



Kunal Jha

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 Computer Science Engineering(CS)

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FULL SYLLABUS TEST-6 (ADVANCE LEVEL) (GATE - 2021) - REPORTS

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Q. 1

The alarmed report of an , eartherquake frightened everyone , in that diaster prone village.

(a) (b) (c)

No error

(d)

A

a

Correct Option

Solution :

(a)
Say 'alarming'.

B

b

C

c

D

d

QUESTION ANALYTICS


Q. 2
[Solution Video](#)
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Select the word that is NEAREST in meaning to the bold word in capital letters VENERATE

A Accuse

B Reverence

Correct Option

Solution :

(b)

C Criticize

D Abuse

QUESTION ANALYTICS


Q. 3
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Three of the six vertices of a regular hexagon are chosen at random. The probability that the triangle with these three vertices is equilateral equals.

A $\frac{1}{6}$

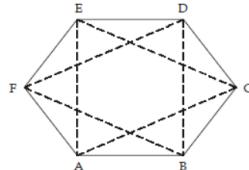
B $\frac{1}{3}$

C $\frac{1}{10}$

Correct Option

Solution :

(c)



No of triangle which can be formed = 6C_3

Now only 2 triangle formed can be equilateral i.e. ACE and BDE.

$$\text{Required probability} = \frac{2}{{}^6C_3} = \frac{2}{20} = \frac{1}{10}$$

D 1

Q. 4

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

At a Style cloth emporium the shopkeeper measures 20% less for every meter of cloth. He also mark up good by 20%. His profit percentage is _____.

A 50%

Correct Option

Solution :

(a)

Let CP per meter = Rs. x MP per meter = Rs. $1.2x$ But he gives the cloth at Rs. $0.8x$ instead of Rs. $1.2x$

$$\text{Profit percentage} = \frac{1.2x - 0.8x}{0.8x} \times 100$$

$$= \frac{0.4}{0.8} \times 100 = 50\%$$

B 70%**C** 80%**D** Can't be determined

Q. 5

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

8 points lies on the circumference of a circle. The absolute difference between the number of triangle and the number of quadrilateral that can be formed is _____.

A 14

Correct Option

Solution :

14

Number of triangle = ${}^8C_3 = 56$ Number of quadrilateral = ${}^8C_4 = 70$

$$\text{Difference} = 70 - 56 = 14$$

Q. 6

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

Sum of n terms of the series _____.

$$\frac{3}{1^2 \cdot 2^2} + \frac{5}{2^2 \cdot 3^2} + \frac{7}{3^2 \cdot 4^2} \dots$$

A $\frac{n^2 - 2n}{(n-1)^2}$

Correct Option

B $\frac{n^2 + 2n}{(n+1)^2}$ **Solution :**

(b)

$$\frac{3}{1^2 \cdot 2^2} + \frac{5}{2^2 \cdot 3^2} + \frac{7}{3^2 \cdot 4^2} \dots$$

$$\Rightarrow \left[1 - \frac{1}{2^2} \right] + \left[\frac{1}{2^2} - \frac{1}{3^2} \right] + \left[\frac{1}{3^2} - \frac{1}{4^2} \right] \dots \left[\frac{1}{n^2} - \frac{1}{(n+1)^2} \right]$$

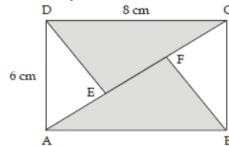
$$\Rightarrow 1 - \frac{1}{(n+1)^2} = \frac{n^2 + 2n}{(n+1)^2}$$

C $\frac{2n^2 + 1}{n}$ **D** None of these

Q. 7

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

ABCD is a rectangle of dimension 6 cm \times 8 cm. DE and BF are perpendicular drawn on the diagonal of the rectangle. What is the ratio of area of shaded region to that of unshaded region.



A 7 : 3

B 16 : 9

Correct Option

Solution :

(b)

$$\begin{aligned} \text{Area of } \triangle ADC &= \frac{1}{2} \times AD \times DC = \frac{1}{2} \times DE \times AC \\ \frac{1}{2} \times 8 \times 6 &= \frac{1}{2} \times DE \times \sqrt{AD^2 + DC^2} \\ 24 &= \frac{1}{2} \times DE \times 10 \\ DE &= 4.8 \text{ cm} \end{aligned}$$

Now,

$$\begin{aligned} \frac{\text{Area of shaded}}{\text{Area unshaded}} &= \frac{2 \times \text{Area } \triangle DEC}{2 \times \text{Area } \triangle ADE} \\ &= \frac{2 \times \frac{1}{2} \times DE \times EC}{2 \times \frac{1}{2} \times DE \times AC} = \frac{EC}{AC} \\ &= \frac{\sqrt{8^2 - 4.8^2}}{\sqrt{6^2 - 4.8^2}} = \frac{6.4}{3.6} = \frac{16}{9} \end{aligned}$$

C $4\sqrt{2} : 3$

D None of these

QUESTION ANALYTICS

+

Q. 8

Solution Video

Have any Doubt?

Q

If $\log_3 2, \log_3 (2^x - 5)$ and $\log_3 \left(2^x - \frac{7}{2}\right)$ are in AP then x is equal to _____.

A 2

B 3

Correct Option

Solution :

(b)

We have $\log_3 2, \log_3 (2^x - 5)$ and $\log_3 \left(2^x - \frac{7}{2}\right)$ in AP.

$$\text{So, } 2\log_3 (2^x - 5) = \log_3 2 + \log_3 \left(2^x - \frac{7}{2}\right)$$

$$(2^x - 5)^2 = 2 \left[2^x - \frac{7}{2}\right]$$

$$(2^x)^2 + 25 - 10(2^x) = 2 \cdot (2^x) - 7$$

$$(2^x)^2 - 12(2^x) + 32 = 0$$

$$(2^x - 8)(2^x - 4) = 0$$

$$x = 3, 2$$

At $x = 2 \Rightarrow \log (2^x - 5)$ not defined
Therefore, $x = 3$

C both (a) and (b)

D None of (a) and (b)

QUESTION ANALYTICS

+

Q. 9

Solution Video

Have any Doubt?

Q

In a group of 132 people 50, 60, 70 people like different sweets - Barfi, Jalebi, Rasgulla respectively. The number of people who like all the three sweet is half the number of people who like exactly 2 sweets. The number of people who like Barfi and Jalebi only, Jalebi and Rasgulla only and Barfi and Rasgulla only is same. If each of the students like at least one of the sweets then the number of people who like all three sweets are _____.

A 10

B 20

Solution :
(c)

$$\therefore g = \frac{1}{2}(d+e+f)$$

$$d = e = f$$

[∴ Number of people liking exactly two sweets is equal to those who like exactly other two of three sweets]

$$g = \frac{1}{2}(3d)$$

$$g = 1.5d$$

Also, $B + d + f + g = 50$

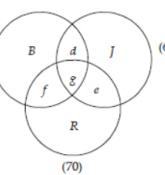
$$B + 3.5d = 50$$

Similarly,

$$J + 3.5d = 60$$

$$R + 3.5d = 70$$

$$B + J + R + 10.5d = 180$$



... (i)

From equation total number of people in group = 132

$$\therefore B + J + R + d + e + f + g = 132$$

$$B + J + R + 3d + 1.5d = 132$$

$$B + J + R + 4.5d = 132$$

... (ii)

From equation (i) and (ii), we get,

$$6d = 48$$

$$d = 8$$

$$g = \frac{3}{2} \times 8 = 12$$

QUESTION ANALYTICS


Q. 10

▶ Solution Video

⌚ Have any Doubt ?



Two tables are given below, out of which Table 1 gives breakup of the percentage of student enrolling for Engineering systems in different states and Table 2 gives percentage breakup of stream wise enrollment in Haryana.

Table-1	
Bihar	20%
Haryana	15%
Maharashtra	30%
Rajasthan	24%
Kerala	11%

Table-2	
Electronics Engineering	17.5%
Mechanical Engineering	30%
Computer	10%
Electrical Engineering	12.5%
Civil Engineering	30%

If 4800 students took admission in Electrical Engineering in Haryana, then

A 28160 total students took admission in Kerala.

Correct Option

B 61440 total students took admission in Rajasthan.

Correct Option

C 6720 students took admission in electronic in Haryana.

Correct Option

D (a) and (b) only

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c

STATUS - SKIPPED

Solution :

(a, b, c)

From the given data of Table-1 and Table-2

$$\therefore 12.5\% \text{ of } 15\% \text{ of total} = 4800$$

$$0.125 \times 0.15 \times \text{total} = 4800$$

$$\text{Total} = 256000$$

Now from Table-1.

$$\text{Admission in Kerala} = 11\% \text{ of total}$$

$$= 0.11 \times 256000 = 28160$$

$$\text{Admission in Rajasthan} = 24\% \text{ of total}$$

$$= 0.24 \times 256000 = 61440$$

From Table-2,

$$\text{Admission in Electronics in Haryana} = 0.15 \times 0.175 \times 256000 = 6720$$

QUESTION ANALYTICS




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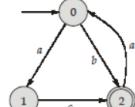
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Q. 11
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Which of the following is a regular expression r with $L(r) = L(M)$ when M is the following nondeterministic finite automaton.



A $(b + ac) ((b + ac)a)^*$

B $(b + ac) a(b + ac)^*$

C $[(b + ac)a]^* (b + ac)$

Correct Option

Solution :

(c)

We can remove the state 1 and add a transition from state 0 to state 2 by arrow ac . So, now, language accepted by M will be $[(b + ac)a]^* (b + ac)$ OR $(b + ac) [a(b + ac)]^*$.

D $[a(b + ac)]^* (b + ac)$

[QUESTION ANALYTICS](#)

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


If A and B are the inputs to a half adder and to a half subtractor and X, Y are the sum and difference output of half adder and half subtractor respectively and C is a carry output of half adder and D is borrow output of half subtractor. Then $X \oplus Y$ and $C \odot D$ respectively

A 0, B

B 1, B

C 1, B'

D 0, B'

Correct Option

Solution :

(d)

A, B are input to half adder and X, C denote the sum output and carry output of half adder respectively.

So, $X = A \oplus B$; $C = AB$

A, B are input to half subtractor and Y, D denote the difference output and borrow output of half subtractor respectively.

So, $Y = A \oplus B$; $D = A'B$

Hence, $X \oplus Y = 0$; $C \odot D = B'$

Option (d) is the answer.

[QUESTION ANALYTICS](#)

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


Which of the following statements about ethernets is typically FALSE?

A Ethernets use circuit switching to send messages.

Correct Option

Solution :

(a)

Ethernets use packet switching to send messages.

B Ethernets use buses with multiple masters.

C Ethernet protocols use a collision-detection method to ensure that messages are transmitted properly.

D Networks connected by ethernets are limited in length to a few hundred meters.

[QUESTION ANALYTICS](#)


Q. 14

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

The number of 1's in the binary representation of $13 \times 16^3 + 11 \times 16^2 + 9 \times 16 + 3$ is

A 7**B** 9**C** 10

Correct Option

D 12 QUESTION ANALYTICS

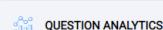
Q. 15

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

There are K people in the room and every person shakes hands with every other person. What is the minimum value of K so that there are at least 12 handshakes?

A 5**B** 6

Correct Option

C 7**D** 8 QUESTION ANALYTICS

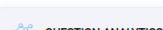
Q. 16

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

The binary relation $R = \{(0, 0), (1, 1)\}$ on $A = \{0, 1, 2, 3\}$ is

A Reflexive, not symmetric, transitive.**B** Not reflexive, symmetric, transitive.

Correct Option

C Not reflexive, symmetric, not transitive.**D** Not reflexive, not symmetric, not transitive. QUESTION ANALYTICS

Q. 17

[Have any Doubt ?](#)

Let M be a two dimensional array declared as follows:

M : array [-5 ... 15] [-10 10] of integer;

Assuming that each integer takes one memory location, the array is stored in row-major order and the first element of the array is stored at location 100, what is the address of the element $A[i][j]$?

A $21j + i + 31$ C 5**B** $21i + j + 215$

Correct Option

C Solution :**D** For array array $[r_1 \dots r_2] [c_1 \dots c_2]$, where each array element takes n memory locations.

In row major order,

Address of element $A[i][j] = \text{Base address} + [(i - r_1) \times (c_2 - c_1 + 1) + (j - c_1)] \times n$

So, for the given question,
Address of element $A[i][j] = 100 + [(i+5) \times 21 + (j+10)] \times 1 = 21i + j + 215$

C $21j + i + 215$

D $21i + j + 315$

QUESTION ANALYTICS



Q. 18

? FAQ

▶ Solution Video

⌚ Have any Doubt ?



Which of the following is a stable sorting algorithm?

- I. Insertion sort
- II. Merge sort
- III. Quick sort
- IV. Selection sort

A I and II only

Correct Option

Solution :
(a)

B I, II and III only

C I and IV only

D I, II and IV only

QUESTION ANALYTICS



Q. 19

? FAQ

⌚ Have any Doubt ?



Consider the SDTs given below:

$S_1 : A \rightarrow BC$ {A.val = B.val + C.val}

$S_2 : D \rightarrow EF$ {D.val = E.val * F.val and E.val = F.val}

A S_1 is S-attributed and S_2 is L-attributed.

Correct Option

Solution :
(b)
 S_1 is L-attributed. But S_2 is not L-attributed because E inherits from its right sibling which is not allowed according to L-attributed's definition.

C Both S_1 and S_2 are S attributed.

D Both S_1 and S_2 are L attributed.

QUESTION ANALYTICS



Q. 20

⌚ Have any Doubt ?



Which of the following disk scheduling techniques has a drawback of starvation?

A SCAN

B SSTF

Correct Option

Solution :
(b)
SSTF suffers from starvation.

C FCFS

D C-Scan

QUESTION ANALYTICS





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OVERALL ANALYSIS COMPARISON REPORT **SOLUTION REPORT**

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

Q. 21

Solution Video

Have any Doubt?



Consider the following two systems of linear equations:

$$S_1 : \begin{aligned} x_1 + x_2 &= 10 \\ -x_1 + x_2 &= 0 \end{aligned}$$

$$S_2 : \begin{aligned} x_1 - 2x_2 &= -3 \\ 2x_1 - 4x_2 &= 8 \end{aligned}$$

Which of the above system has infinite solutions?

A Only S_1

B Only S_2

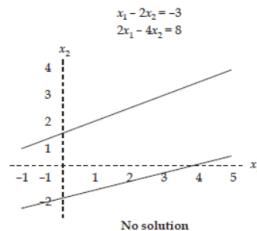
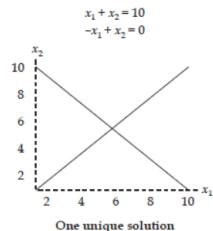
C Both S_1 and S_2

D None of these

Correct Option

Solution :

(d)



QUESTION ANALYTICS



Q. 22

? FAQ

Have any Doubt?



Consider the following statements:

- I. $L_1 = \{xyx^R : x \in \{0, 1\}^*, y \in \{0, 1\}^*\}$ is regular.
 II. There exists a language L that is Turing enumerable but not lexicographically Turing enumerable.

Which of the above statements is/are true?

A Only I

B Only II

C Both I and II

Correct Option

Solution :

(c)

L_1 = Regular. There is no reason to let x be more than one character. So all that is required is that the string have at least two characters and the first and last must be the same.
 $L_1 = (0(0 + 1)^* 0) + (1(0 + 1)^* 1)$.

II. There are languages which are RE but not REC. So it is true statement.

D None of these

QUESTION ANALYTICS



Q. 23

? FAQ

Have any Doubt?



An $n \times n$ array v is defined as follows:

$$v[i, j] = i - j \quad \forall i, j, 1 \leq i \leq n, 1 \leq j \leq n$$

The sum of the elements of the array v is

A 0

Correct Option

Solution :

(a)

First row will have values: 0, -1, -2, -3, ..., 1 - n
 Second row will have values: 1, 0, -1, -2, -3, ..., 2 - n
 Third row will have values: 2, 1, 0, -1, -2, -3, ..., 3 - n
 nth row will have values: n - 1, n - 2, n - 3, ..., 0

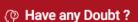
And so on.
But we can notice that summation of first row and first column is 0, similarly for i^{th} row and j^{th} column.
So, total summation will be 0.

- B $n - 1$
- C $n \times n - 3n + 2$
- D $\frac{n \times n(n+1)}{2}$

 QUESTION ANALYTICS



Q. 24

? FAQ 



Let $G = (V, E)$ be a finite directed acyclic graph with $|E| > 0$. Which of the following must be true?

- A G has a vertex with no incoming edge.
- B G has a vertex with no outgoing edge.
- C G has an isolated vertex, that is, one with neither an incoming edge nor an outgoing edge.
- D None of these

YOUR ANSWER - NA

CORRECT ANSWER - a,b

STATUS - SKIPPED

Solution :

(a, b)
Since graph is finite directed acyclic graph so there must be some vertex with no incoming edge and there must be some vertex with no outgoing edge. (c) is not necessarily true.

 QUESTION ANALYTICS



Q. 25

? FAQ 



A message 1001 1100 1010 0011 is transmitted using the internet checksum (using 4-bit words). What will be the decimal value of the checksum?

11

Correct Option

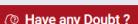
Solution :

11
 1. $9 + 12 + 10 + 3 = 34$ (100010)
 2. $10 + 0010$ (Because we can represent each msg unit in 4 bits) = 0100(4)
 3. Do 1's compliment
 $0100 = 1011(11)$

 QUESTION ANALYTICS



Q. 26

? FAQ 



Which of the following statements are true?

- A The non-clustered index is created to improve the performance of frequently used queries covered by clustered index.
- B B-tree is used instead of B+ tree, when sequential access to key values is required.
- C Conservative 2PL is deadlock free.
- D Strict 2PL is recoverable but it is not deadlock free.

YOUR ANSWER - NA

CORRECT ANSWER - c,d

STATUS - SKIPPED

Solution :

(c, d)
 (a) This is false because the non-clustered index is created to improve the performance of frequently used queries not covered by clustered index. A non-clustered index is stored at one place and table data is stored in another place. This is similar to a textbook where the book content is located in one place and the index is located in another. While a clustered index defines the order in which data is physically stored in a table. Table data can be sorted in only one way, therefore, there can be only one clustered index per table. Therefore non-clustered index improve the performance of the queries not covered by the clustered index
 (b) B-tree is never used for sequential access of records.
 (c) Conservative 2PL guarantees serializability as well as deadlock free schedule. Therefore, it is true.
 (d) Strict 2PL guarantees both serializability as well as strict recoverability. But it does not guarantee a deadlock free schedule. Hence, it is true

 QUESTION ANALYTICS



Q. 27

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Consider a computer system in which processes can request and release one or more resources. Once a process has been granted a resource, the process has exclusive use of that resource until it is released. If a process requests a resource that is already in use, the process enters a queue for that resource, waiting until the resource is available. Which of the following will NOT deal effectively with the problem of deadlock?

- A Giving priorities to processes and ordering the wait queues by priority.

Correct Option

Solution :

- (a)
- Option (b) eliminates hold and wait.
- Option (c) eliminates circular waiting.
- Option (d) breaks deadlock periodically.

- B Having a process request all its required resources when it first begins and restarting if it cannot obtain them all.

- C Numbering the resources and requiring that processes request resources in order of increasing number.

- D Having processes time out and restart after a random interval of waiting.

 QUESTION ANALYTICS

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Q. 28

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Given initial free memory blocks of 300 KB, 200 KB and 250 KB (in that order). First-fit, best-fit, and worst-fit would place blocks of size 100 KB, 150 KB, 200 KB, 200 KB and 100 KB, requested in that order. Assume that when a hole is split into a used portion and a (smaller) hole, the new hole remains in the same position in the list as the old hole. Which of the following service the request?

- A First fit only

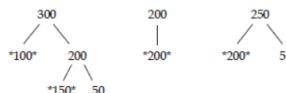
- B Best fit only

- C Worst fit only

Correct Option

Solution :

- (c)
- First fit:



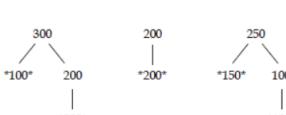
The allocation of the last 100 KB block fails.

Best fit:



The allocation of the second 200 KB block fails.

Worst fit:



- D None of these

 QUESTION ANALYTICS

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Q. 29

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

In an enhancement of the design of a CPU, the speed of a floating point unit has been increased by 30% and the speed of a fixed point unit has been increased by 20%. The overall speedup achieved if the ratio of the number of fixed point operations to a number of floating point operations is 4 : 6 and the floating point operation used to take twice the time taken by fixed-point operation in the original design is _____. (Upto 2 decimal places)

- 1.27 [1.26 - 1.28]

Correct Option

Solution :

1.27 [1.26 - 1.28]

Before Enhancement: Let's assume FXU (fixed point unit) takes 100 units of time. So, FLU (Floating point unit) takes 200 units of time.

So, per instruction execution time:

(0.40) 100 + (0.60) 200 (Because 40% operations are FXU and 60% FLU)

After enhancement: Speed of FXU is increased by 20%, so, new speed of FXU is 1.2 times of

previous speed and time is inversely proportional to speed, so, new time is $\frac{1}{1.2}$ times of previous time, hence, new time for FXU = $\frac{100}{1.2}$.

Speed of FLU is increased by 30%, so, new speed of FLU is 1.3 times of previous speed and time is inversely proportional to speed, so, new time is $\frac{1}{1.3}$ times of previous time, hence, new time

for FLU = $\frac{200}{1.3}$.

Hence,
So, per instruction execution time:

$$(0.40) \frac{100}{1.2} + (0.60) \frac{200}{1.3} \text{ (Because 40% operations are FXU and 60% FLU)}$$

Speedup is: $\frac{\text{Execution time before enhancement}}{\text{Execution time after enhancement}}$

Hence, answer is 1.27.

QUESTION ANALYTICS

Q. 30

FAQ

Solution Video

Have any Doubt ?



Consider the following statements:

- (a) Weak entity cannot exist without the entity with which it has a relationship.
- (b) Weak entity has a primary key that is derived from the parent entity in the relationship.
- (c) Each superkey is a superset of some candidate key.
- (d) Each primary key is also a candidate key, but there may be candidate keys that are not primary keys.

Which of the above statements are correct?

A a

Correct Option

B b

Correct Option

C c

Correct Option

D d

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c,d

STATUS - SKIPPED

Solution :

(a, b, c, d)

Weak entity is existence dependent and maintains a primary key which is derived from parent.

QUESTION ANALYTICS



Item 21-30 of 65 « previous

1

2

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4

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next »



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OVERALL ANALYSIS COMPARISON REPORT **SOLUTION REPORT**

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

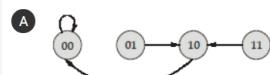
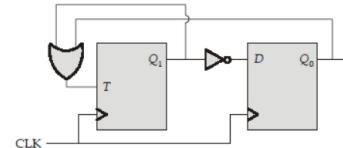
Q. 31

Solution Video

Have any Doubt ?



Which of the following is correct if initially Q_1 and Q_0 are 1 and 0 respectively?

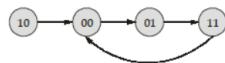


Correct Option

Solution :
 (c)

Q_1	Q_0	T	D	Q_{1n}	Q_{0n}
0	0	0	1	0	1
0	1	1	1	1	1
1	0	1	0	0	0
1	1	1	0	0	0

Hence the counter will be



D None of these

QUESTION ANALYTICS



Q. 32

Have any Doubt ?



Match the following list by choosing one Intermediate Representation that would be best suited for each compiler task specified below:

List-I

- P. Transforming a given C program to a new C program containing calls to a performance instrumentation library.
 Q. Given a statement S that computes a scalar variable X, determining if the computed value is used by any other statement in the procedure.
 R. Performing optimizations on individual arithmetic operations used in array addressing.
 S. Determining whether statement S_1 can be executed provided S_2 is executed, where S_1 and S_2 are in the same procedure.
 T. Finding if a given (sub) expression is evaluated more than once.

List-II

- I. SSA
 II. CFG
 III. Three address code
 IV. AST
 V. DAG

Codes:

- (a) P - I, Q - IV, R - III, S - II, T - V (b) P - IV, Q - I, R - III, S - II, T - V
 (c) P - IV, Q - I, R - II, S - III, T - V (d) P - IV, Q - V, R - III, S - II, T - I

A a

B b

Correct Option

Solution :

- (b) AST: Source-level transformations are easiest on a representation with source level semantics.
- (A) SSA: Only one of the choices that makes the uses of a definition explicit.
- (C) Three address code: Makes array address calculations explicit.
- (D) CFG: Question requires analysis of control flow and the CFG is best suited for that.
- (E) DAG: Designed to identify (sub) expressions that are evaluated in multiple places.

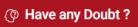
C c

d

QUESTION ANALYTICS



Q. 33

? FAQ  

Which of the following is a reason for choosing to implement a list using linked lists over arrays?

A It is faster to insert an element into a sorted list (at the last position) using a linked list.

B It is faster to sort elements using a linked list.

C It is faster to insert an element into a sorted list (at the first position) using a linked list.

Correct Option

Solution :

(c)

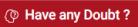
Inserting an element at the first position in an sorted array will take $O(n)$ time but in linked list it will take $O(1)$ only.

D It is faster to invert all the elements of a sorted list using a linked list.

QUESTION ANALYTICS



Q. 34

Following is C like pseudo-code of a function that takes a queue as an argument and uses a stack S to do the processing.

```
void fun(Queue *Q)
{
    Stack S; // Assume it creates an empty stack S
    // Run while Q is not empty
    while (! isEmpty(Q))
    {
        // deQueue an item from Q and push the dequeued item to S
        push(&S, deQueue(Q));
    }
    // Run while Stack S is not empty
    while (! isEmpty(&S))
    {
        // Pop an item from S and enqueue the popped item to Q
        enQueue(Q, pop(&S));
    }
}
```

What does the above function do in general?

A Removes the last from Q

B Keeps the Q same as it was before the call

C Makes Q empty

D Reverses the Q

Correct Option

Solution :

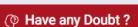
(d)

The function takes a queue Q as an argument. It dequeues all items of Q one by one and pushes them to a stack S one after another. So, stack contains all the elements of Q but in the reverse order of that in Q i.e. Front element of Q is now the bottom element of S and rear element of Q is now top element of S. Now we pop all items of S and enqueue the items back to Q. Since stack is LIFO order, all items of queue are reversed.

QUESTION ANALYTICS



Q. 35

The language $\{ww \mid w \in (0 + 1)^*\}$ is

A Not accepted by any Turing Machine.

B Accepted by some Turing Machine, but not by pushdown automaton.

Correct Option

Solution :

(b)

Given language is ww and it is non-CFL but CSL, so, we have a Turing Machine which accepts it.

C Accepted by some pushdown automaton, but not context-free.

D Context-free, but not regular.

QUESTION ANALYTICS



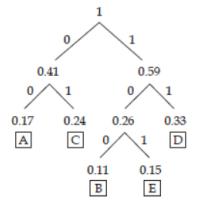
Q. 36

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

Huffman tree is constructed for the following data: {A, B, C, D, E} with frequency {0.17, 0.11, 0.24, 0.33 and 0.15} respectively. 1000001101 is decoded as

A BACE

Correct Option

Solution :
 (a)


100	00	01	101
B	A	C	E

Hence option (a) is answer.

B CADE**C** BAD**D** CADD

QUESTION ANALYTICS

+

Q. 37

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

Consider a system with several running processes. The system is running a modern OS that uses virtual addresses and demand paging. It has been empirically observed that the memory access times in the system under various conditions are: t_1 when the logical memory address is found in TLB cache, t_2 when the address is not in TLB but does not cause a page fault, and t_3 when the address results in a page fault. This memory access time includes all overheads like page fault servicing and logical-to-physical address translation. It has been observed that, on an average, 10% of the logical address accesses result in a page fault. Further, of the remaining virtual address accesses, two-thirds require walking the page tables. Using the information provided above, what is the average expected memory access time (in ns) in the system if $t_1 = 10$ ns, $t_2 = 100$ ns, $t_3 = 1000$ ns

C 136

Correct Option

Solution :

136

$$\text{Average memory access time} = 0.6 \times t_1 + 0.3 \times t_2 + 0.1 \times t_3 \\ = 136 \text{ ns}$$

QUESTION ANALYTICS

+

Q. 38

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

Consider a hypothetical Control Unit which supports 4 K words. The Hardware contains 64 control signals and 16 Flags. What is the size of the control word used in bits and control memory in byte using horizontal micro programming.

A 40, 40 KB**B** 22, 11 KB**C** 80, 40 KB

Correct Option

Solution :
(c)
64 bits for 64 signals

$$\text{Control Word Size} = 4 + 64 + 12 = 80 \text{ bits}$$

$$\text{Control Memory} = 4 \text{ kW} = \left(\frac{(4 \text{ K} \times 80)}{8} \right) = 40 \text{ KB}$$

D 92, 320 KB

QUESTION ANALYTICS

+

Q. 39

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

Suppose $S(n)$ is a predicate on natural numbers (positive integer), n and suppose $\forall k \in N (S(k) \rightarrow$

$S(k + 2)$.

Now, if above assertion holds then consider the following statements:

$S_1 : (\forall n \leq 100 (S(n))) \wedge (\forall n > 100 (\neg S(n)))$

$S_2 : S(1) \rightarrow \forall n S(2n + 1)$

Which of the following is correct for above statements:

A Both assertion S_1, S_2 always holds

B S_1 always holds but S_2 never holds

C S_1 never holds but S_2 always holds

Correct Option

Solution :

(c)

S_1 : In this case, S is true for n up to 100 and false from 101 on. So $S(99)$ is true, but $S(101)$ is false.

That means that $S(k)$ does not imply $S(k + 2)$ for $k = 99$. This case is impossible.

S_2 : This assertion says that if $S(1)$ holds, then $S(n)$ holds for all odd n . This case is always true.

D Both S_1, S_2 can hold but not always

 QUESTION ANALYTICS



Q. 40

 Have any Doubt ?



The greatest integer function $f: R \rightarrow R$ is given by $f(x) = [x]$, where $[x]$ denotes the greatest integer less than or equal to x .

A f is one-to-one but not onto

B f is onto but not one-to-one

C f is both one-to-one and onto

D None of the above

Correct Option

Solution :

(d)

Let, $x_1 = 3.5$ and $x_2 = 3.2 \in R$

Here, $f(x) = [x]$

Then, $f(x_1) = [3.5] = 3$ and $f(x_2) = [3.2] = 3$

Now, $f(x_1) = f(x_2)$

But, $x_1 \neq x_2$

So, f is not one-one function.

Let, $f(x) = 2.5 \in R$

Then $[x] = 2.5$ which is not possible because there is no value of x corresponding to which $[x] = 2.5$.

So, f is not onto function.

Thus f is neither one-one nor onto function.

 QUESTION ANALYTICS



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



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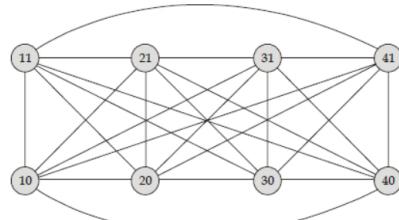
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Q. 41
[FAQ](#) [Have any Doubt ?](#)


Consider the following graph:



The chromatic number of the above graph is _____.

4

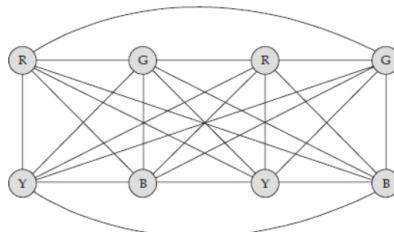
Correct Option

Solution :

4

Observe that the subgraph H of G induced by {11, 21, 10, 20} is a complete graph of order 4 and so $X(H) = 4$.

So, $X(G)$ should be ≥ 4 .



We can see that $X(G) = 4$ using the above coloring.

Or, alternatively you can use Welsh Powell algorithms to find the chromatic number systematically.

QUESTION ANALYTICS


Q. 42
[FAQ](#) [Have any Doubt ?](#)


Let Q be a Queue. Enqueue and Dequeue are usual Queue operations to add and delete element respectively. Q.enqueue(x) adds an element x to the queue. Q.dequeue() performs a dequeue operation on the queue and returns the value that gets dequeued. Consider the following segment of code:

```
Q.enqueue(1);
int count=1;
do {
    count = count + 1;
    x = Q.dequeue();
    Q.enqueue(2*x);
    Q.enqueue(4*x);
} while(x != 32);
```

What will be the value of the variable count, when the above segment of code completes its execution?

12

Correct Option

Solution :

12

The do-while loop will run 11 times.

We can trace x. X is 1 in the first time of loop. Then Q will contain 2x and 4x in that order.

X will be changing like this : 1 \Rightarrow 2 \Rightarrow 4 \Rightarrow 8 \Rightarrow 16 \Rightarrow 32

So, X becomes 32 in 11th run of the loop.

Since count started from 1 and increments in each loop so, Count = 12 at last.

QUESTION ANALYTICS


Q. 43
[FAQ](#) [Have any Doubt ?](#)


Consider the following grammar:

 A \rightarrow BaC

 B \rightarrow Cb

 C \rightarrow a

 C \rightarrow ϵ

A LR(0)

B SLR(1) Correct Option

C Neither LR(0) nor SLR(1)

D Not SLR(1) but LR(1)

YOUR ANSWER - NA

CORRECT ANSWER - b

STATUS - SKIPPED

Solution :

(b)

Augmented grammar for the given grammar is
 $S \rightarrow A$
 $A \rightarrow BaC$
 $B \rightarrow .Cb$
 $C \rightarrow a$
 $C \rightarrow \epsilon$

I_0	$S \rightarrow A$ $A \rightarrow BaC$ $B \rightarrow .Cb$ $C \rightarrow .a$ $C \rightarrow .$	$\text{goto}(A) = I_1$ $\text{goto}(B) = I_2$ $\text{goto}(C) = I_3$ $\text{goto}(a) = I_4$
I_1	$S \rightarrow A.$	
I_2	$A \rightarrow B.aC$	$\text{goto}(a) = I_5$
I_3	$B \rightarrow C.b$	$\text{goto}(b) = I_6$
I_4	$C \rightarrow a.$	
I_5	$A \rightarrow Ba.C$ $C \rightarrow .a$ $C \rightarrow .$	$\text{goto}(C) = I_7$ $\text{goto}(a) = I_4$
I_6	$B \rightarrow Cb.$	
I_7	$A \rightarrow BaC.$	

State 15 contains S/R conflict in LR(0).

Now we need to check for SLR(1).

$\text{Follow}(C) = \{b, \$\}$

$\text{First}(C) = \{a, \epsilon\}$

$\text{Follow}(C) \cap \text{First}(C) = \{\emptyset\}$ no S/R conflict in SLR(1).

The given grammar is not LR(0) but SLR(1).

QUESTION ANALYTICS



Q. 44

? FAQ

► Solution Video

⌚ Have any Doubt?



What is the running time of the following function (specified as a function of the input value)?

```
void Function(int n) {
    int i = 1;
    int s = 1;
    while(s <= n){
        i++;
        s = s + i;
    }
}
```

A $O(n)$

B $O(n^2)$

C $O(1)$

D $O(\sqrt{n})$ Correct Option

Solution :

(d)

At each step we are increasing S by i, where i indicates the number of iterations we had till now.

Here S is sum of first i natural number.

$$\frac{i(i+1)}{2} = n \Rightarrow i = \sqrt{n}$$

Option (d) is the answer.

QUESTION ANALYTICS



Q. 45

? FAQ

⌚ Have any Doubt?



Which of the following are CFL?

A $[a^m b^m \mid m \geq 0] \cup [a^m b^{2m} \mid m \geq 0]$ Correct Option

B $[a^m b^m \mid m \geq 0] \cap [a^m b^{2m} \mid m \geq 0]$ Correct Option

C $\{a^m b^m c^m \mid m \geq 0\} \cup \{a^{2m} b^{2m} c^{2m} \mid m \geq 0\}$

D $\{a^m b^m c^m \mid m \geq 0\} \cap \{a^{2m} b^{2m} c^{2m} \mid m \geq 0\}$

YOUR ANSWER - NA

CORRECT ANSWER - a,b

STATUS - SKIPPED

Solution :

- (a, b)
(a) is CFL but not DCFL.
(b) is regular because it will only contains ϵ .
(c) is CSL.
(d) is CSL because it is same as $\{a^{2m} b^{2m} c^{2m} \mid m \geq 0\}$.

QUESTION ANALYTICS



Q. 46

Have any Doubt ?



Which of the following is/are true?

- I. $A_{CFG} = \{<G, w> \mid G \text{ is a CFG that generates string } w\}$ is Turing decidable.
II. $REG_{TM} = \{<M> \mid M \text{ is a TM and } L(M) \text{ is regular}\}$ is Turing decidable.
III. $E_{DFA} = \{ \mid B \text{ is a DFA with } L(B) = \emptyset\}$ is Turing decidable.

A I is correct

Correct Option

B II is correct

C III correct

Correct Option

D None is correct

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

Solution :

- (a,c)
I. $A_{CFG} = \{<G, w> \mid G \text{ is a CFG that generates string } w\}$ is Turing decidable. True (Membership for CFL)
II. $REG_{TM} = \{<M> \mid M \text{ is a TM and } L(M) \text{ is regular}\}$ is Turing decidable. False (Regularity for RE)
III. $E_{DFA} = \{ \mid B \text{ is a DFA with } L(B) = \emptyset\}$ is Turing decidable. True (Emptiness problem for regular)

QUESTION ANALYTICS



Q. 47

FAQ Have any Doubt ?



Consider a complete bipartite graph $K(10, 10)$ where two partitions are A, B and each has 10 vertices. We add two more edges into this graph and obtain $G(10, 10)$. Consider the following statements about $G(10, 10)$: Which of the following statements is/are true?

A $G(10, 10)$ is 3-colorable i.e. $G(10, 10)$ can be properly colored using 3 colors such that no two adjacent vertices have the same color.

Correct Option

B $G(10, 10)$ has an independent set of size 9.

Correct Option

C $G(10, 10)$ has a vertex cover of size 11.

Correct Option

D The maximum size matching in $G(10, 10)$ is of size 10.

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - b,c,d

STATUS - SKIPPED

Solution :

- (b, c, d)
 $G(10, 10)$ is 4-colorable (when both edges are added in different partitions), has an guaranteed independent set of size 9 (when both edges are added in different partitions), has vertex cover of size 11 (when both edges are added in different partitions) and has maximum matching of size 10 (in all cases).

QUESTION ANALYTICS



Q. 48

FAQ Solution Video Have any Doubt ?



If a relation $R(A, B, C)$ with FD's $\{AB \rightarrow C, C \rightarrow A\}$ is decomposed into BCNF. Then choose the incorrect option

A It is possible for BCNF with lossless join, dependency preserving decomposition.

Correct Option

B It is possible for BCNF with dependency preserving.

Correct Option

C It is not possible for BCNF with dependency preserving.

D All option are false

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,b,d

STATUS - SKIPPED

Solution :

(a, b, d)

Option (c) is true because

For given FD's $\{AB \rightarrow C, C \rightarrow A\}$, CK = $\{AB, BC\}$ 1NF, 2NF and 3NF is satisfied and $C \rightarrow A$ is violating BCNF rule so decompose the relation.

Here, we can decompose the relation into 4-different types.

Case 1: $R_1(AB), R_2(BC)$ it is not LLJ, DP but satisfies BCNF condition.

Case 2: $R_1(AB), R_2(AC)$ it is not LLJ, DP but satisfies BCNF condition.

Case 3: $R_1(AC), R_2(BC)$ it is not LLJ, and satisfying BCNF condition but it is not DP.

Case 4: $R_1(ABC), R_2(AC)$ it is not LLJ and DP but it is not satisfying BCNF conditions.

So, (a), (b) are false.

Hence option (a), (b) and (d) are correct.

QUESTION ANALYTICS



Q. 49

FAQ

Solution Video

Have any Doubt ?



Assume flag is set to false for both the processes.

```
//process 0           | //process 1  
while (flag[1]);      | while (flag[0]);  
flag[0] = true;       | flag[1] = true;  
/* critical section */| /* critical section */;  
flag[0] = false;      | flag[1] = false;
```

Which is true for the above code snippet?

A Satisfies mutual exclusion

B Satisfies progress

Correct Option

C It satisfies both mutual exclusion and progress

D Not satisfies mutual exclusion

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - b,d

STATUS - SKIPPED

Solution :

(b, d)

Progress definition: If no process is executing in its critical section and some processes wish to enter their critical sections, then only those processes that are not executing in their remainder sections can participate in the decision on which will enter its critical section next, and this selection cannot be postponed indefinitely.

Here progress is not violated.

Mutual exclusion:

P_0 executes the while flag[1] false

P_1 executes the while flag[0] false

Both can enter the CS at the same time.

Here mutual exclusion is violated.

QUESTION ANALYTICS



Q. 50

Solution Video

Have any Doubt ?



Which of the following is a disadvantage of a hardwired control unit?

A It is slower than vertical programming.

B It is faster than horizontal microprogramming.

C It is slower than horizontal microprogramming.

D Their design uses a fixed architecture.

Correct Option

Solution :

(d)

Hardwire control although provides faster control unit but design isn't flexible if new instructions need to be added.

QUESTION ANALYTICS





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ALL(65)

CORRECT(0)

INCORRECT(0)

SKIPPED(65)

Q. 51

Solution Video

Have any Doubt?



0/1-Knapsack is a well known problem where, it is desired to get the maximum total profit by placing n times (each item is having some weight and associated profit) into a knapsack of capacity W. The table given below shows the weights and associated profits for 5 items, where one unit of each item is available to you. It is also given that the knapsack capacity W is 8. If the given 0/1 Knapsack problem is solved using dynamic programming, which one of the following will be maximum earned profit by placing the items into the Knapsack of capacity 8.

Item	Weight	Associated Profit
1	1	3
2	2	5
3	4	9
4	5	11
5	8	18

A 19

Correct Option

Solution :

(a) Option (a) 19, as it is a 0/1 Knapsack we can include item 1, 2 and 4 to get maximum profit of $3 + 5 + 11 = 19$.

B 18

C 17

D 20

QUESTION ANALYTICS



Q. 52

Solution Video

Have any Doubt?



The maximum number of candidate keys for given 6 distinct attributes are _____.

A 10

B 20

Correct Option

Solution :

(b) The maximum number of candidate keys of size r for given n attributes is ${}^n C_r$. While, in general, the maximum number of candidate keys for n attributes is given as ${}^n C_{\lfloor n/2 \rfloor}$. This is because the candidate key is the minimal super key.

Thus, the maximum number of candidate keys for given 10 attributes is

$${}^6 C_{(6/2)} = {}^6 C_3 = \frac{6!}{(3! \times 3!)} = 20 \text{ keys}$$

C 30

D 40

QUESTION ANALYTICS



Q. 53

FAQ

Solution Video

Have any Doubt?



The number of different B-trees possible when the data file has 6 records (where the nodes of the B-tree can have 3 keys and 4 pointers) are _____.

A 5

Correct Option

Solution :

5

QUESTION ANALYTICS



Q. 54

FAQ

Solution Video

Have any Doubt?



A hash table has space for 100 records. Then the probability of collision before the table is 10% full is approximately _____? (Upto 2 decimal places)

0.37 [0.37 - 0.38]

Correct Option

Solution:
0.37 [0.37 - 0.38]

$$= 1 - \frac{100.99.98.97.96.95.94.93.92.91}{100^{10}} = 0.37$$

QUESTION ANALYTICS



Q. 55

? FAQ

Have any Doubt?



Consider the effect of using additive increase multiplicative decrease (AIMD) on a line with propagation delay of 10 ms. The receive window is 24 KB and the maximum segment size is 2 KB. How long does it take to completely achieve full window size segment if initial threshold of 20 KB is _____ (in ms)?

120

Correct Option

Solution:
120
First transmission: 2 KB
Second transmission: 4 KB
Third transmission: 8 KB
Fourth transmission: 16 KB
Fifth transmission: 20 KB [Threshold reached]
Sixth transmission: 22 KB [Congestion avoidance phase starts]
Seventh transmission: 24 KB
It takes 6 round trip time.

$$\text{RTT} = 2 \times T_p = 10 \text{ ms} = 20 \text{ ms}$$

So, $6 \text{ RTT} = 20 \times 6 = 120 \text{ ms}$

QUESTION ANALYTICS



Q. 56

Solution Video

Have any Doubt?



Find the value of the following limit $\lim_{x \rightarrow 2} \frac{\sin(3x^2 - 12)}{x - 2}$ _____?

12

Correct Option

Solution:
12
As we have 0/0, we must resort to other methods than simply substituting. Using L'Hospital's rule, we find the limit is just $\lim_{x \rightarrow 2} \frac{6x(\cos(3x^2 - 12))}{1}$, which is 12. This is because the denominator is always 1 and $x \rightarrow 2$ the numerator tends to $6 \cdot 2 \cdot \cos 0 = 12$.

QUESTION ANALYTICS



Q. 57

Have any Doubt?



What is the output of following function when called with "start" pointing to the first node of the following singly linked list?

```
1 → 2 → 3 → 4 → 5 → 6
void fun(struct node* start)
{
    if(start == NULL)
        return;
    printf("%d", start->data);
    if(start->next != NULL)
        fun(start->next->next);
    printf("%d", start->data);
}
```

A 1 3 5 5 3 1

Correct Option

Solution:

(a)

Start is a local variable to the function "fun".

"fun(start->next->next);" this statement jumps on alternative values i.e. from pointing 1 to pointing 3 and then pointing 5 then pointing null.

First it prints 1 then calls to fun(3) then prints 3, then calls fun(5), then prints 5, then calls fun(null), then returns, then prints 5, then returns then prints 3 then returns then prints 1. So, output 1, 3, 5, 5, 3, 1.

B 1 3 5

C 1 2 3 4 5 6

D 1 3 5 3 1

Q. 58

FAQ Solution Video Have any Doubt ?

Consider 8 processes sharing the CPU in a Round Robin fashion. Assuming that each process switch takes 0.125 seconds, what must be the quantum size 'q' such that the overhead resulting from process switching is minimized but at the same time each process is guaranteed to get its turn at the CPU at least every 64 seconds?

A $q \leq 9$ seconds

Correct Option

Solution :

(a)

There are 8 processes.

Consider $P_1 || P_2 || P_3 || P_4 || P_5 || P_6 || P_7 || P_8 || P_1$

Here context switches are represented by ||.

If we see our scheduling pattern P_1 get CPU again after 8 Context switches and 7 time quanta.So $8 \times 0.125 + 7q \leq 64$ Seconds

$$8 \times 0.125 + 7q \leq 64$$

Which means $7q \leq 63$

$$\Rightarrow q \leq 9 \text{ seconds}$$

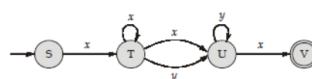
Hence option (a) is answer.

B $q \geq 9$ seconds**C** $q \leq 7$ seconds**D** $q \geq 7$ seconds

Q. 59

FAQ Have any Doubt ?

Consider the following non-deterministic finite state automaton over alphabet $\{x, y\}$ with start state S.



Which of the following over alphabet $\{x, y\}$ generates the language recognized by the automaton above?

A $S \rightarrow xT$
 $T \rightarrow xT | xU | yU$
 $U \rightarrow yU | xV$

Correct Option

B $S \rightarrow xT$
 $T \rightarrow xT | xU | yU$
 $U \rightarrow yU | x$ **Solution :**

(b)

The given FA accepts the language $xx^*(x + y)y^*x$

So, option (b) is correct grammar for it.

C $S \rightarrow xT | T$
 $T \rightarrow xT | xU | yU | T | U$
 $U \rightarrow yU | xV | V | x$ **D** $S \rightarrow xV$
 $T \rightarrow xT | yU$
 $U \rightarrow yU | xV$

Q. 60

FAQ Have any Doubt ?

Let A be an array of 31 numbers consisting of a sequence of 0's followed by a sequence of 1's. The problem is to find the smallest index i such that $A[i] = 1$ by probing the minimum number of locations in A. The worst case number of probes performed by an optimal algorithm is

A 2**B** 4**C** 5

Correct Option

Solution :

(c)

Apply binary search. We have to do $\log(31) = 5$ comparisons.

Numerical Answer Type Questions : 0.51 carry 2 marks

D 6

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Q. 61
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The following is a dump of a UDP header in hexadecimal form:
 06 32 00 0D 00 1C E2 17
 What is the total length (in bytes) of the UDP?

28
[Correct Option](#)
Solution :
28

The UDP header has four parts, each of two bytes. That means we get the following interpretation of the header.

Source port number = 0632
 Destination port number = 000D
 Total length = 001C
 Converting 001C hexadecimal into decimal.
 $0000\ 0000\ 0001\ 1100 = 28$ bytes

QUESTION ANALYTICS

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


The values of n for the following system of equations has solution when
 $x + y + z = 1$
 $x + 2y + 4z = n$
 $x + 4y + 10z = n^2$

A $n = 1, -2$
B $n = -1, -2$
C $n = 3, -2$
D $n = 1, 2$
[Correct Option](#)
Solution :
(d)

We will get the following reduced echelon form:

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 0 & 1 & 3 & a-1 \\ 0 & 0 & 0 & a^2 - 3a + 2 \end{array} \right]$$

For the system of equations to have solution, rank of augmented matrix must be equal to rank of coefficient matrix.

Rank of coefficient matrix = 2

So for the rank of augmented matrix to be equal to 2, $a^2 - 3a + 2$ must be equal to 0.

Therefore, $a = 1, 2$

QUESTION ANALYTICS

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


A 64-bit processor has 64 registers and uses 20 bit instruction format. It has two types of instructions: M-type and R-type. Each M-type instruction contains an opcode, and a memory address. Each R-type instruction contains an opcode and two register names. Main memory is 64 K words and it is byte addressable. If there are 10 distinct M-type instruction, then the maximum number of distinct R-type instruction is _____.

96
[Correct Option](#)
Solution :
96

Instruction length is 20, so, maximum possible encodings = 2^{20}

It is given that there are 10 M-type instructions. Let's assume the maximum R-type instructions to be x.

Therefore, $2^{20} \leq (10 \times 2^{16}) + (x \times 2^6 \times 2^6)$
 $x \leq 96$

QUESTION ANALYTICS


What is the output of the following program?

```
#include <stdio.h>
int fun(char *S1)
{
    char *S2 = S1;
    while(++S1)
        return (S1 - S2);
}
int main()
{
    char *s = "CRACKGATE";
    printf("%d", fun(s));
    return 0;
}
```

1

Correct Option

Solution :

1

Output of this program will be 1.

"while(++S₁)" this statement will run only one time because first time it becomes true then the inner statement is return statement, so, we will return from the function fun after one time while loop runs. So, when "while(++S₁)" runs one time, S₁ will have the value that is the address of R of the string. S₂ points to the base of the string, so, S₁ - S₂ will return 1.

QUESTION ANALYTICS

+

A 16-bit register is considered to store a floating point number, where 'M' denotes the mantissa which is implicit normalized sign-magnitude fraction and 'E' denotes exponent which is expressed in excess 64 format. The base of the number system is 2. What is the value of the largest number represented in base 10.

A 256×2^{55} **B** 256×2^{64} **C** 512×2^{64} **D** 511×2^{55}

Correct Option

Solution :

(d)

Firstly, calculate the number of bits out of 16 given for mantissa and exponent. Since maximum number represented by k bits is $2^k - 1$. So for excess 64 system we will equate $2^k - 1 = 64$ and can find the value of k, which is nothing but number of bits for exponent which is equal to 7. Remaining $16 - 7 - 1 = 8$ bits are for mantissa. For the number to be largest every bit in mantissa as well as in exponent should be 1. If we solve it further it will form G.P. Which gives $2^{64} - 2^{55}$ as output which is nothing but 511×2^{55} .

QUESTION ANALYTICS

+