}$

C $\frac{-1}{2}$ Correct Option

Solution :
(c)

$$\lim_{n\to\infty}\left(\sqrt{n^2-n}-\sqrt{n^2-1}\right) = \lim_{n\to\infty}\frac{\left(\sqrt{n^2-n}-\sqrt{n^2-1}\right)\left(\sqrt{n^2-n}+\sqrt{n^2-1}\right)}{\sqrt{n^2-n}+\sqrt{n^2-1}}$$

$$= \lim_{n\to\infty}\frac{n^2-n-n^2+1}{n\left[\sqrt{1-\frac{1}{n}}+\sqrt{1-\frac{1}{n^2}}\right]}$$

$$= \lim_{n\to\infty}\frac{1-n}{n[1+1]} = \lim_{n\to\infty}\frac{\left[\frac{1}{n}-1\right]}{[1+1]} = \frac{0-1}{2} = \frac{-1}{2}$$

D 1

QUESTION ANALYTICS +

Q. 22 Solution Video | Have any Doubt ?

Consider the following first order logic formulae. Take the domain to be the set of all real numbers (let Z denote the set of all integers).

I. $\forall x \forall n\ (n \in Z \wedge x = 2n\pi \Rightarrow \sin(x) > 0)$
II. $\forall x \forall n\ (n \in Z \wedge x = 2n\pi \Rightarrow \cos(x) > 0)$
III. $\forall x\ (\sin^2 x + \cos^2 x = 1)$

Which of the above statements are true?

A II, III but not I Correct Option

Solution :
(a)
We know that, $\sin(x)$ equals zero at all integral multiples of 2π, and I is false, since it says strictly greater than zero, instead of saying 'greater than or equal to zero'.
As far as II goes, $\cos x$ equals 1 at integral multiples of 2π. Hence II is true.
III is one of the most popular results in trigonometry and hence III is also true.

B I, III, but not II

C III only

D All of the above

QUESTION ANALYTICS +

Q. 23 Solution Video | Have any Doubt ?

Which of the following is correct?

A A record of all transactions and the corresponding changes to the database is recorded in a log.

B Two phase locking is used to prevent unauthorized user to access to a database record.

C Transaction is a program unit where execution preserve the consistency of the database.

D Both (a) and (c) Correct Option

Solution :
(d)
Transaction is a program unit where execution preserve the consistency of the database and records of all transaction and the corresponding changes to the database is recorded in a log.

QUESTION ANALYTICS +

Q. 24 Solution Video | Have any Doubt ?

In how many ways can we draw 5 cards from a well shuffled deck of 52 cards, such that we get exactly 3 Kings and 1 Queen?

A 16

B 704 Correct Option

Solution :
(b)
In our deck of cards, we have 4 Kings and 4 Queens. So as per question, we need 3 Kings and 1 Queen, and one extra card which can be any one of the remaining 44 cards (don't forget this, else you'll end up getting 16, which is wrong).
Hence the required answer = ${}^4C_3 \times {}^4C_1 \times {}^{44}C_1 = 4 \times 4 \times 44 = 704$.
So (b) is the answer.

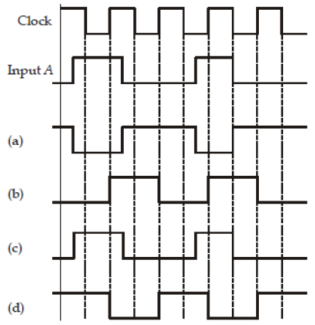
C 120

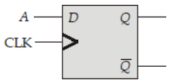
D 64

QUESTION ANALYTICS +

Q. 25 Solution Video | Have any Doubt ?

The input A and clock applied to the D flip-flop are shown in figure below. The output $\bar{Q}$ is





A a

B b

C c

D d Correct Option

Solution :
(d)
D flip-flop changes its output according to input and clock pulse applied to it. The flip flop shown in figure is positive edge triggered so the output modifies at every positive edge of clock according to the input.

QUESTION ANALYTICS +

Q. 26 Solution Video | Have any Doubt ?

Consider a fully associative data cache with 32 blocks of 64 bytes each. The cache uses LRU (Least Recently Used) replacement. Consider the following C code to sum together all of the element of a 64 by 64 two dimensional array of 64 bit double precision floating numbers. double sum (double A[64] [64])

```
{
    int i, j;
    double sum = 0;
    for (i = 0; i < 64; i++)
    for (j = 0; j < 64; j++)
    sum += A[i] [j];
    return sum;
}
```

Assume all blocks in the cache are initially invalid. How many cache misses will result from the code _____.

512 Correct Option

Solution :
512

Cache block size = 64 bytes
Each element size of array = 64 bits = 8 bytes

Each cache block can hold $\frac{64 \text{ bytes}}{8 \text{ bytes}}$ = 8 array element

Now for each other loop their will be 8 miss.
So for total 64 × 8 = 512 miss

QUESTION ANALYTICS +

Q. 27 Have any Doubt ?

Consider RSA algorithm with value of $p = 7$ and $q = 17$, e is the key used for encryption and value of $e = 5$, value of decryption key is _____.

77 Correct Option

Solution :
77

$$\begin{aligned} p, q &= 7, 17 \\ n &= 7 \times 17 = 119 \\ \phi(n) &= (7-1) \times (17-1) = 96 \\ (e \times d) \bmod \phi(n) &= 1 \\ (5 \times d) \bmod 96 &= 1 \\ d &= 77 \end{aligned}$$

Satisfy the equation and value of decryption key = 77

QUESTION ANALYTICS +

Q. 28 Solution Video Have any Doubt ?

If the matrix $A = \begin{bmatrix} 1 & 2 & -2 & 3 \\ 2 & 5 & -4 & 6 \\ -1 & -3 & 2 & -2 \\ 2 & 4 & -1 & 6 \end{bmatrix}_{4\times4}$ then the rank of the matrix A is _____.

4 Correct Option

Solution :
4

$$A = \begin{bmatrix} 1 & 2 & -2 & 3 \\ 2 & 5 & -4 & 6 \\ -1 & -3 & 2 & -2 \\ 2 & 4 & -1 & 6 \end{bmatrix}_{4\times4}$$

Applying $R_2 \to R_2 - 2R_1$, $R_3 \to R_3 + R_1$ and $R_4 \to R_4 - 2R_1$

$$A = \begin{bmatrix} 1 & 2 & -2 & 3 \\ 0 & 1 & 0 & 0 \\ 0 & -1 & 0 & 1 \\ 0 & 0 & 3 & 0 \end{bmatrix}$$

Applying $R_3 \leftrightarrow R_3 + R_2$ and $R_4 \to \frac{1}{3}R_4$

$$A = \begin{bmatrix} 1 & 2 & -2 & 3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

Applying $R_3 \leftrightarrow R_4$

$$A = \begin{bmatrix} 1 & 2 & -2 & 3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$\therefore$ Rank of $A = 4$

QUESTION ANALYTICS +

Q. 29 Solution Video Have any Doubt ?

Consider the following table:

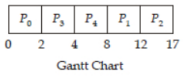
(All time in ms)

Process	Arrival Time	Burst Time	Priority
P_0	0	2	1 (Highest)
P_1	3	4	4
P_2	1	5	5
P_3	2	2	2
P_4	2	4	3

Processes are scheduled with non preemptive priority scheduler. The average Turn Around Time _____ (ms).

7 — Correct Option

Solution :
7



Gantt Chart

Average Turn Around Time

P_0	2
P_1	9
P_2	16
P_3	2
P_4	6

$$= \frac{2+9+16+2+6}{5} = 7 \text{ ms}$$

QUESTION ANALYTICS +

Q. 30 Solution Video | Have any Doubt ?

Let R be an equivalence relation on a set S with n equivalence classes $S_1, S_2, ..., S_n$ such that $|S_i| = i$, where $1 <= i <= n$. Then the cardinality of R when $n = 5$, is equal to _____.

55 — Correct Option

Solution :
55
The cardinality of R will be equal to $1^2 + 2^2 + ... + 5^2$ (as R has 5 partitions of sizes 1, 2, 3, 4 and 5 respectively).
So the answer will be equal to 55.

QUESTION ANALYTICS +

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Computer Science Engineering(CS)

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FULL SYLLABUS TEST-5 (ADVANCE LEVEL) GATE 2020 - REPORTS

OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

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

Q. 31 Have any Doubt ?

Consider the following statements about recursive and iterative programs.
I. Recursive programs require dynamic memory management.
II. Recursive programs are more powerful than iterative programs.
III. For every iterative program there is an equivalent recursive program.
IV. Both recursive and iterative programs are equally expressive.
The number of correct statements are _____.

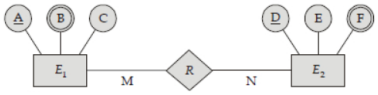
3 — Correct Option

Solution :
3
I, III and IV are correct but II is false since both are equally powerful.

QUESTION ANALYTICS +

Q. 32 Solution Video | Have any Doubt ?

The minimum number of RDBMS tables required for the following ER diagram is _____.



5 — Correct Option

Solution :
5
Multivalued attribute combines with key.
For many-to-many relationship one separate table is required with both table keys.
R_1(AB)
R_2(AC)
R_3(AD)
R_4(DE)
R_5(DF)
Total 5 tables required.

QUESTION ANALYTICS +

Q. 33 Have any Doubt ?

Consider the following statement(s):
I. Symbol table is modified only during lexical phase of a compiler.
II. Lexical error is produced by lexical analyzer when there is a missing left parenthesis in an expression.
The number of correct statement(s) is/are _____.

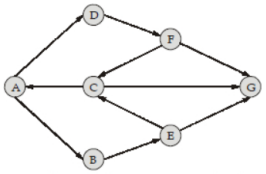
0 — Correct Option

Solution :
0
Symbol table is modified also during semantic analysis, type of identifiers is updated in the symbol table.
Lexical analyzer produces an error when an illegal character appears in the string pattern that makes invalid token.

QUESTION ANALYTICS +

Q. 34 Solution Video | Have any Doubt ?

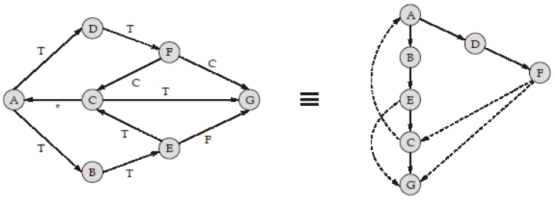
Consider the following graph:



If depth-first search applied from vertex A on the above graph then find number of back edges. Assume vertices are visited in the alphabetic order.

Solution :
1

- Tree edge (T): the edges in the graph that also appears in the DFS tree are called tree edges (T).
- Back edge (*): it is the edge in the graph which is going from child to parent in graph but not in DFS tree.
- Cross edge (C): remaining edges.
- Forward edge (F)



Tree edge (T) = 6, Back edge (*) = 1, Cross edge (C) = 2, Forward edge (F) = 1.

QUESTION ANALYTICS +

Q. 35 Have any Doubt ?

Assume that node l, whose key is kl, is a leaf node of a Binary Search Tree 'T' having total number of nodes greater than 2 and that its parent is node P with key k_p then consider the following statements:

I. k_p is the smallest key greater than k_l

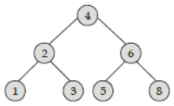
II. k_p is the longest key smaller than k_l

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

2 Correct Option

Solution :
2

Consider the following Binary Search Tree,



Consider 2 Scenarios :

Scenario 1: $k_l = 1; k_p = 2$

Here, k_p is the smallest key greater than k_l

Scenario 2: $k_l = 3; k_p = 2$

Here, k_p is the longest key which is smaller then k_l

Hence, either of the two is possible depending on the key.

QUESTION ANALYTICS +

Q. 36 Have any Doubt ?

Consider a algorithm in which the input is two array A[1 ..... *n*] and B[1 ..... *n*] both arrays are in increasing order, the output is an array X[1 ... 2*n*] which has all the values of the array A and B in increasing order, what is time complexity of that algorithm?

A O(n logn)

B $O(n^2)$

C $O(n)$ Correct Option

Solution :
(c)

To join array A and B, algorithm is similar to merge algorithm in merge sort

$O(n) + O(n) = O(2n)$

Time complexity $= O(n)$

D O(log*n*)

QUESTION ANALYTICS +

Q. 37 Solution Video Have any Doubt ?

Consider the following statements:
I. RIP uses distributed version of Bellman Ford algorithm.
II. RIP uses distance vector algorithm.
III. FTP uses port number 21 for data transfer.
Which of the above statement(s) is/are correct?

A I and II only Correct Option

Solution :
(a)
RIP uses distributed version of Bellman Ford algorithm.
RIP uses distance vector algorithm.
FTP uses port number 20 for data and 21 for control connection.

B I and III only

C II and III only

D II only

QUESTION ANALYTICS +

Q. 38 Solution Video | Have any Doubt ?

Let $f(x) = \sum_{k=0}^{\infty} a_k x^k$ is a generating function for the sequence $a_0, a_1, a_2, a_3, \ldots$ match the following sequences in List-I with their corresponding generating functions in List-II.

List-I	List-II
I. $\underbrace{0,0,0,\ldots,0}_{n}, a_0, a_1, a_2, \ldots$	P. $f'(x)$
II. $a_1, 2a_2, 3a_3, 4a_4, \ldots$	Q. $f(x^2)$
III. $a_0, 0, a_1, 0\ a_2, 0 \ldots$	R. $x^n f(x)$
	S. $\int_0^x f(t)dt$

A 1 → P, 2 → S, 3 → R

B 1 → R, 2 → P, 3 → Q Correct Option

Solution :
(b)
Given, $f(x) = a_0 + a_1 x + a_2 x^2 + \ldots \Rightarrow a_0, a_1, a_2, \ldots$
Differentiate both sides,
$f'(x) = a_1 + 2a_2 x + 3a_3 x^2 + 4a_4 x^3 \ldots$
Hence the sequence will be : $a_1, 2a_2, 3a_3, 4a_4, \ldots$
So 2 matches with P.
Again take $f(x) = a_0 + a_1 x + a_2 x^2 + \ldots$
Therefore $f(x^2) = a_0 + a_1 x^2 + a_2 x^4 + \ldots$
or $f(x^2) = a_0 + 0 \cdot x + a_1 \cdot x^2 + 0 \cdot x^3 + a_2 \cdot x^4 \ldots$
Hence 3 matches with Q.
And for 1, consider $x^n f(x) = x^n [a_0 + a_1 x + a_2 x^2 + \ldots]$
$= a_0 x^n + a_1 x^{n+1} + a_2 x^{n+2} + \ldots$
Which can be written as,
$0 + 0 \cdot x + 0 \cdot x^2 + \ldots + 0 \cdot x^{n-1} + a_0 x^n + a_1 x^{n+1} + \ldots$
Hence sequence will be $\underbrace{0,0,0,\ldots,0}_{n \text{ zeroes}}, a_0, a_1, a_2, \ldots$
So I matches with R.
Hence option (b) is the right choice.

C 1 → R, 2 → P, 3 → S

D None of these

QUESTION ANALYTICS +

Q. 39 Solution Video | Have any Doubt ?

Consider the following snapshot of a system with 5 processes (P_1, P_2, P_3, P_4 and P_5) and 3 sources (R_1, R_2 and R_3).

Process	Current Allocated			Maximum Demand		
	R_1	R_2	R_3	R_1	R_2	R_3
P_1	0	0	1	1	1	1
P_2	0	1	0	1	1	0
P_3	1	2	3	2	2	4
P_4	0	1	1	1	2	1
P_5	1	0	1	3	0	1

If the system has 1 unit of R_1 and 1 unit of R_3 available then how many minimum resource units available for R_2 to guarantee deadlock free?

A 3

B 2

C 1

D 0 Correct Option

Solution :
(d)

	Need		
	R_1	R_2	R_3
P_1	1	1	0
P_2	1	0	0

P_3	1	0	1
P_4	1	1	0
P_5	2	0	0

Available = (1, x, 1). If x = 0, the system will be in safe state

Available = (1, 0, 1)

$P_2 \rightarrow$ (0, 1, 0) → (1, 1, 1)

$P_1 \rightarrow$ (0, 0, 1) → (1, 1, 2)

$P_3 \rightarrow$ (1, 2, 3) → (2, 3, 5)

$P_4 \rightarrow$ (0, 1, 1) → (2, 4, 6)

$P_5 \rightarrow$ (1, 0, 1) → (3, 4, 7)

There is safe sequence.

∴ Minimum zero units of R_2 is guarantee deadlock free.

QUESTION ANALYTICS +

Q. 40

Solution Video | Have any Doubt ?

Consider the following statements:
I. Projection is not a commutative operation in relation algebra.
II. If R and S are two relation in BCNF then natural join of R and S is also in BCNF.
Which of the above statement(s) is/are correct?

A I only — Correct Option

Solution :
(a)

I. Projection is not a commutative operation.

II. Consider R(A, B) {A → B}
S(B, C) {B → C}
R ⋈ S = A → B, B → C
Which is not in BCNF.

B II only

C Both I and II

D Neither I nor II

QUESTION ANALYTICS +

Kunal Jha
Course: GATE
Computer Science Engineering(CS)

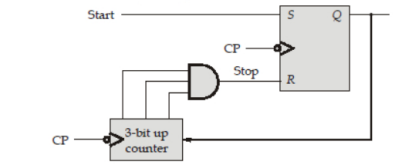
FULL SYLLABUS TEST-5 (ADVANCE LEVEL) GATE 2020 - REPORTS

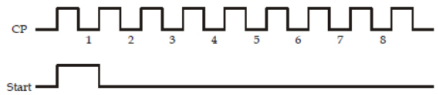
OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

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

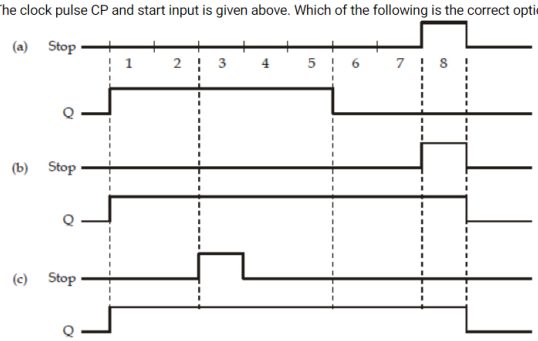
Q. 41 Solution Video | Have any Doubt ?

Consider the below digital diagram:





The clock pulse CP and start input is given above. Which of the following is the correct options for output Q and stop signal?



(d) None of these

A a

B b — Correct Option

Solution :
(b)
The correct option is (b) when counter is 111 then Q is cleared.

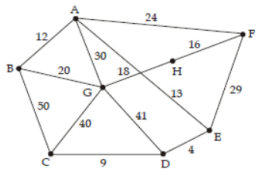
C c

D d

QUESTION ANALYTICS +

Q. 42 Solution Video | Have any Doubt ?

The routing table for C and entire network using the link state protocol is given below:



	Cost	Via
A	26	E
B	X	A
C	0	C
D	9	C
E	Y	D
F	42	G
G	Z	B
H	58	F

Assume that the network is stable and all the routing tables at all routers A, B, C,..., H are successfully updated. The respective values for X, Y and Z are

A 43, 38, 40

B 29, 38, 46

C 38, 13, 40 — Correct Option

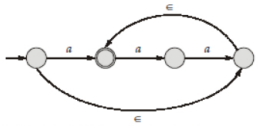
Solution :
(c)
X = 38, Y = 13, and Z = 40 are updated for routing table C.

D 40, 38, 21

QUESTION ANALYTICS

Q. 43 Solution Video | Have any Doubt ?

Consider the following NFA R, over Σ = {a}



Now we're given the following claims.

I. $L(\bar{R}) - L(R) = \overline{L(R)}$

II. $L(R) \subseteq L(\bar{R})$

III. $L(R) \cup L(\bar{R}) = \Sigma^*$

Which of the above claims are correct?

A None of the above

B I and II only

C I and III only

D All of the above — Correct Option

Solution :
(d)

$$L(R) = \{a^{2k+1} \mid k \geq 0\}$$

$$L(\bar{R}) = a^*$$

Now seeing I, $L(\bar{R}) - L(R) = (a^* - a(aa)^*)$

$$= (aa)^* \ [\overline{\text{odd } a\text{'s}} = \text{even } a\text{'s}]$$

Which is equal to $\overline{L(R)}$. So I is true.

II says, $L(R) \subseteq L(\bar{R})$ i.e. $a^{2k+1} \subseteq L(a^*) \Rightarrow$ true.

III is also true, as $L(a^*) \cup L(a(aa)^*) = L(a^*) = \Sigma^* \Rightarrow$ true.

So all 3 are true, hence option (d) is correct.

QUESTION ANALYTICS

Q. 44 Have any Doubt ?

Consider the following statements:
I. Quadratic probing suffers from both primary clustering and secondary clustering.
II. Linear probing suffers only from primary clustering.
Which of the above statement(s) is/are correct?

A I only

B II only — Correct Option

Solution :
(b)
If two keys started from same hash address, both will follow same path in linear manner to get the empty slot, because of this searching time increases and this situation is called primary clustering. If they follow same path in quadratic manner to get empty slot the average searching time increases this is called secondary clustering and it is possible in quadratic probing but primary clustering not possible.

C Both I and II

D Neither I nor II

QUESTION ANALYTICS

Q. 45 Have any Doubt ?

The following function attempts to merge two sorted linked lists. ListNode is the custom structure representing a node in the linked list.

```
ListNode* Merge (ListNode* p1, ListNode* p2)
{
    ListNode* pMergedHead = NULL;
    if (p1 → value < p2 → value)
    {
        pMergedHead = p1;
        pMergedHead → next = Merge(p1 → next, p2);
    }
    else if (p1 → value > p2 → value)
    {
        pMergedHead = p2;
        pMergedHead → next = Merge (p1, p2 → next);
    }
    return pMergeHead;
}
```

}

Assume that the inputs lists are correctly sorted. Which of the following are some of the possible behaviors when the code is executed with well-formed and valid inputs?
I. The code snippet can produce a correctly merged linked list.
II. The code snippet can lead to a segmentation fault.
III. The code snippet can result in an incorrectly merged linked list.

A I, II and III

B II only — Correct Option

Solution :
(b)
Above code will always leads to segmentation fault because whenever one of the list gets over it always try to fetch value (Null → value) which is a fault.
Only II statement is correct.

C II and III only

D I and II only

QUESTION ANALYTICS +

Q. 46 Solution Video | Have any Doubt ?

Consider the following relations Student (Sid , Sname) and Apply (Sid, Cname, major). Which of the following SQL query finds sid of the students who apply for CS but not for ME?

A
```
Select A1.Sid
from Apply A1, Apply A2
where A1.Sid = A2.Sid and A1.major = 'CS' and A2.major < > 'ME'
```

B
```
Select Sid
from Student
where Sid in (select Sid Apply where major = 'CS') and NOT Sid in (select Sid from Apply
where major = 'ME')
```
Correct Option

Solution :
(b)
Query (a) is wrong. This query finds the Sid Applied to CS and applied to any major that is not ME, which include CS itself.

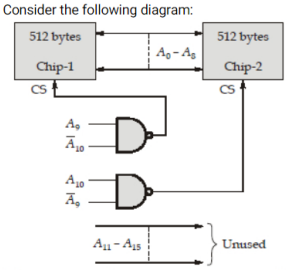
C Both (a) and (b) are correct but the processing time in (a) is less than (b)

D Both (a) and (b) are correct but the processing time in (b) is less than (a)

QUESTION ANALYTICS +

Q. 47 Solution Video | Have any Doubt ?

Consider the following diagram:



What memory addresses range is represented by Chip-1 or Chip-2 in the figure. (Assume CS means chip select)?

A $[A32B - BBE0]_H$

B $[0400 - FAFF]_H$

C $[02FF - 03FF]_H$ — Correct Option

Solution :
(c)
Chip-1:

A_{15}	A_{12}	A_{11}	A_{10}	A_9	A_8	A_7	A_0	
0 0 ... 0 ... 0	0	0	1	0	0	.....	0	[0200]
⋮								
0 0 ... 0 ... 0	0	0	1	1	1	.....	1	[03FF]

Chip-2:

A_{15}	A_{12}	A_{11}	A_{10}	A_9	A_8	A_7	A_0	
0 0 ... 0 ... 0	0	1	0	0	0	.....	0	[0400]
⋮								
0 0 ... 0 ... 0	0	1	0	1	1	.....	1	[05FF]

Option (c) can not be the memory range for Chip-1 and Chip-2.

D $[0500 - FCFF]_H$

QUESTION ANALYTICS +

Q. 48 Have any Doubt ?

Consider the following CFG with A as the start symbol.

$A \rightarrow C * S + E \mid CSE$

$C \rightarrow g \mid CS$

$S \rightarrow t \mid SE$

$E \rightarrow r$

Which of the following non terminal has maximum number of elements in FOLLOW set?

A C

B S

C E — Correct Option

Solution :

(c)

FOLLOW (A) = {$}

FOLLOW (C) = {*, t}

FOLLOW (E) = {$, +, *, t, r}

FOLLOW (S) = {+, *, t, r}

E has maximum number of elements in FOLLOW set.

D A

QUESTION ANALYTICS +

Q. 49 Solution Video Have any Doubt ?

If a matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ then the eigen vectors of the matrix A is

A $\begin{bmatrix} -1 \\ -1 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$ — Correct Option

Solution :

(a)

The characteristic equation of A is given by

$$|A - \lambda I| = \begin{bmatrix} 1-\lambda & 0 & 0 \\ 0 & 2-\lambda & 1 \\ 2 & 0 & 3-\lambda \end{bmatrix} = 0$$

or,

$$(1 - \lambda)(2 - \lambda)(3 - \lambda) = 0$$

or,

$$\lambda = 1, 2, 3$$

Corresponding to the eigen value $\lambda = 1$, we have

$$(A - I)x = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 1 \\ 2 & 0 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

We obtain the eigen vector as $[-1, -1, 1]^T$

Corresponding to the eigen value $\lambda = 2$, we have

$$(A - 2I)x = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 0 & 1 \\ 2 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

We obtain the eigen vector as $[0, 1, 0]^T$

Corresponding to the eigen value $\lambda = 3$, we have

$$(A - 3I)x = \begin{bmatrix} -2 & 0 & 0 \\ 0 & -1 & 1 \\ 2 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = 0$$

We obtain the eigen vector as $[0, 1, 1]^T$

B $\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} \begin{bmatrix} -1 \\ 0 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ -1 \end{bmatrix}$

C $\begin{bmatrix} 0 \\ -1 \\ 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \begin{bmatrix} -1 \\ 0 \\ -1 \end{bmatrix}$

D $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} -1 \\ 0 \\ -1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$

QUESTION ANALYTICS +

Q. 50

Have any Doubt ?

Consider the following C program:

```
void hello(int x)
{
    Printf("Hello");
    if (x > 1)
    {
        hello (x/4);
        hello (x/4);
        hello (x/4);
        hello (x/4);
    }
}
```

How many times "Hello" is printed when hello(n) is called where n is multiple of 4 i.e. n = 4^k?

A 4^n

B 4^{n+1}

C n^{4+1}

D $\frac{4^{n+1}-1}{3}$ Correct Option

Solution :
(d)

Recurrence relation of the function = $4T\left(\frac{n}{4}\right)+1$

By solving above recurrence relation using substitution method we get

$$T(n) = \frac{4^{k+1}-1}{4-1} = \frac{4^{k+1}-1}{3}$$

QUESTION ANALYTICS +

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OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

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

Q. 51 Solution Video | Have any Doubt ?

Let M be a Turing machine, and let L(M) be the language generated by M. How many of the following problems are decidable?
I. Does $L(M)$ contain at least two strings?
II. Is $L(M)$ infinite?
III. Is $L(M)$ a context-free language?
IV. Is $L(M) = (L(M))^R$?

A 0 — Correct Option

Solution :
(a)
All the four problems are non trivial questions on RE languages, and therefore are undecidable. Hence none of the above problems are decidable, and hence (a) is the answer.

B 1

C 2

D 3

QUESTION ANALYTICS +

Q. 52 Solution Video | Have any Doubt ?

If we decide to stay away from IEEE 754 format by making our exponent field 10 bits wide and our mantissa field 21 bits wide, then which of the following statement is true?

A It will not change the precision.

B It will provide more precision as there will be fewer Mantissa bits.

C It will provide less precision as there will be fewer Mantissa bits. — Correct Option

Solution :
(c)
Option (c) is correct answer.

D None of the above

QUESTION ANALYTICS +

Q. 53 Solution Video | Have any Doubt ?

Hidden node problem is solved by

A CSMA/CD

B CSMA/CA — Correct Option

Solution :
(b)

C Both (a) and (b)

D None of these

QUESTION ANALYTICS +

Q. 54 Solution Video | Have any Doubt ?

The number of strings having length upto 8, of the type ww, where $w \in \Sigma^+$, where $\Sigma = \{0, 1\}$ is equal to _____.

30 — Correct Option

Solution :
30

Do note that it is Σ^+ here and not Σ^*, and hence null string is not a part of our answer. Hence we'll start off counting the even length strings of the type ww with length equal to 2, then 4, 6 and finally 8 length strings. So let's begin.

2 length strings: aa, bb. So 2 such strings.

4 length strings: We have 4 places, such that each of the first 2 places can be filled with either 0 or 1 i.e. 2 ways each, and the remaining 2 places will automatically get fixed in accordance with the way we want - 'ww' means that the first half of the string should be equal to the second half. So we'll have 2.2 = 4 such strings of length 4.

Now talking about 6 length strings, the first half can again be filled in 2^3 ways, and the remaining half will automatically get filled.

Similarly there will be 2^4 strings of length 8. So adding all the things up,

$$2 + 2^2 + 2^3 + 2^4 = 30$$

Hence 30 will be the answer.

QUESTION ANALYTICS +

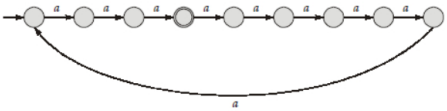
Q. 55 Solution Video | Have any Doubt ?

The number of states in the minimal DFA corresponding to the language generated by the regular expression $(a^9 + a^{18})^* a3$, over $\Sigma = \{a\}$ is equal to _____.

9 Correct Option

Solution :
9

Given regular expression is $(a^9 + a^{18})^* a^3$ which is same as $(a^9)^* a^3$, for which the DFA is shown below.



So we require 9 states. So 9 is the answer.

QUESTION ANALYTICS +

Q. 56 Solution Video | Have any Doubt ?

The number of ones in binary representation of DHCP client address is _____.

0 Correct Option

Solution :
0
DHCP client address = 0.0.0.0
Number of ones = 0

QUESTION ANALYTICS +

Q. 57 Solution Video | Have any Doubt ?

Consider the following code for two processes P_0 and P_1:

P_0 :	P_1 :
$P(A)$	$P(A)$
$P(B)$	$V(B)$
$a = b + 8;$	$b = a + 3;$
$V(B)$	$V(B);$
$V(A)$	$V(A);$

Assume A and B are binary semaphore variables initialized with 1 and 0 respectively. a and b are shared variable and initial value of $a = 3$, $b = 10$. Assume that short term scheduler always starts process P_1 first, while executing P_0 and P_1 concurrently, the sum of the value of a and b after the execution _____.

20 Correct Option

Solution :
20

A = 1, B = 0, $a = 3$, $b = 10$

If P_0 will execute before P_1 there will be deadlock, so P_1 execute before P_0

After P_1 execution $b = a + 3$

$= 3 + 3 = 6$

After P_0 execution $a = 6 + 8 = 14$

Sum of the value of a and $b = 6 + 14 = 20$

QUESTION ANALYTICS +

Have any Doubt ?

Q. 58

Consider a task scheduling algorithm T(a, b) with a = start time and b = finish time; some task are given below:
T = {(1, 3), (2, 4), (3, 5), (2, 7), (4, 6), (5, 6), (3, 7)}
Minimum number of machine required to schedule all the task in given time _____.

4 — Correct Option

Solution :
4
Sort the task in order by their start times.

$$T = \{(1, 3), (2, 4), (3, 5), (2, 7), (4, 6), (5, 6), (3, 7)\}$$
$$M_1 : (1, 3)\ (3, 5)\ (5, 6)$$
$$M_2 : (2, 4)\ (4, 6)$$
$$M_3 : (2, 7)$$
$$M_4 : (3, 7)$$

Total 4 machine required.

QUESTION ANALYTICS +

Q. 59 — Have any Doubt ?

Consider the following parameter for disk system.
Disk request for cylinders 8, 24, 20, 5, 41, 10 in that order, seek time is 4 ms per cylinder and initially disk arm at cylinder 30.
Total seek time for the above requests using FCFS scheduling algorithm _____ (ms).

496 — Correct Option

Solution :
496
Requests 8, 24, 20, 5, 41, 10

$$\text{Seek time} = [(30 - 8) + (24 - 8) + (24 - 20) + (20 - 5) + (41 - 5) + (41 - 10)] \times 4$$
$$= [22 + 16 + 4 + 15 + 36 + 31] \times 4$$
$$= 124 \times 4 = 496 \text{ ms}$$

QUESTION ANALYTICS +

Q. 60 — Solution Video — Have any Doubt ?

A car manufacturing factory has two plants, X and Y. Plant X manufactures 70% of cars and plant Y manufactures 30%. 80% of the cars at plant X and 90% of the cars at plant Y are rated of standard quality. A car is chosen at random and is found to be of standard quality the probability that it has come from plant X is _____.
(Upto 3 decimal places)

0.674 [0.650 - 0.690] — Correct Option

Solution :
0.674 [0.650 - 0.690]
Let E be the event that the car is of standard quality. Let B_1 and B_2 be the events that the car is manufactured in plants X and Y. Now

$$P(B_1) = \frac{70}{100} = \frac{7}{10}$$
$$P(B_2) = \frac{30}{100} = \frac{3}{10}$$
$$P(E|B_1) = \text{Probability that a standard quality car is manufactured in plant.}$$
$$= \frac{80}{100} = \frac{8}{10}$$
$$P(E|B_2) = \frac{90}{100} = \frac{9}{10}$$
$$P(B_1|E) = \text{Probability that a standard quality car has come from plant } X$$
$$= \frac{P(B_1) \times P(E|B_1)}{P(B_1).P(E|B_1) + P(B_2).P(E|B_2)}$$
$$= \frac{\frac{7}{10} \times \frac{8}{10}}{\frac{7}{10} \times \frac{8}{10} + \frac{3}{10} \times \frac{9}{10}} = \frac{56}{83} = 0.67469$$

QUESTION ANALYTICS +

Kunal Jha
Course: GATE
Computer Science Engineering(CS)

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FULL SYLLABUS TEST-5 (ADVANCE LEVEL) GATE 2020 - REPORTS

OVERALL ANALYSIS | COMPARISON REPORT | SOLUTION REPORT

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

Q. 61

Have any Doubt ?

Consider the following C program:

```
#include <stdio.h>
void f(int x, int * p)
{
   *p = x;
    x = 10;
}
int main ( )
{
   int a = 5,  b = 6;
   int  *p = &a, **q;
   *p = 20; q = &p;
   f(a, &b);
   *q = &b;
   *p = 30;
   printf("%d", b);
}
```

The value printed by above program is _____.

30 — Correct Option

Solution :
30

After Execution

main ( )	a	b	p	q
int a = 5, b = 6;	5	6		
int *p = &a, **q;	5	6	&a	-
*p = 20; q = &p;	20	6	&a	&p
f(a, &b);	20	20	&a	&p
*q = &b;	20	20	&b	&p
*p = 30;	20	30	&b	&p

$b = 30$

QUESTION ANALYTICS +

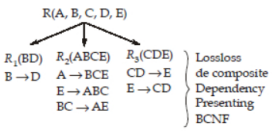
Q. 62

Solution Video | Have any Doubt ?

How many minimum relations are required for the following Relation R(A, B, C, D, E) with
FD {A → BC, CD → E, B → D, E → A} to convert into BCNF without violation of lossless and dependency preserving decomposition _____.

3 — Correct Option

Solution :
3



QUESTION ANALYTICS +

Q. 63

Solution Video | Have any Doubt ?

A 4-bit binary comparator is designed with the required digital logic gates. The function of the circuit is logic 1 whenever 4-bit input A is greater than 4-bit input B else logic 0. The number of such combination will be _____.

120 — Correct Option

Solution :
120

For example, take 2-bits

A	B	Total possibilities (A > B)
00	-	0
01	00	1
10	00, 01	2
11	00, 01, 10	3

Total possibilities = 6 (it is nothing but sum of natural numbers from 1 to $2^n - 1$ i.e. (1 + 2 + 3)

where n is number of bit).

Now in the given question number of bit = 4.

So, sum of natural number from

$$(1 \text{ to } 2^4 - 1) = 1 + 2 + 3 \ldots + 15$$

$$= \frac{15 \times 16}{2} = 120$$

Hence total such combinations with logic 1 will be 120.

QUESTION ANALYTICS +

Q. 64 Have any Doubt ?

Consider the following grammar G:

$S \rightarrow Ac \mid d$

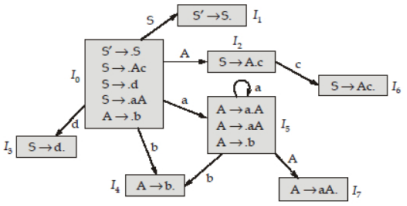
$A \rightarrow aA \mid b$

Number of states in LR(0) parser for G are _____.

8 Correct Option

Solution :

8



Total 8 states in LR(0) parser.

QUESTION ANALYTICS +

Q. 65 Solution Video Have any Doubt ?

The instruction pipeline of a RISC processor has the following stages: Instruction Fetch (IF), Instruction Decode (ID), Execute (EX), Memory Access (MA), Write Back (WB) and their respective time requirements are 9 ns, 3 ns, 7 ns, 9 ns and 2 ns. Assume at each stage the pipeline overhead is 1 ns. A program P having 90 instructions to run on this RISC processor where every 4th instruction needs a 1 cycle stall before the EX stage. The CPU time required to complete the execution is _____ (ns).

1160 Correct Option

Solution :

1160

1 instruction will take 5 cycles as there are 5 stages.

- Now without any stall, for 90 instruction

$$\text{Execution time} = 5 + (90 - 1) \text{ cycles}$$

$$= 94 \text{ cycles}$$

- Total stalls in 90 instructions $= \frac{90}{4} = 22$

Total cycle to complete 90 instructions = 94 + 22 = 116 cycle

$$\text{Total time} = 116 \times 10 \text{ ns} = 1160 \text{ ns}$$

QUESTION ANALYTICS +