



Kunal Jha

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Computer Science Engineering(CS)

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Q. 1

Solution Video

Have any Doubt ?



Select the word that is farthest in meaning to the bold word in capital letters.

CIRCUMSPECT

 A Careless

Correct Option

Solution :

(a)
'Circumspect' means 'Cautious'. B Alert C Reticent

Your answer is Wrong

 D Hostile

QUESTION ANALYTICS



Q. 2

Solution Video

Have any Doubt ?



Directions :

(i) The sentence is in the three separate part and each one is labelled as (a), (b) and (c). Read the sentence to find out whether there is an error in any part. No sentence has more than one error. When you find an error in any one of the parts (a), (b) or (c) indicate your response as

(a), (b) or (c) option. You may feel that there is no error in a sentence. In that case letter (d) will signify a 'No Error' response.

(ii) Error may in grammar, word usage or idioms. There may be a word missing or there may be a word which should be removed.

One of the most widely spread bad habit is the use of tobacco. No error.

(a) (b) (c) (d)

 A a

Correct Option

 B b

Solution :

(b)
Bad habits. C c D d

QUESTION ANALYTICS



Q. 3

Solution Video

Have any Doubt ?



At a shop, items of only one type are sold such that for every 3 item sold at the shop, one item is given free. If the cost price of each item is 0.4 times the selling price, what is effective profit percentage on account of this?

 A 150%

Correct Option

 B $87\frac{1}{2}\%$

Solution :

(b)

$$C.P. = 0.4 \times S.P.$$

$$\begin{aligned} S.P. &= \frac{5}{2} \\ C.P. &= \frac{2}{2} \end{aligned}$$

$$\begin{aligned} \text{Profit percentage} &= \frac{5 \times 3 - 2 \times 4}{2 \times 4} \times 100 \\ &= \frac{7}{8} \times 100 = 87\frac{1}{2}\% \end{aligned}$$

 C $33\frac{1}{3}\%$ D 75%

Q. 4

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

If $x = \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}}$ then x is

A 1**B** 2

Correct Option

Solution :

(b)

$$\begin{aligned}x &= \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}} \\ \Rightarrow x &= \sqrt{2+x} \\ \Rightarrow x^2 &= 2+x \\ \Rightarrow x^2 - x - 2 &= 0 \\ \Rightarrow x &= \frac{1 \pm \sqrt{9}}{2} \\ \Rightarrow x &= 2, -1 \\ \text{Now, } x &> 0 \\ \Rightarrow x &= 2\end{aligned}$$

C 3**D** None of these

Q. 5

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

A person wants to reduce the trade tax, so he calculates profit on selling price instead of cost price. In this way by selling an article for Rs. 280 he calculates his profit as $14\frac{2}{7}\%$. His actual profit percentage is ____%.

16.67 (15.84 - 17.50)

Correct Option

Solution :

16.67 (15.84 - 17.50)

Selling price = Rs. 280

$$\text{Profit percentage} = \frac{\text{SP} - \text{CP}}{\text{SP}} \times 100 = \frac{100}{7}\%$$

$$\frac{280 - \text{CP}}{280} = \frac{1}{7}$$

Cost price, C.P. = 240

$$\begin{aligned}\text{Actual profit percentage} &= \frac{280 - 240}{240} \times 100 \\ &= 16.67\%\end{aligned}$$

Q. 6

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

Many adults, no matter what their age, respond to adversity by seeking advice only from their parents. Consciously or not, they regress to psychological state of childhood dependence in which the parent seen as the only source of wisdom and comfort. Adults who don't regress to childhood mode turn for advice in adversity only to other loved ones spouse or a best friend whom they perceive and relate to as peers.

If all the above statements are true, which of the following must also be true?

A No adults seek advice in adversity from total strangers.

Correct Option

Solution :

(a)

B Adults who regress to a state of childhood dependence loose touch with peers.**C** Ones parent offer more wisdom in adversity than peers.**D** Adults who don't suffer adversity look only to their parents for advice.

Q. 7

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

In triangle ABC , D is a point on side BC . Length of $AC = 3$ cm; $CD = 1$ cm and $BD = 8$ cm. AD is also 3 cm long. Find the length of AB .

A 6 cm

B 7.5 cm

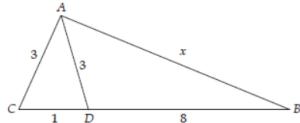
C 11 cm

D 9 cm

Correct Option

Solution :

(d)



In triangle ACD, $AC = 3 \cdot CD$ and In triangle ABC, $BC = 9 \text{ cm} = 3 \cdot AC$ and in triangle ACD and triangle ABC, angle C is common, triangles ACD is similar to triangle BCA which means their sides are proportional and corresponding angles are congruent which gives

$$\frac{AC}{BC} = \frac{CD}{CA} = \frac{DA}{AB} \text{ or } \frac{3}{9} = \frac{1}{3} = \frac{3}{AB} \text{ which gives } AB = 9 \text{ cm i.e. option (d).}$$

Alternatively,

Consider two triangles ΔACB and ΔADB ,

$$\cos B = \frac{8^2 + x^2 - 3^2}{2 \times 8 \times x} = \frac{9^2 + x^2 - 3^2}{2 \times 9 \times x}$$

Solve for $x \Rightarrow$

$$x^2 = 81$$

$$\Rightarrow x = 9 \text{ cm}$$

QUESTION ANALYTICS

Q. 8

? FAQ

▶ Solution Video

⌚ Have any Doubt ?



A He feels proud of his country.

B He is looking forward to the challenge of being in the military.

Correct Option

Solution :

(b)

C He is afraid of going in the battle.

D He regrets joining the military.

QUESTION ANALYTICS



Q. 9

▶ Solution Video

⌚ Have any Doubt ?



A 8.3

B 5

C 12.5

Correct Option

Solution :

(c)

Let the person's speed be $x \text{ m/s}$ and that of escalator be $y \text{ m/s}$.

$$\text{We have, } x + y = \frac{100}{5} = 20 \text{ m/s} \quad \dots(i)$$

$$x - y = \frac{100}{25} = 4 \text{ m/s} \quad \dots(ii)$$

From equation (i) and (ii)

$$x = 12 \text{ m/s}$$

$$y = 8 \text{ m/s}$$

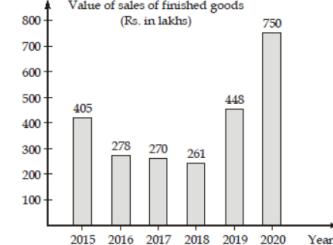
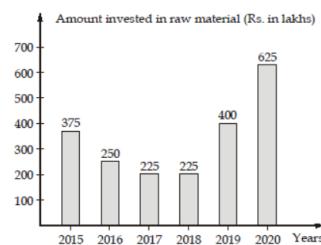
$$\text{Time} = \frac{100}{8} = 12.5 \text{ seconds}$$

D 25

QUESTION ANALYTICS



Out of two bar graphs provided below one shows the amount (in lakhs) invested by a company in purchasing raw material over the years and other shows the values (in lakhs) of finished good sold by the company over the years. Study the two bar groups and identify which year(s) have maximum profit?



A 2019

B 2017

Correct Option

C 2018

D 2020

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - b,d

STATUS - SKIPPED

Solution :

(b,d)

Profit percentage in year 2017

$$= \frac{270 - 225}{225} \times 100 = 20\%$$

Profit percentage in year 2018

$$= \frac{261 - 225}{225} \times 100 = 16\%$$

Profit percentage in year 2019

$$= \frac{448 - 400}{400} \times 100 = 12\%$$

Profit percentage in year 2020

$$= \frac{750 - 625}{625} \times 100 = 20\%$$

Year 2017 and year 2020 are having maximum profit.

QUESTION ANALYTICS

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


The total number of spanning trees that can be drawn using five labelled vertices is

A 125

[Correct Option](#)
Solution :

(a)
 The number of spanning trees on n labelled vertices is n^{n-2} .
 Thus, $5^{5-2} = 5^3 = 125$

B 64

C 36

D 16

[QUESTION ANALYTICS](#)

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


Which of the following is aggregate function in SQL?

A Select

B Ordered by

C Distinct

D Max

[Correct Option](#)
Solution :

(d)
 Avg, max, min, count and sum are aggregate functions in SQL.

[QUESTION ANALYTICS](#)

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


What is the output of following program?

```
#include <stdio.h>
void main()
{
    int i = 2, j = 3, k = 0;
    int p;
    p = (i, k, j);
    printf("%d\n", p);
}
```

A 2

B 3

[Correct Option](#)
Solution :

(b)
 The last variable value is taken when the arguments are within the brace and separated by commas.

C 0

D Error

[QUESTION ANALYTICS](#)

Q. 14
[Solution Video](#)
[Have any Doubt ?](#)


Consider the following statements:
S₁ : Given an array A[1 n] of integers, the running time of heap sort is polynomial in the input size n.
S₂ : Any n node unbalanced tree can be balanced using O(log n) rotations.
S₃ : AVL trees can be used to implement an optimal comparison based sorting algorithm.
Which of the above is/are true?

- A S₁ only
- B S₂ and S₂
- C S₂ and S₃
- D S₁ and S₃

Correct Option

Solution :

(d)
S₁ : is true. Heap sort runs in O(log n) time.
S₂ : is false. The worst case unbalanced tree is list and it requires O(n) rotations.
S₃ : is true: AVL trees can be used to sort N numbers in O(N log N) time, by inverting all the members in the tree and iteratively calling next-largest N times.

QUESTION ANALYTICS



Q. 15

Have any Doubt ?



Process is in blocked state

- A When process is scheduled to run after some execution.
- B When process is unable to run until some task has been completed.
- C When the process is using the CPU.
- D None of these

Correct Option

Solution :
(b)

QUESTION ANALYTICS



Q. 16

Have any Doubt ?



Let Y be a set with 8 elements. How many subsets of Y have even cardinality?

- A 8
- B 256
- C 16
- D 128

Correct Option

Solution :
(d)
If Y is set of 8 elements, then there are total of 2^8 subsets.
Out of which $2^7 = 128$ are of odd cardinality and 128 are of even cardinality.

QUESTION ANALYTICS



Q. 17

Solution Video

Have any Doubt ?



A graph is k -regular if every vertex has degree k . For a k -regular graph on n vertices, which of the following must be true?

- A Both k and n are even.
- B Both k and n are odd.
- C Atleast one of k and n is odd.
- D Atleast one of k and n is even.

Correct Option

Solution :
(d)
Hint: If k and n are both odd then there will be odd number of vertices of odd degree which is impossible. Therefore atleast k or n must be even.

Q. 18

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

Let L_1, L_2 be two languages and let L be a language such that $L_1 \subseteq L \subseteq L_2$. Which of the following is true about L ?

- A L is always decidable
- B L is always undecidable
- C L may be decidable
- D None of these

Correct Option

Solution :

(c)

Let's take $L_1 = \emptyset$ and $L_2 = \Sigma^*$ Here both L_1 and L_2 are decidable, also we know that $L_1 \subseteq HP \subseteq L_2$ and halting problem is not decidable and on the other hand.We know that $L_1 \subseteq a^* \subseteq L_2$ and a^* is decidable.

So, option (c) is correct.

Q. 19

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

Given a binary half-subtraction having two inputs A and B, the correct set of logical expression for the output $D = A - B$ and X = borrow are

- A $D = AB + \bar{A}\bar{B}$, $X = \bar{A}B$
- B $D = \bar{A}\bar{B} + A\bar{B}$, $X = A\bar{B}$
- C $D = \bar{A}B + A\bar{B}$, $X = \bar{A}B$
- D $D = AB + \bar{A}\bar{B}$, $X = A\bar{B}$

Correct Option

Solution :

(c)

$$D = \bar{A}\bar{B} + A\bar{B} = A \oplus B$$

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

Q. 20

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

In SMTP, the command to write receiver's e-mail address is written with the command _____.

- A RCPT TO
- B MAIL TO
- C RCVR TO
- D SEND TO

Correct Option

Solution :

(a)

The RCPT TO command specifies the recipient. As an argument, RCPT TO includes a destination mailbox (forward-path). In case of multiple recipients, RCPT TO will be each specify each recipient separately.



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Q. 21

Solution Video

Have any Doubt?



Two balls are drawn uniformly at random without replacement from a set of five balls numbered 1, 2, 3, 4, 5 from a box. What is the expected value of the highest number on the balls drawn?

(A) 2.5

(B) 3

(C) 4

Correct Option

Solution :

(c)

Number of ways for drawing balls from the box is ${}^5C_2 = 10$.

Here order does not matter in which sequence the balls are taken out from the box.

x	P(x)
1	0
2	$\frac{1}{10}$
3	$\frac{2}{10}$
4	$\frac{3}{10}$
5	$\frac{4}{10}$

Now expected value $E(x) = \sum x P(x) = 1 \times 0 + 2 \times \frac{1}{10} + 3 \times \frac{2}{10} + 4 \times \frac{3}{10} + 5 \times \frac{4}{10} = 4$

(D) 3.5

QUESTION ANALYTICS



Q. 22

FAQ

Have any Doubt?



The "seek" system call allows the application program to change the value of the file's offset so that subsequent read/write is performed from a new position in the file. Which of the following task will require the use of seek operation.

(A) Copying the contents of file A to B.

(B) Reversing the contents of a file.

Correct Option

Solution :

(b)

Reversing the contents of a file.

(C) Insert/update/delete at a particular point.

(D) Finding a particular character in file.

QUESTION ANALYTICS



Q. 23

Have any Doubt?



Which of the following techniques is used to replace run-time computations by compile time computations?

(A) Constant folding

Correct Option

Solution :

(a)

(B) Code hoisting

(C) Peep hole optimization

(D) Invariant computation

QUESTION ANALYTICS



Q. 24

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

A computer has a main memory access time of 50 ns. We want to reduce this time by 15 ns by adding cache. Determine how fast the cache must be (access time) to expect a 90% probability of a hit _____ ns.

30

Correct Option

Solution :

30

$$\begin{aligned} T_M &= 50 \text{ ns} \\ H_C &= 90\% = 0.9 \\ T_{avg} &= 50 - 15 = 35 \text{ ns} \\ T_C &=? \\ \text{So, } T_{avg} &= H_C T_C + (1 - H_C) [T_C + T_M] \\ 35 \text{ ns} &= 0.9 T_C + 0.1 \times T_C + 0.1 \times 50 \text{ ns} \\ 35 \text{ ns} &= T_C + 5 \text{ ns} \\ T_C &= 30 \text{ ns} \end{aligned}$$

[QUESTION ANALYTICS](#)

Q. 25

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

Consider building an IEEE 802.3 network at 1 Gbps over a 1 km cable with no repeaters. What is the minimum frame size _____ (in bytes). [Assume the signal speed in the cable is 200000 km/sec?]

1250

Correct Option

Solution :

1250

In order to detect collision, the station must be transmitting when first bit reaches the end of the cable.
 Thus, for a 1 km cable $t_p = 5 \mu\text{sec}$ one way propagation time.
 So, $2t_p = 10 \mu\text{sec}$ (RTT)
 At 1 GBps all frames smaller than 10000 bits can be completely transferred in 10 ms.
 As, $1 \times 10^9 \times 10 \times 10^{-6}$

$$= \frac{10000 \text{ bits}}{8} = 1250 \text{ bytes}$$

[QUESTION ANALYTICS](#)

Q. 26

[FAQ](#)[Have any Doubt ?](#)

The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the output of difference between the height and leftmost child value.

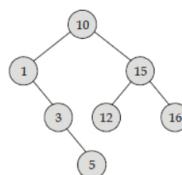
2

Correct Option

Solution :

2

BST will be



Height is 3.

So, difference is $3 - 1 = 2$ [QUESTION ANALYTICS](#)

Q. 27

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

If $(14AC7)_{16} = X_8$ then value of X is _____.

245307

Correct Option

Solution :

245307

$$(0001 \quad 0100 \quad 1010 \quad 1100 \quad 0111)_{16}$$

Now for X_8 pair with three digits.

So,

(010 100 101 011 000 111)8

Q. 28

FAQ Have any Doubt ?

Find the number of tokens in the following code:
void main()

```
{
    i/*nt*/ /a = 10;
    a += 1;
    a >= 2;
    if (a == 0);
        printf("Hi");
}
```

31

Correct Option

Solution :

31

```

    ① ② ③ ④
    void main ( )
    ⑤ ⑥ ⑦ ⑧ ⑨ ⑩
    { i a = 10 ;
        ⑪ ⑫ ⑬ ⑭
        a += 1 ;
        ⑮ ⑯ ⑰ ⑱
        a >= 2 ;
        ⑲ ⑳ ⑳ ⑳ ⑳
        If ( a != 0 ) ;
        ㉖ ㉗ ㉘ ㉙ ㉚
        printf ( "Hi" ) ;
    ㉛
}
```

Q. 29

▶ Solution Video Have any Doubt ?

A relation R with 5 attributes A_1, A_2, A_3, A_4, A_5 . Given the following functional dependencies.

$$\begin{aligned}A_1 &\rightarrow A_2 \\A_2 A_3 &\rightarrow A_5 \\A_4 A_5 &\rightarrow A_1\end{aligned}$$

The number of candidate keys that includes attribute A_3 are _____.

3

Correct Option

Solution :

3

All keys of relation R are $A_1 A_3 A_4$, $A_3 A_4 A_5$ and $A_2 A_3 A_4$.
 A_3 is a prime attribute therefore it will be included in every candidate key.

Q. 30

▶ Solution Video Have any Doubt ?

Which of the following statements is false?

A For any relational algebra, there is a unique way to translate it to an SQL query.

Correct Option

B In SQL we can use aggregate function without using group by clause.

Correct Option

C Triggers are supported in views.

Correct Option

D Intersection is basic relational algebra operator.

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,c,d

STATUS - SKIPPED

Solution :

- (a, c, d)
- Option (a) is false because there can be multiple SQL queries for one problem.
- Option (b) is correct.
- Option (c) is false, triggers run after an insert, update or delete on a table, they are not supported for views.
- Option (d) is false.



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CORRECT(0)

INCORRECT(1)

SKIPPED(64)

Q. 31

Solution Video

Have any Doubt ?



Which of the following is true?

A For every multi tape TM M , there is a single tape TM M' such that $L(M) = L(M')$.

Correct Option

B The set R of all real numbers is countable.

C Some languages are not Turing recognizable.

Correct Option

D $EQ_{TM} = \{ \langle M_1, M_2 \rangle \mid M_1, M_2 \text{ are TMs with } L(M_1) = L(M_2) \}$ is decidable.

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

Solution :

(a, c)

- Option (a) is true
- Option (b) is false as set R of all real numbers is uncountable.
- Option (c) is true.
- Option (d) is false as equivalence of TM is undecidable.

QUESTION ANALYTICS



Q. 32

Solution Video

Have any Doubt ?



Which of the following statement is true to deploy a router?

A The LAN's interconnected must belong to different networks.

Correct Option

B The ethernet interface and the LAN must belong to the same network.

Correct Option

C The router sharing the same link must belong to the same network.

Correct Option

D All the interfaces of the router must belong to same network.

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c

STATUS - SKIPPED

Solution :

(a, b, c)

- All the interfaces of the router must belong to different network.
- Note: The above given options are rules to deploy a router.

QUESTION ANALYTICS



Q. 33

Have any Doubt ?



Which of the following is correct?

A OS communicates with hardware devices directly.

Correct Option

B A process must have atleast one thread.

Correct Option

C Inter process communication and sharing is easier between processes than threads.

D Thread provides finer grain control for tasks, scheduling etc.

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,b,d

STATUS - SKIPPED

Solution :

(a, b, d)

IPC and sharing is easier between threads than processes.

QUESTION ANALYTICS



Q. 34

FAQ

Solution Video

Have any Doubt ?



Suppose the cache memory is 50 times faster than main memory and it is used 30% of the time. The performance is gained by introducing this cache is _____. (Upto 2 decimal places)

A. 1.41 [1.41 - 1.42]

Correct Option

Solution :

1.41 [1.41 - 1.42]

$$\delta = 50$$

$$f = 30\%$$

$$\delta_{\text{overall}} = \left[1 - 0.3 + \frac{0.3}{50} \right]^{-1} = [0.7 + 0.006]^{-1} = \frac{1}{0.706} = 1.41$$

 QUESTION ANALYTICS



Q. 35

 Solution Video

 Have any Doubt ?



The following system of homogeneous equations:

$$2x + y + 2z = 0$$

$$x + y + 3z = 0$$

$$4x + 3y + bz = 0$$

Has non-trivial solution, the value of 'b' is _____.

B. 8

Correct Option

Solution :

8

For a non-trivial solution of homogeneous system of equations,

$$|A| = 0$$

$$\text{where, } A = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 1 & 3 \\ 4 & 3 & b \end{bmatrix}$$

$$\Rightarrow 2 \begin{vmatrix} 1 & 3 \\ 3 & b \end{vmatrix} - 1 \begin{vmatrix} 1 & 3 \\ 4 & b \end{vmatrix} + 2 \begin{vmatrix} 1 & 1 \\ 4 & 3 \end{vmatrix} = 0$$

$$b = 8$$

 QUESTION ANALYTICS



Q. 36

 Solution Video

 Have any Doubt ?



Consider the following table Diwali_Allowance:

Employee	Department	Allowance
James	CS	5000
Maverick	Electrical	2000
Khan	Civil	3000
Tourist	IT	4000

What is the output of the following SQL query?

Select count (*) from

((Select Employee, Department from Diwali_Allowance)

Natural Join

((Select Department, Allowance from Diwali_Allowance)

as T);

C. 16

D. 4

Correct Option

Solution :

(b)

We will get the same table after applying natural join. So number of rows returns by count function is 4.

E. 8

F. None of these

 QUESTION ANALYTICS



Q. 37

? FAQ

 Have any Doubt ?



Consider the following statements:

S_1 : In the merge sort execution tree, roughly the same amount of work is done at each level of the tree.

S_2 : Binary insertion sorting (insertion sort that uses binary search to find each insertion point) requires $O(n \log n)$ total operations.

Which of the following option is true?

G. S_1 is correct

Correct Option

Solution :

(a)

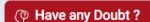
- At the top level, roughly $O(n)$ work is done to merge all n elements.
- For statement S_2 the algorithm as a whole takes running time of $O(n^2)$ on average because of swaps required for each operations.

- B** S_2 is correct
C Both S_1 and S_2 are correct
D None of these

 QUESTION ANALYTICS



Q. 38





Consider the following preemptive-scheduling algorithm based on dynamically changing priorities. Larger priority numbers imply higher priority. When a process is waiting for CPU (in ready queue, but not running), its priority changes at the rate of $P(t) = P_0 + a \times (t - t_0)$ where t_0 is the time at which the process joins the ready queue. Similarly, when it is running, its priority changes at a rate b . All processes are given a priority 0 when they end the ready queue. The parameter a and b can be set to obtain many different scheduling algorithms. Which one of the following algorithm that results from $b > a > 0$.

- A** FCFS

Correct Option

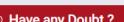
Solution :
 (a)
 FCFS: All the process in the ready queue has the same initial priority $P_0 = 0$. Their priority increases at the same rate $a(a > 0)$, thus the earlier the process enters the ready queue t_0 , the higher its priority will be $P(t) = a(t - t_0)$.

- B** Round-Robin
C SRTF
D None of these

 QUESTION ANALYTICS



Q. 39



Let,
 m = "James is a math major."
 c = "James is a computer science major."
 g = "James's girlfriend is a literature major."
 h = "James's girlfriend has read Geeta," and
 t = "James's girlfriend has read The Ramayana."
 Which of the following expresses the statement "James is a computer science major and math major, but his girlfriend is a literature major who has read the Geeta but not the Ramayana."

- A** $c \wedge m \wedge (g \vee (\neg h \vee \neg t))$
B $c \wedge m \wedge g \wedge (\neg h \wedge \neg t)$

- C** $c \wedge m \wedge g \wedge h \wedge \neg t$

Correct Option

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

- D** $c \wedge m \wedge (g \vee (\neg h \wedge \neg t))$

 QUESTION ANALYTICS



Q. 40



What is the time complexity of

$$T(n) = T(n-1) + \frac{1}{n} \quad \text{if } n > 1 \\ = 1, \quad \text{otherwise}$$

- A** $O(n)$

- B** $O(\log n)$

Correct Option

Solution :

(b)
 It can be easily seen from the induction that it is of the form

$$1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$$

which is $O(\log n)$.

C O(nlogn)

D O(loglogn)

 QUESTION ANALYTICS

+

Item 31-40 of 65 « previous 1 2 3 4 5 6 7 next »



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SOLUTION REPORT

ALL(65)

CORRECT(0)

INCORRECT(1)

SKIPPED(64)

Q. 41

FAQ

Have any Doubt?



What is the output of following code?

```
#include <stdio.h>
main ()
{
    int var = 5;
    printf("%d", var = ++var == 6);
}
```

A Error

B 1

Correct Option

Solution :

(b)

The resolved expression is var = (++var == 6), because == is of higher precedence than assignment (=) operator. In the inner expression, ++var is evaluated first which yields TRUE (1).

C 7

D 6

QUESTION ANALYTICS



Q. 42

Have any Doubt?



Consider the following statements:

- I. A depth-first search of a directed graph always produces the same number of tree edges (i.e. independent of the order in which the vertices are provided and independent of the order of the adjacency lists).
 II. If a topological sort exists for the vertices in a directed graph, then a DFS on the graph will produce no back edges.

Which of the following is correct?

A Statement I is true

B Statement II is true

Correct Option

Solution :

(b)

- False. The DFS forest may contain different numbers of trees (and tree edges) depending on the starting vertex and upon the order in which vertices are searched. Consider the example below. If the DFS starts at a, then it will visit b next, and (a, b) will become a tree edge. But if the DFS visits b first, then a and b become separate trees in the DFS forest, and (a, b) becomes a cross edge.
- True. Both parts of the statement hold if and only if the graph is acyclic.

C Both I and II are true

D None of these

QUESTION ANALYTICS



Q. 43

FAQ

Have any Doubt?



What is the output of the program?

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    int x;
    clrscr ();
    x = ~lprntf;
    printf("%x", x);
    getch();
}
```

A Garbage value

B Error

C 0000

D ffff

Correct Option

...
...

SOLUTION :

(d) Here printf returns TRUE value then '!' negates the value into zero and zero's 1's compliment value (-1) is assigned to x. Here -1 is equal to ffff in hexadecimal form.

QUESTION ANALYTICS

Q. 44

FAQ

Have any Doubt ?



What could the output of the concurrent execution of process A and process B be?
 int x = 0;
 int y = 0; "initialization"

Process A:

```
while(x == 0) {do-nothing};
printf("a");
y = 1;
y = 0;
printf("d");
y = 1;
```

- I. badc
- II. bacd
- III. b
- IV. ad

Process B:

```
printf("b");
x = 1;
while(y == 0)
{do-nothing};
printf("c");
```

A I and IV only**B** I, II and III**C** III and IV only**D** I and II only

Correct Option

Solution :

(d)
 When we will run these two processes only I and II will be printed.

QUESTION ANALYTICS

Q. 45

▶ Solution Video

Have any Doubt ?



The initial congestion window size over a TCP is 1. If slow start algorithm is used and the size of congestion window is incremented by 1 whenever an ACK is received i.e., after first round trip time congestion window size is 2 segments. Assume that connection never leaves slow start .The number of RTT's to send 3999 segments are

A 10**B** 11**C** 12

Correct Option

Solution :

(c)

Window Size [WS = 1] initially
 • After 1 RTT, window size = 2 and 1 segment is sent in total.
 • After 2 RTT, window size = 4 and 3 segment is sent in total.
 • After 3 RTT, window size = 8 and 7 segment is sent in total.
 • After 'X' RTT's, window size = 2^x and 2^{x-1} segment are sent.
 Now, $2^{x-1} = 3999$
 $2^x = 4000$
 $x = \log_2(4000)$
 $x = 12$ RTT's

D 9

QUESTION ANALYTICS

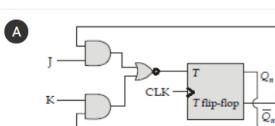
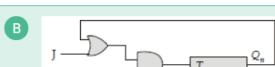
Q. 46

▶ Solution Video

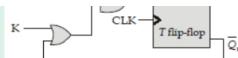
Have any Doubt ?



A JK flip-flop can be implemented by T flip-flop. Identify the correct implementation.

A**B**

Correct Option



Solution :

(b)

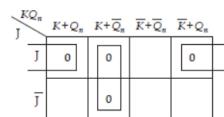
To obtain a JK flip-flop from a T flip-flop, we first construct the characteristic table of JK flip-flop; and then obtain the excitation values for the T flip-flop as shown below:

J	K	Q_n	Q_{n+1}	T
0	0	0	0	0
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	1

Characteristic table of JK flip flop Excitation values for T flip-flop

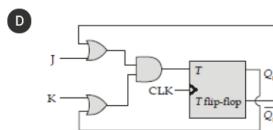
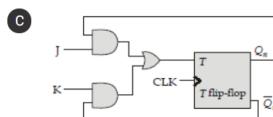
Now, assuming T to be an output, we solve it in terms of J, K, Q_n inputs. This gives the definition of the logic to be applied on the T input.

Also, observing the given options, we solve for T using a max terms map instead of using a min terms map, as shown below:



$$T = (J + Q_n) \cdot (K + \bar{Q}_n)$$

The circuit corresponding to this expression is given option (b).



QUESTION ANALYTICS

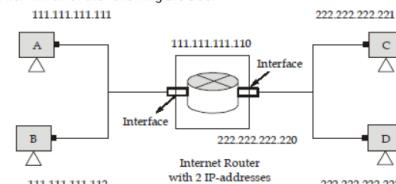
Q. 47

Solution Video

Have any Doubt ?



Suppose 'A' wants to send an IP data gram to the receiver 'D' host with IP address 222.222.222.222. Then which of the following are true.



- I. There is only one subnet with router at center and all other hosts attached to it.
II. Destination IP of the datagram upto the router is 222.222.222.220 and from router onwards to host 'D' the destination IP is 222.222.222.222

A Only II

B Both I and II

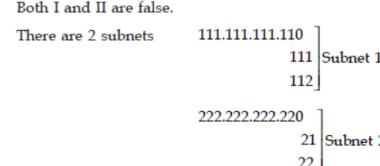
C Only I

D None of these

Correct Option

Solution :

(d)
Both I and II are false.



∴ I is false.

From the beginning to end destination IP does not change. It should be 222.222.222.222 all the way. It implies II is also false.

Q. 48

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

Consider the following schedules:

- $S_1 : W_2(x), W_1(x), R_3(x), R_1(x), W_2(y), R_3(y), R_2(z), R_2(x)$
 $S_2 : R_2(z), W_2(x), W_2(y), R_1(x), R_2(x), R_2(z), R_3(y), W_1(x)$
 $S_3 : R_3(z), W_2(x), W_2(y), W_1(x), R_1(x), R_3(x), R_3(z), R_3(y)$

Which of the above schedules are conflict equivalent?

 A S_1 and S_2 B S_1 and S_3 C S_2 and S_3 D None of these

Correct Option

Solution :

(d)

Any two schedules are conflict equivalent iff their precedence graph over data items are equal.

We can also define that all conflicting operations and their ordering should be same.

(a) S_1 and S_2 are not conflict equivalent. $W_1(x), R_3(x)$ in S_1 but S_2 has $R_3(x)$ and then $W_1(x)$.

Hence their conflict order is not same.

(b) S_1 and S_3 are not conflict equivalent. S_1 has $W_1(x)$ and then $R_2(x)$ conflict operation but S_3 has no such operation.

Hence these are also not conflict equivalent.

(c) S_2 and S_3 are not conflict equivalent. S_2 has $R_3(x)$ then $W_1(x)$ operation, but S_3 has $W_1(x)$ then $R_3(x)$.

So order of these conflicts are not same.

∴ No two schedules are conflict equivalent.

Q. 49

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

Consider the following integrals:

$$\int_0^4 f(x) \cdot dx = 10 \text{ and } \int_2^4 f(x) \cdot dx = 6$$

What is the value of $\int_0^1 f(2x) \cdot dx$? A 1 B 0 C 2

Correct Option

Solution :

(c)

$$\int_0^1 f(2x) \cdot dx$$

Put,

$$u = 2x \Rightarrow du = 2 \cdot dx$$

$$x = 0 \Rightarrow u = 0$$

$$x = 1 \Rightarrow u = 2$$

$$\int_0^1 f(2x) \cdot dx = \int_0^2 f(u) \cdot \frac{du}{2} = \frac{1}{2} \int_0^2 f(u) \cdot du = \frac{1}{2} \cdot \int_0^4 f(x) \cdot dx \quad \dots(i)$$

$$\int_0^4 f(x) \cdot dx = \int_0^2 f(x) \cdot dx + \int_2^4 f(x) \cdot dx$$

$$\Rightarrow 10 = \int_0^2 f(x) \cdot dx + 6$$

$$\Rightarrow \int_0^2 f(x) \cdot dx = 4 \quad \dots(ii)$$

From equation (i)

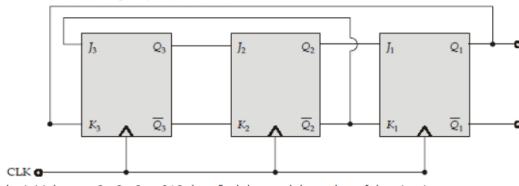
$$\int_0^1 f(2x) \cdot dx = \frac{1}{2} \cdot \int_0^4 f(x) \cdot dx = \frac{1}{2} \cdot 10 = 5 \quad [\text{Substitute (ii)}]$$

 D 4

Q. 50

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

Consider the following sequential circuit:



If the initial state $Q_1 Q_2 Q_3 = 010$ then find the modulus value of the circuit.

A 3

B 4

C 5

Correct Option

Solution :

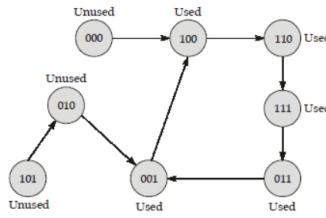
(c)

$$Q_{3N+1} = J_3 \bar{Q}_{3N} + \bar{K}_3 Q_{3N} \quad [Q_{3N+1} = \bar{Q}_{2N} \bar{Q}_{3N} + \bar{Q}_1 Q_{3N}]$$

$$Q_{2N+1} = J_2 \bar{Q}_{2N} + \bar{K}_2 Q_{2N} = Q_{3N} \bar{Q}_{2N} + Q_{3N} Q_{2N} \quad [Q_{2N+1} = Q_{3N}]$$

$$Q_{1N+1} = J_1 \bar{Q}_{1N} + \bar{K}_1 Q_{1N} = Q_{2N} \bar{Q}_{1N} + Q_{2N} Q_{1N} \quad [Q_{1N+1} = Q_{2N}]$$

Present State			Next State		
Q_3	Q_2	Q_1	Q_3	Q_2	Q_1
0	0	0	1	0	0
0	0	1	1	0	0
0	1	0	0	0	1
0	1	1	0	0	1
1	0	0	1	1	0
1	0	1	0	1	0
1	1	0	1	1	1
1	1	1	0	1	1



Above circuit is mod-5 counter.

D 6

QUESTION ANALYTICS

+



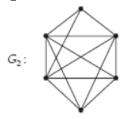
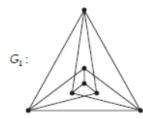
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Q. 51
[▶ Solution Video](#)
[Have any Doubt ?](#)

 Consider the following graphs G_1 and G_2 :


Which of the above graphs is planar?

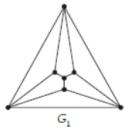
 A G_1 only

Correct Option

Solution :

(a)

- G_1 is planar.



- G_2 is not planar, graph has vertices $n = 6$. According to theorem maximum edges can be $3n - 6$ for planar connected graph.

 So, $3 \times 6 - 6 = 12$

 But here it is given 13 edges in G_2 .

Therefore it can not be planar.

 B G_2 only

 C Both G_1 and G_2
 D Neither G_1 nor G_2
[QUESTION ANALYTICS](#)

Q. 52
[Have any Doubt ?](#)


Consider the following codes i.e., coke machine that has 10 slots. Where the producer is the delivery person and the consumer is the student using the machine. The three semaphores are as follows:

- Semaphore mutex
- Semaphore fullbuffer /*Number of filled slots*/
- Semaphore emptybuffer /*Number of empty slots*/

```
#define NUM_SLOTS 10
semaphore mutex = 1
semaphore fullBuffer = x //x + y must equal 10
semaphore emptyBuffer = y //x + y must equal 10
delivery_person( )           student( )
{
    wait(emptyBuffer)
    wait(mutex)
    put_1_coke_in_machine( );
    signal(mutex)
    signal(fullBuffer)
}
take_1_coke_from_machine( );
signal(mutex)
signal(emptyBuffer)
```

Which of the following is guaranteed by the above code?

- I. Mutual Exclusion
- II. No deadlock

 A Only I

 B Only II

 C Both I and II

Correct Option

Solution :

(c)

Since there is no deadlock between `delivery_person()` and `student()`. So surely mutual exclusion is satisfied. In any order of execution `fullBuffer + emptyBuffer` is always 10 which provides consistency between the functions.

 D Neither I and nor II

[QUESTION ANALYTICS](#)


- Let the number of nodes be x and y be the number of edges in the DAG of following code what is the value of $x + y$ _____?
1. $a = b \times c$
 2. $d = b$
 3. $e = d \times c$
 4. $b = e$
 5. $f = b + c$
 6. $g = f + d$

11

Correct Option

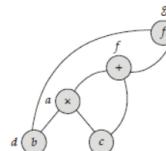
Solution :

11

The common sub-expression $e = d \times c$ it is actually $b \times c$ because $d = b$ is eliminated.
The dead code $b = c$ is eliminated.

So the optimized block is

- | | |
|-------|------------------|
| (i) | $a = b \times c$ |
| (ii) | $d = b$ |
| (iii) | $f = a + c$ |
| (iv) | $g = f + d$ |



$$\begin{aligned}x &= 5, y = 6 \\x + y &= 11\end{aligned}$$

So,

QUESTION ANALYTICS

+

Let q be a queue and S be a stack. Assume that q and S are initially empty. What is the last integer value printed by the following code?

```

enqueue (q, 8);
enqueue (q, 3);
Push (S, 7);
Push (S, 9);
for (i = 0, i < 5; i++)
{
    printf("%d", dequeue (q));
    printf("%d", Pop (S));
    enqueue (q, i);
    Push (S, i + 5);
}
  
```

8

Correct Option

Solution :

8

The output sequence printed by the given code is : 8, 9, 3, 5, 0, 6, 1, 7, 2, 8.
Last output is : 8.

QUESTION ANALYTICS

+

Consider 1 GHz clock frequency processor, uses different operand accessing modes shown below:

Operand Accessing Mode	Frequency (%)
Register	20
Immediate	20
Direct	20
Mem indirect	10
Indexed	17
Auto indexed	13

Assume that 4 cycles consumed for mem reference, 2 cycles consumed for arithmetic computation and 0 cycles consumed when the operand is in register(s) instruction itself.
What is the average operand fetch rate (in million words/sec) of the processor?

294.11 [290 - 297]

Correct Option

Solution :

294.11 [290 - 297]

Average of time = $\{(0.2 \times 0) + (0.2 \times 0) + (0.2 \times 4) + (0.1 \times 8) + (0.17 \times 6) + (0.13 \times 6)\} = 3.4$ cycles

So, Average of time = 3.4 ns

1 operand 3.4 ns

number of operands in 1 sec

$$\text{Number of operands} = \frac{1 \text{ operand}}{3.4 \text{ ns}} = 0.29411 \times 10^9 \text{ operand/sec.}$$

∴ Operand fetch rate = 294.11 million words/sec

QUESTION ANALYTICS

+

Q. 56

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

Consider a 16 bit processor in which the following appears in main memory starting at location 38246.

38246	JMP	Mode
38247	-12	
38248	Next instruction	

The first byte of the instruction specifies the opcode and type of addressing mode used. Second byte of the instruction is the address field. Determine the effective address of the instruction to transfer the control if the mode field uses the PC relative addressing mode. Assume all values are in decimal.

38236

Correct Option

Solution :

38236

EA = PC + Address field value

$$EA = 38248 + (-12) = 38236$$

QUESTION ANALYTICS



Q. 57

[Have any Doubt ?](#)

Consider the following table which contain CPU burst times for last four runs of the same process.

Run	R ₁	R ₂	R ₃	R ₄
Service time	4	5	2	3

What will be the next predict of CPU burst time using shortest process next with simple averaging technique?

3.5

Correct Option

Solution :

3.5

T(i) is the actual burst at ith run of a process.S(k) is the predict of burst time at kth run of a process.

$$T(1) = 4$$

$$T(2) = 5$$

$$T(3) = 2$$

$$T(4) = 3$$

$$S(5) = \frac{T(1)+T(2)+T(3)+T(4)}{4} = \frac{4+5+2+3}{4} = 3.5$$

QUESTION ANALYTICS



Q. 58

[Have any Doubt ?](#)

Consider the following CFG:

S → aAb | aBc | bAd | bBe

A → g

B → g

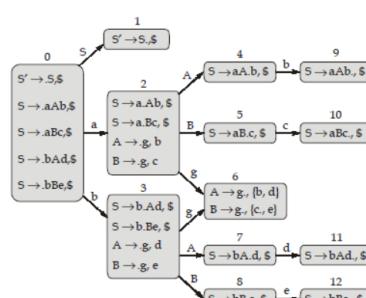
How many total conflicts occur in DFA construction of LALR (1) parser for the above grammar?

0

Correct Option

Solution :

0



⇒ No conflict in above DFA.

QUESTION ANALYTICS



Q. 59

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

Which of the following is/are correct?

- A** An interrupt vector contains the saved program counter values of interrupted user programs.
- B** Direct memory access (DMA) requires a special controller that facilitates the transfer of blocks between the I/O device and main memory. Correct Option
- C** We can prevent users from accessing other users programs and data by introducing base and limit registers that hold the smallest physical memory address and the size of range of the user program respectively. Correct Option
- D** The signal sent to the device from the processor to the device after receiving an interrupt is Interrupt-acknowledge. Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - b,c,d

STATUS - SKIPPED

Solution :

(b, c, d)

• An interrupt vector is the memory address of an interrupt handler, or an index into an array called an interrupt vector table. So option (a) is false.

 QUESTION ANALYTICS



Q. 60

 Solution Video

 Have any Doubt ?



Which of the following are languages over the alphabet {a, b} (select all that apply)?

A {a}

Correct Option

B a

C ab

D The empty set

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,d

STATUS - SKIPPED

Solution :

(a, d)

A language here is a set of strings consisting of a's and b's.

{a} is language as well as the empty set. The only option that isn't a language is 'ab' and 'a' because that is a single string and not a set.

 QUESTION ANALYTICS





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ALL(65)

CORRECT(0)

INCORRECT(1)

SKIPPED(64)

Q. 61

Solution Video

Have any Doubt?



Consider the grammar $G = (V, \Sigma, R, S)$ defined on the alphabet $\Sigma = \{a, b, 0, 1\}$, the variables $V = \{S, T, U\}$, S is the start symbol and production set R is given below. Identify all the strings in the options which belong to the language defined by the grammar.

$$\begin{aligned} S &\rightarrow TU \\ T &\rightarrow 0T1 \\ U &\rightarrow aUb \\ T &\rightarrow \epsilon \\ U &\rightarrow \epsilon \end{aligned}$$

A

 ϵ

Correct Option

B

01

Correct Option

C

00

D

0011ab

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,b,d

STATUS - SKIPPED

Solution :

(a, b, d)

QUESTION ANALYTICS



Q. 62

Solution Video

Have any Doubt?



Identify the false options:

A

Every conflict serializable schedule is also 2PL.

Correct Option

B

Strict 2PL is free from starvation.

Correct Option

C

Wound-Wait scheme is a pre-emptive technique for deadlock prevention.

D

Wait-Die scheme is a pre-emptive technique for deadlock prevention.

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,b,d

STATUS - SKIPPED

Solution :

(a, b, d)

- Every 2PL is conflict serializable schedule but not vice-versa.
- Strict 2PL is not free from starvation.
- Wait-Die scheme is a non pre-emptive technique for deadlock prevention.

QUESTION ANALYTICS



Q. 63

Solution Video

Have any Doubt?



Which of the following addresses CANNOT be assigned to network hosts? If the subnet mask is 255.255.255.224

A

14.24.108.63

Correct Option

B

82.1.168.93

C

137.158.14.56

D

192.168.13.127

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,d

STATUS - SKIPPED

Solution :

(a, d)

Given net mask = 255.255.255.224
 $224 = \underline{11100000}$

So, we have 5 host bits.

- (a) 63 = 00111111
 (b) 93 = 01011101
 (c) 56 = 00111000
 (d) 127 = 01111111
- In option (a) all 5 host bits are 1, it is the directed broadcast address in 14.24.108.32 subnet.
 - In option (d) all 5 host bits are 1, it is the directed broadcast address in 192.168.13.96.

QUESTION ANALYTICS

Q. 64

Solution Video

Have any Doubt ?



A class of first year B.Tech. students is composed of four batches A, B, C and D, each consisting of 30 students. It is found that the sessional marks of students in Engineering Drawing in batch C have a mean of 6.6 and standard deviation while that of entire class are 5.5 and 4.2, respectively. It is decided by the course instructor to normalize the marks of the students of all batches to have the same mean and standard deviation as that of the entire class. Due to this, the marks of a student in batch C are changed from 8.5 to _____. (Upto 2 decimal places)

8.96 [8.95 - 9.00]

Correct Option

Solution :
8.96 [8.95 - 9.00]

Let the mean and standard deviation of the students of batch C be μ_c and σ_c respectively and the mean and standard deviation of entire class of first year students be μ and σ respectively.

Now given, $\mu_c = 6.6$
 $\sigma_c = 2.3$
 and $\mu = 5.5$
 $\sigma = 4.2$

In order to normalize batch C to entire class, the normalized score (Z scores) must be equated.

Since, $Z = \frac{x - \mu}{\sigma} = \frac{x - 5.5}{4.2}$
 $Z_c = \frac{x_c - \mu_c}{\sigma_c} = \frac{8.5 - 6.6}{2.3}$

Equating these two and solving, we get

$$\frac{8.5 - 6.6}{2.3} = \frac{x - 5.5}{4.2}$$

$$x = 8.969 \approx 9.0$$

QUESTION ANALYTICS



Q. 65

Have any Doubt ?



A UNIX file system has 2 KB blocks and 4 byte disk addresses. Each i-node contains no direct entries, one singly-indirect entry and one doubly-indirect entry. What could be the maximum file size in the system (in MB)?

513

Correct Option

Solution :
513

Block size = 2 KB = 2048 bytes

Disk address is 4 bytes

Number of disk addresses in single block

$$\text{File size} = \left(\frac{2048}{4}\right) \times 2 \text{ KB} + \left(\frac{2048}{4}\right) \left(\frac{2048}{4}\right) \times 2 \text{ KB}$$

$$= 1024 \text{ KB} + 524288 \text{ KB} = 52532 \text{ Kg}$$

$$= 513 \text{ MB}$$

QUESTION ANALYTICS

