



Kunal Jha

Course: GATE  
Computer Science Engineering(CS)

HOME

MY TEST

BOOKMARKS

MY PROFILE

REPORTS

BUY PACKAGE

NEWS

TEST SCHEDULE

## FULL SYLLABUS DEMO TEST : (CS) - REPORTS

OVERALL ANALYSIS

COMPARISON REPORT

SOLUTION REPORT

ALL(65)

CORRECT(0)

INCORRECT(0)

SKIPPED(65)

Q. 1

Have any Doubt ?

Select the word that is most SIMILAR in meaning to the bold word in capital letters  
**VAPID**

(A) Virtuous

(B) Priceless

(C) Dull

Correct Option

(D) Vital

QUESTION ANALYTICS



Q. 2

Have any Doubt ?

Select the word that is FARTHEST in meaning to the bold word in capital letters.  
**COVERT**

(A) Clandestine

(B) Open

Correct Option

Solution :  
(b)

(C) Virtuous

(D) Wide

QUESTION ANALYTICS



Q. 3

? FAQ Have any Doubt ?

No sooner did he see the traffic policeman then, he wore seat belt No error.  
(a) (b) (c) (d)

(A) a

(B) b

Correct Option

Solution :  
(b)  
Use 'than'

(C) c

(D) d

QUESTION ANALYTICS



Q. 4

Have any Doubt ?



When the sum of digits of an even number is 36. Then that number is always divisible by

(A) 9

(B) 18

D Both (a) and (b)

Correct Option

**Solution :**

(d)

The number whose sum is 36 will be divisible by 9 and the number is even so number will be divisible by 2, therefore the number is always divisible by 18. So number is divisible by both 9 and 18.

QUESTION ANALYTICS

Q. 5

FAQ



Albela, Bob and Chubul have to read a document of seventy eight pages and make a presentation next day. They realize that the article is difficult to understand and they would require team work to finish the assignment. Albela can read page in 2 mins, Bob in 3 mins and Chubul in 4 min. If they divide the article in 3 parts so that all three of them spend the equal amount of time on the article. The number of pages that Bob should read is \_\_\_\_\_.

24

Correct Option

**Solution :**

24

Let they require 't' time to read the pages

$$\frac{t}{2} + \frac{t}{3} + \frac{t}{4} = 78$$

$$t \left[ \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right] = 78$$

$$t \left( \frac{6+4+3}{12} \right) = 78$$

$$t = \frac{12 \times 78}{13} = 72$$

$$\Rightarrow \text{Pages read by Bob} = \frac{72}{3} = 24$$

QUESTION ANALYTICS

Q. 6

FAQ



Train X starts from point A to point B, at the Y starts from point B to A. A and B are 300 km apart. The train meets each other 3 hours after they start. After meeting, the faster train takes 2 hours to reach the destination. The total time required by slower train to the destination is

A 1.5 hours

B 3.5 hours

C 7.5 hours

Correct Option

**Solution :**

(c)

Let the speed of train are  $x$  km/h (faster) and  $y$  km/h (slower)

They meet after 3 hours.

$$\Rightarrow (x + y) \times 3 = 300$$

$$x + y = 100$$

$$x \times (3 + 2) = 300$$

$$x = 60 \text{ km/h}$$

$$y = 40 \text{ km/h}$$

$$\text{Time required by slower train} = \frac{300}{40} = 7.5 \text{ hours}$$

D 11.5 hours

QUESTION ANALYTICS

Q. 7

FAQ



At a reputed engineering college in Delhi, total expenses of a semester are partly fixed and partly varying linearly with the number of students. The total expense is ₹400 when there are 20 students and 600 when there are 40 students. When there are 80 students, the total expenses is

A 4200

B 800

C 1000

Correct Option

**Solution :**

(c)

Total expense = Fixed + Variable × Number of students

Let the fixed expense is  $x$  and variable expense is  $y$  per students.

According to given data,

$$\begin{aligned}
 x + 40y &= 400 \\
 x + 40y &= 600 \\
 \text{From here,} \quad y &= 10 \\
 x &= 200 \\
 \text{Average expense when there are 80 students} \\
 &= 200 + 80 \times (10) \\
 &= 1000
 \end{aligned}$$

D 4080

QUESTION ANALYTICS

Q. 8



A page contains 60 lines. A chapter contains 125 pages. A book contains 5 chapters. 20 such books form a bound. If there are totally 30 lakhs lines in  $x$  number of bounds, then value of  $x$  is

A 0.25

B 4

Correct Option

Solution :  
(b)

$$\begin{aligned}
 \text{No. of bounds } x &= \frac{\text{Lines}}{60 \times 125 \times 5 \times 20} \\
 &= \frac{3000000}{60 \times 125 \times 5 \times 20} = 4
 \end{aligned}$$

C 144

D 25

QUESTION ANALYTICS



Q. 9



A lad was asked his age by his friend. The lad said, the number you get when you subtract 25 times my age from twice the square of my age will be thrice your age if the friend's age is 14 years, then the age of the lad is

A 14 years

Correct Option

Solution :  
(a)

Let the lad's age is  $x$  years.

According to given data

$$\begin{aligned}
 2x^2 - 25x &= 3 \times 14 \\
 2x^2 - 25x - 42 &= 0 \\
 x &= 14, \frac{-3}{2}
 \end{aligned}$$

Sine age can't be negative.

$$\Rightarrow \text{Lad's age} = 14 \text{ years}$$

B 28 years

C 32 years

D 42 years

QUESTION ANALYTICS



Q. 10



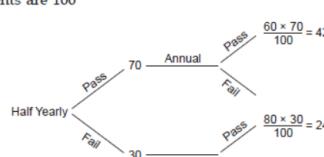
In the half yearly exam only 70% of the students were passed. Out of these (passed in half yearly) only 60% have passed the annual exam. Out of those, who did not pass the half yearly exam, 80% passed in annual exam. The percentage of students passed the annual exam \_\_\_\_%.

66

Correct Option

Solution :  
66

Let number of students are 100



Total passing percentage in annual exam =  $42 + 24 = 66$

 QUESTION ANALYTICS

+

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



Kunal Jha

 Course: GATE  
 Computer Science Engineering(CS)

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

## FULL SYLLABUS DEMO TEST : (CS) - REPORTS

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


Consider the following languages:

- $L_1 = \{a^{2^n} | n \text{ is a positive integer}\}$
- $L_2 = \{a^n b^{2n} c^n | n \geq 0\}$
- $L_3 = \{a^n b^m c^{m+k} | n, m, k > 0\}$
- $L_4 = \{(a^n)^m b^n | n, m \geq 1\}$

Which of the following are CORRECT?

- I.  $L_1$  is context-free but not regular.
- II.  $L_2$  is not context-free.
- III.  $L_3$  is deterministic context-free but not regular.
- IV.  $L_4$  is deterministic context-free.

**A** I, III and IV only

**B** II and III only

Correct Option

**Solution :**

- (b)
- $L_1 = \{a^{2^n} | n \text{ is a positive integer}\}$  is non CFL since non linear power is present on a.
  - $L_2 = \{a^n b^{2n} c^n | n \geq 0\}$  is CSL i.e. non CFL.
  - $L_3 = \{a^n b^m c^{m+k} | n, m, k > 0\}$  is DCFL because push and pop are clear and will do with single stack.
  - $L_4 = \{(a^n)^m b^n | n, m \geq 1\}$   
 $= \{a^{nm} b^n | n, m \geq 1\}$   
 $= a^n b^n + a^{2n} b^n + a^{3n} b^n + \dots \text{ i.e. infinite union of CFL is non CFL}$

**C** I and II only

**D** III and IV only

QUESTION ANALYTICS


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


Which of the following problems are decidable?

- P<sub>1</sub> : If L is a deterministic context-free language, then, is  $\bar{L}$  also deterministic context-free?  
 P<sub>2</sub> : If L is a context sensitive language, then, is  $\bar{L}$  also context sensitive?  
 P<sub>3</sub> : If L is a recursively enumerable, then, is  $\bar{L}$  also recursively enumerable?  
 P<sub>4</sub> : If L is a recursive language, then, is  $\bar{L}$  also recursive?

**A** 1, 2, 3, 4

**B** 1, 2, 4

Correct Option

**Solution :**

- (b)
- P<sub>1</sub> : DCFL is closed under complement (trivially decidable). So true  
 P<sub>2</sub> : CSL is closed under complement (trivially decidable). So true  
 P<sub>3</sub> : REL is not closed under complement (Undecidable). So false  
 P<sub>4</sub> : REC is closed under complement (trivially decidable). So true

**C** 2, 3, 4

**D** 3, 4

QUESTION ANALYTICS


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


Consider the following statements:

- S<sub>1</sub> : { $w_1 c w_2 | w_1, w_2 \in \{a, b\}^*$ ,  $w_1 \neq w_2$ } is regular language.  
 S<sub>2</sub> : { $a^n b^{n+k} | n \geq 0, k \geq 1\} \cup \{a^{n+k} b^n | n \geq 0, k \geq 3\}$  is DCFL.

 Which of the following is true about S<sub>1</sub> and S<sub>2</sub>?

**A** Only S<sub>1</sub> is correct

**B** Only S<sub>2</sub> is correct

Correct Option

**Solution :**

(D)  $S_1 : \{w_1cw_2 \mid w_1, w_2 \in \{a, b\}^*, w_1 \neq w_2\}$  is non-regular language, since  $w_1 \neq w_2$  is done by string matching, which cannot be done by finite automata.  
 $S_2 : \{a^n b^{n+k} \mid n \geq 0, k \geq 1\} \cup \{a^{n+k} b^n \mid n \geq 0, k \geq 3\}$  is DCFL, since push and pop are clear.

C Both  $S_1$  and  $S_2$  are correct

D None of  $S_1$  and  $S_2$  is correct

#### QUESTION ANALYTICS

Q. 14

Have any Doubt ?

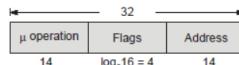
Assume that the control memory is 32 bit wide. The micro-instruction format is divided into 3 fields. A micro operation field of 14 bits specifies the micro-operations to be performed. An address selection field specifies a condition based on flags and control memory address field. There are 16 flags. How many bits are in address selection field, address field and the size of control memory in words respectively?

A 14 bits, 4 bits and 16384 C-Words

Correct Option

Solution :

(a) Control word structure:



$$\begin{aligned} \text{Control memory size} &= 2^{14} \text{ control words} \\ &= 16384 \text{ control word} \end{aligned}$$

B 14 bits, 4 bits and 8192 C-Words

C 12 bits, 4 bits and 16384 C-Words

D 14 bits, 8 bits and 1024 C-Words

#### QUESTION ANALYTICS

Q. 15

Have any Doubt ?

A certain problem is having an algorithm with the following recurrence relation:

$$T(n) = 2T\left(\frac{n}{\sqrt{2}}\right) + n, \quad T(1) = O(1)$$

How much time would the algorithm take to solve the problem?

A  $O(\log n)$

B  $O(n)$

C  $O(n \log n)$

D  $O(n^2)$

Correct Option

Solution :

(d)

$$T(n) = 2T\left(\frac{n}{\sqrt{2}}\right) + n$$

Using Master's theorem,  $a = 2, b = \sqrt{2}, f(n) = n$

$$\begin{aligned} n^{\log_2 a} &= n^{\log_2 2^2} = n^2 \\ &\Rightarrow n^2 > f(n) \\ &\Rightarrow T(n) \text{ is } O(n^2) \end{aligned}$$

#### QUESTION ANALYTICS

Q. 16

Have any Doubt ?

Consider the following propositional function:  
 $[(A \vee B) \wedge (\neg A \wedge \neg B \vee \neg C)] \vee (\neg A \wedge \neg B) \vee (\neg A \wedge \neg C)$   
Which of the following is true about above function?

A Contradiction

B Valid

Correct Option

Solution :

(b)

$$\begin{aligned} &\Rightarrow [(A' + B') ((B' + C')')] + (A' B') + (A' C') \\ &\quad \vdash \text{True in all cases} \end{aligned}$$

$$\begin{aligned}
 &\Rightarrow [(A + B)(A' + B')] + [(A + B)(A' + C)] + [(A + C)(A' + B')] \\
 &\Rightarrow [(A + B)(A + C)] + [(A' B') + (A' C')] \\
 &\frac{[(A + B)(A + C)]}{P} + \frac{[(A' B') + (A' C')]}{P'} \\
 P + P' = 1 \text{ tautology. Hence valid}
 \end{aligned}$$

**C** Satisfiable

**D** Contingency

### QUESTION ANALYTICS

Q. 17

Have any Doubt ?



What is the main reason for occurrence of RACE condition while synchronizing the processes?

- A** The two processes are trying to update the variable at the same time.
- B** More than one process entering into critical section at the same time.
- C** Mutual exclusion condition not satisfies.
- D** All of these

Correct Option

Solution :

(d)  
Meaning of all statements (a), (b), (c) are logically same. So answer is (d).

### QUESTION ANALYTICS

Q. 18

Have any Doubt ?



Which of the following statement is correct?

$S_1$  : In simple connected undirected graph no two vertices are of same degree.  
 $S_2$  : In 3 regular graph with n vertices, the maximum vertex connectivity of a graph is 3.

- A** Only  $S_1$

- B** Only  $S_2$

Correct Option

Solution :

(b)  
According to Handshaking lemma, in simple connected undirected graph atleast two vertices are of same degree. So, statement  $S_1$  is false.  
In 3 regular graph with n vertices, minimum degree is 3 and we know that  
Vertex connectivity should be  $\leq$  minimum degree.  
Vertex connectivity should be  $\leq 3$ . So  $S_2$  is true.

- C** Both  $S_1$  and  $S_2$

- D** None of the above

### QUESTION ANALYTICS

Q. 19

Have any Doubt ?



Consider the operations:

$f(X, Y, Z) = XY' + XZ'$  and  
 $g(X, Y, Z) = XYZ' + X'Z' + XY'$

Which one of the following is correct?

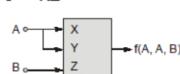
- A** Both {f} and {g} are functionally complete

Correct Option

Solution :

(a)

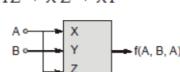
$$f(X, Y, Z) = XY' + XZ'$$



$$f(A, A, B) = AA' + AB' = A' + B' = (A \cdot B)' \text{ it is NAND operation.}$$

Hence it is functionally complete.

$$g(X, Y, Z) = XYZ' + X'Z' + XY'$$



$$f(A, B, A) = ABA' + A'A' + AB' = A' + AB'$$

$$= A' + B' = (A \cdot B)' \text{ it is NAND operation.}$$

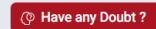
Hence it is functionally complete.

- B Only {f} is functionally complete
- C Only {g} is functionally complete
- D Neither {f} nor {g} is functionally complete

 QUESTION ANALYTICS



Q. 20

 Have any Doubt?



If the broadcast address of the subnet is given as 163.93.63.255, which of the following mask cannot suit the above address?

- A 255.255.240.0
- B 255.255.248.0
- C 255.255.128.0
- D Both (a) and (b)

Correct Option

Solution :

(c)

Broadcast address = 163.93.63.255

163 is class B

63.255 = 00111111.11111111

- (A) 240.0  $\Rightarrow$  11110000.00000000  $\Rightarrow$  12 bits are host
- (B) 248.0  $\Rightarrow$  11111000.00000000  $\Rightarrow$  11 bits are host
- (C) 128.0  $\Rightarrow$  10000000.00000000  $\Rightarrow$  15 bits are host

15 bits of host remains '0's' so all 15 bits should be 1's in broadcast address, this condition is violating

So 255.255.128.0 cannot suit as mask.

Item 11-20 of 65 [« previous](#) [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [next »](#)



Kunal Jha

 Course: GATE  
 Computer Science Engineering(CS)

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

### FULL SYLLABUS DEMO TEST : (CS) - REPORTS

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


$$\lim_{x \rightarrow 0} \left( \frac{4e^{4x} - 4}{\sin(2x)} \right) \text{ is equal to } \underline{\hspace{2cm}}$$

**A** 8

[Correct Option](#)
**Solution :**

(a)

$$\lim_{x \rightarrow 0} \left( \frac{4e^{4x} - 4}{\sin(2x)} \right) \text{ it is of form } \left( \begin{matrix} 0 \\ 0 \end{matrix} \right)$$

Applying L Hospital's rule

$$\begin{aligned} & \lim_{x \rightarrow 0} \frac{16e^{4x}}{2 \cos(2x)} \\ &= \frac{16}{2} = 8 \end{aligned}$$

**B** 16

**C** 4

**D** Limit does not exist

QUESTION ANALYTICS


**Q. 22**
[Have any Doubt ?](#)


Consider the following CFG:

 $S \rightarrow (L)|aL$ 
 $L \rightarrow SL|b$ 
 $L' \rightarrow x SL'| \in$ 

Which of the following represents FOLLOW(L) and FIRST(L)?

**A** FOLLOW(L) = {}, \$  
 FIRST(L) = {a, b}

[Correct Option](#)
**B** FOLLOW(L) = {x, }, \$  
 FIRST(L) = {, a, b}

**Solution :**

(b)

- FOLLOW(L) = {}, FOLLOW(S)
- FOLLOW(S) = FIRST(L') = {x, FOLLOW(S)} = {x, \$}
- FOLLOW(L) = { }, x, \$
- FIRST(L) = [FIRST(S), b]
- FIRST(S) = [ , a]
- FIRST(L) = [ , a, b]

**C** FOLLOW(L) = {}, \$  
 FIRST(L) = {, a}

**D** FOLLOW(L) = {x, }, \$  
 FIRST(L) = {, a, b, ∈}

QUESTION ANALYTICS


**Q. 23**
[Have any Doubt ?](#)


An AVL tree is constructed by inserting the following sequence of elements into empty AVL tree. After building AVL tree, if a root element is deleted from it and after stabilizing of AVL again root element is deleted then which of the following represent the preorder of resulted AVL tree (replace root by using inorder predecessor)?  
 17, 14, 19, 16, 15, 18, 13

**A** 13, 14, 15, 18, 19

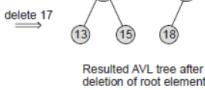
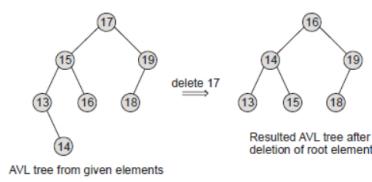
**B** 13, 14, 18, 19, 15

**C** 16, 13, 14, 19, 18

D 15, 14, 13, 19, 18

Correct Option

**Solution :**  
(d)



delete 17

Resulted AVL tree after deletion of root element

Resulted AVL tree after deletion of root element

delete 16

Resulted AVL tree after deletion of root element

QUESTION ANALYTICS



Q. 24

Have any Doubt?



A bag contains 40 tickets numbered 1, 2, 3, ..., upto 40. Among them 4 are drawn at random and arranged in ascending order  $t_1 < t_2 < t_3 < t_4$ . The number of possible order when  $t_3$  being 25 are \_\_\_\_\_.

4140

Correct Option

**Solution :**  
4140

Assume  $t_3$  is 25. There are 24 cards preceding 25.  
 $t_1$  and  $t_2$  can be chosen from these 24 cards  ${}^{24}C_2$  ways.  
 $t_4$  should be greater than 25.  
Number of such cards = 15

∴ Number of ways of choosing  $t_4$  =  ${}^{15}C_1$   
∴ Favourable outcomes =  ${}^{24}C_2 \times {}^{15}C_1 = 4140$

QUESTION ANALYTICS



Q. 25

Have any Doubt?



Consider the following relational schema:  
 $R(A, B, C, D, E, F, G, H)$  with FD set  $\{AB \rightarrow C, AC \rightarrow B, AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow G\}$  the following relations are sub relations of the relation R.  
1.  $R_1(A, B, C)$   
2.  $R_2(A, B, C, D)$   
3.  $R_3(A, B, C, E, G)$   
The number of sub relation are in BCNF \_\_\_\_\_.

1

Correct Option

**Solution :**  
1

$R_1(ABC)$	$R_2(ABCD)$	$R_3(ABCDEG)$
FD set $\{AB \rightarrow C$ $BC \rightarrow A$ $AC \rightarrow B\}$ BCNF	$AB \rightarrow CD$ $BC \rightarrow AD$ $AC \rightarrow BD$ $B \rightarrow D$ Not BCNF	$AB \rightarrow CEG$ $BC \rightarrow AEG$ $AC \rightarrow BEG$ $E \rightarrow G$ Not BCNF

QUESTION ANALYTICS



Q. 26

Have any Doubt?



A non-pipelined processor has a clock rate of 4 GHz and an average CPI of 5. An upgradation to the processor introduced a six stage pipeline. However due to internal pipeline delays the clock rate of the new processor has to reduced 2 GHz. Then the speed up is \_\_\_\_\_. (Upto 1 decimal)

2.5 [2.3 - 2.7]

Correct Option

**Solution :**  
2.5 [2.3 - 2.7]

$$\text{Cycle time} = \frac{1}{\text{Frequency}}$$

$$\begin{aligned} ET_{\text{nonpipe}} &= \text{Avg CPI} \times \text{Cycle time} \\ &= 5 \times \frac{1}{4 \times 10^9} = \frac{5}{4} \text{nsec} \end{aligned}$$

$$\begin{aligned}
 &= 1.25 \text{ nsec} \\
 ET_{\text{pipe}} &= \text{Avg CPI} \times \text{Cycle Time} \\
 &= 1 \times \frac{1}{2 \times 10^9} = 0.5 \text{ ns} \quad (\because \text{Avg CPI of pipeline} = 1) \\
 \text{Speedup} &= \frac{ET_{\text{nopipe}}}{ET_{\text{pipe}}} = \frac{1.25 \text{ nsec}}{0.5 \text{ nsec}} = 2.5
 \end{aligned}$$

QUESTION ANALYTICS



Q. 27

Have any Doubt ?



Consider the following recursive function which is used by dynamic programming:

$$T(n) = \begin{cases} 0 & \text{if } n < 1 \\ 1 & \text{if } n = 1 \\ T(n-1) + T(n-2) + 1 & \text{if } n > 1 \end{cases}$$

Assume for every function call  $T(i)$  it checks the table first, if its value is already computed it retrieves the value from table. Otherwise it calls a recursive function call to compute its return value. Whenever a function  $T(i)$  computes for first time its return value is stored in the table to avoid the redundant function calls. If system allocated 48 bytes for stack allocation, then the maximum value of 'n' so that overflow cannot occur \_\_\_\_\_. (Assume system allocate 4 byte to each stack entry which is sufficient for storing required data.)

12

Correct Option

Solution :

12

Given recurrence relation calculate Fibonacci number, with dynamic programming we can calculate each function call only one time so maximum number of function call before stack overflow:

$48 = n \times 4$

$n = 12$

QUESTION ANALYTICS



Q. 28

Have any Doubt ?



The eigen value of matrix  $A = \begin{bmatrix} 4 & 1 & 2 \\ 17 & 2 & 1 \\ 14 & -4 & 10 \end{bmatrix}$  correspond to eigen vector  $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$  is \_\_\_\_\_.  
Correct Option

12

Correct Option

Solution :

12

We know that,  $AX = \lambda X$

Here X is eigen vector

$$\begin{aligned}
 \text{So, } \begin{bmatrix} 4 & 1 & 2 \\ 17 & 2 & 1 \\ 14 & -4 & 10 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} &= \lambda \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \\
 \begin{bmatrix} 12 \\ 24 \\ 36 \end{bmatrix} &= \lambda \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}
 \end{aligned}$$

i.e.

$$\begin{bmatrix} 12 \\ 24 \\ 36 \end{bmatrix} = \lambda \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

$$\lambda = 4 + 2 + 6$$

$$\lambda = 12$$

QUESTION ANALYTICS



Q. 29

Have any Doubt ?



Consider four process (process id 0, 1, 2) with burst time 2, 4, 6 times units. All processes are arrive at time zero. Consider the longest remaining time first scheduling. In LRTF ties are broken by following highest process id. The average waiting time is \_\_\_\_\_. (Upto 1 decimal places)

7.0

Correct Option

Solution :

7.0

Gantt chart using LRTF:

2	2	1	2	1	2	1	0	2	1	0
0	2	3	4	5	6	7	8	9	10	11

Process id	Burst Time	Completion	TAT	W.T.
0	2	12	12	10
1	4	11	11	7
2	6	10	10	4
Average W.T. = $21/3 = 7$				

QUESTION ANALYTICS



The characteristics of RISC architecture is/are

A Relatively few instructions.

Correct Option

B Relatively more addressing modes.

C Use of overlapped register windows to speed-up procedure call and return.

Correct Option

D Memory access limited to load and store instructions.

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,c,d

STATUS - SKIPPED

Solution :

(a, c, d)

QUESTION ANALYTICS

+



Kunal Jha

 Course: GATE  
 Computer Science Engineering(CS)

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

## FULL SYLLABUS DEMO TEST : (CS) - REPORTS

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

 For two relations  $R(A, B, C)$  and  $S(D, E)$ , relation  $S$  maintains a foreign key for  $D$  on attribute  $A$  of relation  $R$ . Consider the following statements:

- (a) Each record of  $R$  is related to 0 or more records of  $S$ .
  - (b) Each record of  $S$  is related to 0 or more records of  $R$ .
  - (c) Each record of  $S$  is related to 0 or 1 record of  $R$ .
  - (d) Each record of  $R$  is related to 0 or 1 record of  $S$ .
- Which of the following is/are true?

 A a

Correct Option

 B b

 C c

Correct Option

 D d

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

**Solution :**

(a, c)  
 Option (a) is correct because relation  $S$  is allowed to take only those values which are part of relation  $R$ . Hence,  $R$  is related to 0 or more records of  $S$ . Option (c) is correct, since relation  $S$  is going to have only those values which are part of  $R$ . Hence, it is related to only 1 value of  $R$ . But the field with NULL is related to 0 value of  $R$ . Hence, option (b) and (d) are false.

QUESTION ANALYTICS


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


Exceptions are caused by

 A Page fault

Correct Option

 B When device finishes I/O.

 C When timer fires.

 D When a user attempts to write to read only page.

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,d

STATUS - SKIPPED

**Solution :**

(a, d)  
 Exceptions are caused by software executing instructions.  
 Example - a page fault, or an attempted write to read only page.  
 Interrupts are caused by hardware devices.  
 Example - when devices finishes I/O, timer fires.

QUESTION ANALYTICS


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


Which of the following is/are true?

 A  $f(n) + g(n) = O(f(n))$  if  $g(n) = O(f(n))$ 

Correct Option

 B  $\log(\log^* n) > \log^*(\log n)$ 
 C  $n^{\log \log n} = (\log n)^{\log n}$ 

Correct Option

 D  $n \log \log n = (\log n)!$ 

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

**Solution :**

(a,c)  
 • Statement (a) is true.

- Let  $f(n) = 2^{2^{n^2}}$  1000 times

$\log^* n = 1000$  and  $\log f(n) = 2^{2^{1000-2}} \text{ times}$   
 $\log(\log^* n) \approx 10$  So  $\log(\log^* n) > \log^*(\log n)$   
 So statement (b) is false.  
 •  $n^{\log \log n} = (\log n)^{\log n}$   
 $n^{\log(\log n)} \Rightarrow (\log n)^{\log n}$   
 So statement (c) is correct.  
 • Statement (d) is false because  $(\log n)! = O(\log n)^{\log n}$

QUESTION ANALYTICS



Q. 34

Have any Doubt ?



The number of balance parenthesis possible with 5-pairs of parenthesis \_\_\_\_\_. [Assume () and (( )) is balance parenthesis but not )().]

42

Correct Option

Solution :

Number of possible balance parenthesis = Number of binary search tree

$$\text{Number of binary search tree} = \frac{2nC_n}{n+1} \quad \dots(i)$$

Put value of  $n = 5$  in equation (i)

$$\begin{aligned} \text{Number of binary search tree} &= \frac{2 \times 5 C_5}{5+1} = \frac{10 C_5}{6} \\ &= \frac{1}{6} \times \frac{10 \times 9 \times 8 \times 7 \times 6 \times 5!}{5 \times 5!} = 42 \end{aligned}$$

QUESTION ANALYTICS



Q. 35

Have any Doubt ?



In IPv4, a router is sending IP packets whose total length (data + header) is 2048 bytes. Assuming that packet lifetime is 10 sec, the maximum data line speed router can operate at without wrap around of identification number of datagram \_\_\_\_\_ (in Mbps). (Upto 2 decimal places)

107.37 [107.30 - 107.40]

Correct Option

Solution :

107.37 [107.30 - 107.40]

Packet length = 2048 bytes

Packet lifetime = 10 sec

In IPv4 number of packet that can be identify uniquely at per time =  $2^{16} = 65536$

Maximum 65536 packet may be present in 10 sec

So, in 1 sec =  $65536 \div 10 = 6553.6$

So, data line speed = (Number of byte/packet)  $\times$  (Number of packet/seconds)  $\times$  (Number of bits/bYTE)

$$= 2048 \times 6553.6 \times 8$$

$$= 107374182.4 \text{ bits/sec}$$

In Mbps = 107.37

QUESTION ANALYTICS



Q. 36

Have any Doubt ?



Consider the following code for single linked list:  
 Struct void Modified (Struct node \*\* head)

```
{
    Struct node * X = *head;
    Struct node * Y;
    Struct node * Z = NULL;
    while (X != NULL)
    {
        Y = X -> next;
        X -> next = Z;
        Z = X;
        X = Y;
    }
    *head = Z;
}
```

If head is a pointer to a pointer to the first node of the list and it is passed to the 'Modified' function then find the list after executing the function.

A It adds a new node at the first

B It adds a new node at the last

C It keeps the list as same

D It reverses the list

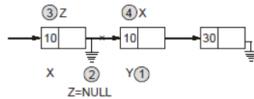
Correct Option

Solution :

(d)

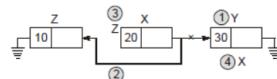
Assume initially X is pointing to the first node.

1.  $Y = X \rightarrow next;$
2.  $X \rightarrow next = Z;$
3.  $Z = X;$
4.  $X = Y;$

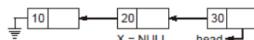


In the first iteration of loop, list is modified as above.

In the second iteration of the loop, second node next is the first, which is shown below.



Similarly after the third iteration, 3<sup>rd</sup> node next is the second node. After the third iteration the list is reversed as following.



While loop exit due to  $X = NULL$  and finally executes  $*head = Z$ , so head will be double pointer to the node 30.

∴ list is reversed.

QUESTION ANALYTICS

+

Q. 37

Have any Doubt ?

Q

Consider the following last level order strategy for traversing a binary tree:

- Visit right sub tree using last level order.
- Visit left sub tree using last level order.
- Visit root.

Assume  $\uparrow$  is power operator and it has the highest precedence and follows right associativity.

The last level order traversal of expression tree corresponding to the given postorder traversal is

7 7 1 ↑ 7 1 \* / + 7 -

A 7, 1, 7, \*, 1, 7, ↑, 7, /, +, -

B 7, -, 1, \*, 7, /, 1, ↑, 7, +, 7

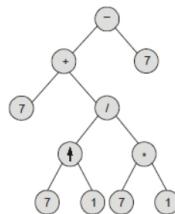
C 7, 1, 7, \*, 1, 7, ↑, /, 7, +, -

Correct Option

Solution :

(c)

Expression tree equivalent to given postorder traversal:



Equivalent last level traversal is 7, 1, 7, \*, 1, 7, ↑, /, 7, +, -

D 7, 7, 1, \*, 1, 7, ↑, /, 7, +, -

QUESTION ANALYTICS

+

Q. 38

Have any Doubt ?

Q

Consider the following statements:

S<sub>1</sub> : When a strict routing has been specified by the source but can't be followed by the intermediate routers, such events will not be reported by ICMP.

S<sub>2</sub> : Two distinct webpages (for eg. www.madeeasy.in/student.html and www.madeeasy.in/ course.html) can not be sent over the same persistent connection.

Which of the above statements are true?

A Only S<sub>1</sub>

B Only S<sub>2</sub>

C Both S<sub>1</sub> and S<sub>2</sub>

D None of these

Correct Option

Solution :

(d)

$S_1$  : When a strict routing has been specified by the source but can't be followed by the intermediate routers, such events will be reported by ICMP.

$S_2$  : Since persistent HTTP leaves connection open if connection is not timeout. So we can send more webpages over persistent HTTP connection.

### QUESTION ANALYTICS

Q. 39

? FAQ Have any Doubt ?



Consider the following synchronization construct used by the processes  $P_1$ ,  $P_2$  and  $P_3$ . The  $S_1$ ,  $S_2$  and  $S_3$  are counting semaphore variables:

$S_1 = 3$ ,  $S_2 = 2$ ,  $S_3 = 1$ ;

$P (S_1);$

$P (S_2);$

$P (S_3);$

#### Critical section

$V (S_3);$

$V (S_2);$

$V (S_1);$

Which of the below statement is true?

A It satisfies mutual exclusion and progress but not bounded waiting.

B It satisfies both progress and bounded waiting but not mutual exclusion.

C It satisfies mutual exclusion and bounded waiting but not progress.

D It satisfies all the mutual exclusion, progress and bounded waiting.

Correct Option

#### Solution :

(d)

It satisfies all the M.E. progress, bounded waiting, because the order of counting semaphore down operations are accordingly performed.

### QUESTION ANALYTICS

Q. 40

Have any Doubt ?



In a computer system, three files of size 11052 B, 4992 B and 5172 B need to be stored. For storing these files on disk, we can use either 100 B disk block or 200 B disk block. For each block used to store a file, 2 bytes of book keeping information also needs to be stored on the disk. Thus, the total space used to store a file is the sum of space taken to store the file and space taken to store the book keeping information for the blocks allocated for storing the file. A disk block can store either book keeping information for a file or data from a file, but not both. What is the total space required for storing the files using 100 B and 200 B disk blocks respectively.

A 21800 B, 22240 B

B 21700 B, 22000 B

C 21900 B, 22000 B

Correct Option

#### Solution :

(c)

100 B			
File size	100 B block	Bytes needed for Book keeping	Block for Information
4992	50	100	1
5172	52	104	2
11052	111	222	3
Total	213		6

$$\text{Space} = 213 \times 100 + 6 \times 100 = 21300 + 600 = 21900 \text{ B}$$

200 B			
File size	200 B block	Bytes needed for Book keeping	Block for Information
4992	25	50	1
5172	26	52	1
11052	56	112	1
Total	107		3

$$\text{Space} = 107 \times 200 + 3 \times 200 = 22000 \text{ B}$$

D 21800 B, 22200 B

### QUESTION ANALYTICS



Kunal Jha

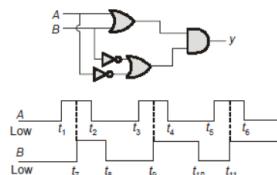
 Course: GATE  
 Computer Science Engineering(CS)

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

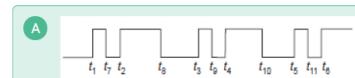
## FULL SYLLABUS DEMO TEST : (CS) - REPORTS

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


The input to the circuit are shown below:



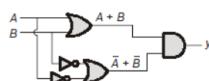
The output waveform y will be the form



Correct Option

**Solution :**

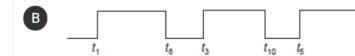
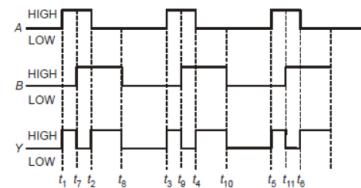
(a)



$$= (A + B)(\bar{A} + \bar{B})$$

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

$$= A \oplus B$$

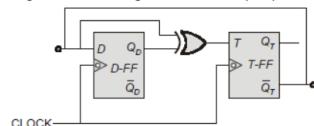


(D) None of the above

**QUESTION ANALYTICS**

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


A digital circuit is designed with one D-flip flop and one T-flip flop.


 The initial value of  $Q_D Q_T = 00$ , then after how many clock pulses, the  $Q_D Q_T = 10$  will appear

**A** 4

**B** 6

**C** 8

**D** Never

Correct Option

**Solution :**  
 (d)

	$Q_D$	$Q_T$	FFD	FFT
Clock pulse	0	0	$D = \bar{Q}_T$	$T = \bar{Q}_T \oplus Q_D$

1	1	1	0	1
2	0	0	1	1
3	1	1	0	1
4	0	0		

So, output will either be 00 or 11 and never 10.

#### QUESTION ANALYTICS

Q. 43

Have any Doubt ?



Consider a scenario of modified quick sort, where we have given an input sorted array  $A[1 \dots n]$ , all elements of array are distinct and  $n \geq 3$ . Pivot is the median of set of 3 elements [First element, middle element, and last element]. What will be worst case time complexity of modified quick sort?

A  $O(n^2)$

B  $O(n \log n)$

Correct Option

Solution :

(b)

Since the given array is sorted to find the first middle and last element will take constant time i.e.,  $O(1)$ .

The median of these three elements will be found in  $O(1)$  time which will be the pivot element.

The selected pivot element will divide the given array in two parts each contain approx  $n/2$  elements.

So, the recurrence relation

$$T(n) = 2T(n/2) + O(n) \quad [\because \text{For portions} = O(n)]$$

After solving the recurrence we get  
 $= O(n \log n)$

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

D  $O(n \log \log n)$

#### QUESTION ANALYTICS

Q. 44

Have any Doubt ?



Let  $a$  be an array containing  $n$  integers in decreasing order. The following algorithm determines whether there are two distinct numbers in the array whose difference is a specified number where  $S > 0$ .

```
i = 0; j = 1;
while (j < n)
{
    if(E) j++;
    else if(a[i] - a[j] == S) break;
    else i++;
}
if (j < n) printf("yes");
else printf("no");
```

Which of the following is correct expression for E?

A  $a[j] - a[i] > S$

B  $a[j] - a[i] < S$

C  $a[i] - a[j] < S$

Correct Option

Solution :

(c)

Since, the numbers are arranged in decreasing order. So, the number at 0<sup>th</sup> index will be the largest.

Suppose the array with elements is given below:

5	4	3	2	1
0	1	2	3	4

Take  $S = 4$  (difference between 2 elements is 4)

$$i = 0, j = 1$$

So,  $a[i] = 5; a[j] = 4; a[i] - a[j] = 1$

Since,  $S = 1$  so we have to increment the value of  $j$  which will point the next element of the array.

Until our requirement  $a[i] - a[j] == 4$  not satisfied we have to move right side of the given array.

If such 2 elements are not present in array then  $a[i] - a[j] < S$  becomes false and program will return no i.e., elements not found.

So, the correct option is (c).

D  $a[i] - a[j] > S$

#### QUESTION ANALYTICS

Q. 45

Have any Doubt ?



In an weighted, directed connected graph, the shortest path between every pair of nodes in graph is computed most efficiently in terms of running time complexity, is given by which of the following algorithm?

- A Applying DFS algorithm
- B Applying Dijkstra's algorithm
- C Applying Bellman-ford algorithm
- D Applying Floyd-Warshall algorithm

Correct Option

**Solution :**

- (d)  
 Floyd-Warshall algorithm takes  $O(V^3)$  time.  
 Find minimum distance between 1-adjacent node take  $O(V^2)$ .  
 So for finding minimum distance between every pair of node it takes =  $V \times O(V^2) = O(V^3)$ .
- Since DFS applying only on unweighted, undirected graph.
  - Dijkstra algorithm fail when graph contain negative edge weight cycle and use only for find minimum distance from single source node to every other node.
  - Bellman-Ford algorithm fail since it find shortest distance from one node to every other node.

 QUESTION ANALYTICS



Q. 46





Consider Relational Schema  $R(A, B, C)$  and  $S(A, B, C)$ . (Consider the following queries given below)

1. Select \*  
 FROM R  
 Where  $(A, B, C)$  in (Select \*  
 FROM S)
2. Select \*  
 FROM R  
 Where EXISTS (Select \*  
 FROM S  
 Where  $R \cdot A = S \cdot A$  and  $R \cdot B = S \cdot B$  and  $R \cdot C = S \cdot C$ )
3. Select \*  
 FROM R  
 Where  $(A, B, C)$  NOT IN ((Select \*  
 FROM R  
 Where  $(A, B, C)$  NOT IN (Select \*  
 FROM S)))

Which of the following SQL expressions equal to  $R \cap S$ ?

- A Only 1
- B Only 1 and 2
- C Only 2 and 3

- D All 1, 2, 3

Correct Option

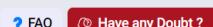
**Solution :**

- (d)  
 All the three SQL queries represents  $R \cap S$ .

 QUESTION ANALYTICS

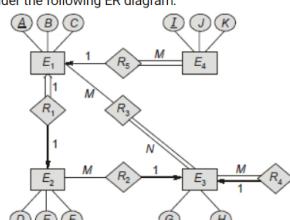


Q. 47

FAQ 



Consider the following ER diagram:



What is the minimum number of tables required to represents above ER diagram?

- A 3

- B 4

Correct Option

**Solution :**  
 (b)

$E_1(ABC)$	$E_1R_1E_2R_2(ABCD EFG)$
$R_1(A D)$	G foreign key
$E_2(DEF)$	
$R_2(D G)$	

$R_3(I J K)$	$E_1R_3(E_4(I J K))$
$E_4(G H)$	

$R(G_1, G_2) \vdash R_4(G_1, G_2)$

$R_3(A) \vdash R_3 E_i(\Delta L/K)$

$E_i(\Delta L/K) \vdash A \text{ foreign key}$

C 5

D 6

QUESTION ANALYTICS

+

Q. 48

Have any Doubt ?

Q

Consider the following statements:

$S_1$  : Static allocation can not support recursive function.

$S_2$  : Stack allocation can support pointers but can not deallocate storage at run-time.

$S_3$  : Heap allocation can support pointers and it can allocate or deallocate storage at run-time.

Which of the above statements are true?

A  $S_1$  and  $S_2$

B  $S_2$  and  $S_3$

C  $S_3$  and  $S_1$

Correct Option

Solution :

- (c)
- Since, static allocation is done for all objects at compile time and in case of recursion, it's not possible for compiler to decide as depth of recursion depends on recursion parameter. So recursive functions can't be implemented with static storage allocation.
  - Stack allocation can support pointers and with help of pointers it can allocate and deallocate dynamic variables and hence can manage runtime storage.
  - Heap allocation can also manage runtime storage and dynamic memory allocation with help of pointers.

D  $S_1, S_2$  and  $S_3$

QUESTION ANALYTICS

+

Q. 49

Have any Doubt ?

Q

Consider the following grammar:

$S \rightarrow A + A | A$

$A \rightarrow AB | B$

$B \rightarrow a | b$

Which of the given options is true regarding the grammar?

A Grammar is LL(1) but not LR(0)

B Grammar is not LR(0) but it is LL(1)

C Grammar is both LR(0) as well as LL(1)

D Grammar is neither LR(0) nor LL(1)

Correct Option

Solution :

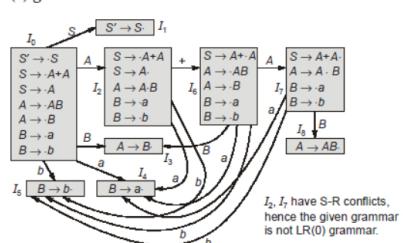
(d)

Checking for LL(1) grammar:

$$\begin{aligned} \text{Since first (s)} &= \text{First (A+A)} \cap \text{First (A)} \\ &= \text{First (A)} \cap \text{First (A)} \\ &= \{a, b\} \cap \{a, b\} \\ &= \{a, b\} \neq \{\epsilon\} \end{aligned}$$

So, grammar is not LL(1).

Checking for LR(0) grammar:



So, the given grammar is neither LR(0) nor LL(1).

QUESTION ANALYTICS

+

What is the number of seven digit integers possible with sum of the digits equal to 11 and formed by using the digits 1, 2 and 3 only?

A 210

B 49

C 161

Correct Option

Solution :

(c)

$$x_1 + x_2 + x_3 + \dots + x_7 = 11$$

$$1 \leq x_i \leq 3 \text{ and } (1 \leq i \leq 7)$$

$$\text{Coefficient } x^{11} \Rightarrow (x^1 + x^2 + x^3)^7$$

$$\text{Coefficient } x^{11} \Rightarrow x^7(1 + x + x^2)^7$$

$$\text{Coefficient } x^4 \Rightarrow (1 + x + x^2)^7$$

$$\text{Coefficient } x^4 \Rightarrow \left( \frac{1-x^3}{1-x} \right)^7$$

$$\text{Coefficient } x^4 \Rightarrow \sum_{r=0}^7 {}^7C_r (-x^3)^r \times \sum_{r=0}^{\infty} {}^{7-1+r}C_r x^r$$

$$\Rightarrow {}^7C_0 \times {}^{10}C_4 - {}^7C_1 {}^7C_1$$

$$\text{Coefficient } x^4 \Rightarrow 210 - 49$$

$$\Rightarrow 161$$

D 259

QUESTION ANALYTICS

+



Kunal Jha

 Course: GATE  
 Computer Science Engineering(CS)

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

## FULL SYLLABUS DEMO TEST : (CS) - REPORTS

[OVERALL ANALYSIS](#)
[COMPARISON REPORT](#)
[SOLUTION REPORT](#)
[ALL\(65\)](#)
[CORRECT\(0\)](#)
[INCORRECT\(0\)](#)
[SKIPPED\(65\)](#)
**Q. 51**
[Have any Doubt ?](#)


Identify the language generated by the following grammar, where S is the start variable:

$$S \rightarrow aSc \mid TB$$

$$T \rightarrow aTb \mid \epsilon$$

$$B \rightarrow bb \mid cc \mid bc$$

**A**  $\{a^n b^m c^p \mid n = m + p - 2; n, m, p \geq 1\}$

[Correct Option](#)
**Solution :**

(a)

$$S \rightarrow aSc \mid TB \Rightarrow a^m [a^q b^q (bb + cc + bc)] c^m$$

$$T \rightarrow aTb \mid \epsilon \Rightarrow T \rightarrow (a^n b^n)$$

$$B \rightarrow bb \mid cc \mid bc \Rightarrow [bb + cc + bc]$$

Which is same as:

$$= a^m [a^q b^q (bb + cc + bc)] c^m$$

$$= a^{m+q} b^{q+2} c^m + a^m + q b^q c^{m+2} + a^m + q b^q + 1 c^{m+1}$$

$$= \{a^n b^m c^p \mid n = m + p - 2; n, m, p \geq 1\}$$

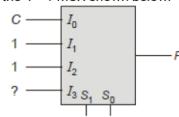
**B**  $\{a^n b^m c^p \mid n = m + p + 2; n, m, p \geq 1\}$

**C**  $\{a^n b^m c^p \mid n = m + p + 1; n, m, p \geq 1\}$

**D**  $\{a^n b^m c^p \mid n = m + p - 1; n, m, p \geq 1\}$

### QUESTION ANALYTICS


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

 For the  $4 \times 1$  MUX shown below:

 If the output  $F = A + B + C$ , then  $I_3$  will be

**A** A

[Correct Option](#)
**Solution :**

(a)

$$\begin{aligned} F &= \bar{S}_1 \bar{S}_0 I_0 + \bar{S}_1 S_0 I_1 + S_1 \bar{S}_0 I_2 + S_1 S_0 I_3 \\ &= \bar{A}\bar{B}C + \bar{A}B \cdot 1 + A\bar{B}1 + AB\bar{I}_3 \\ &= \bar{A}\bar{B}C + \bar{A}B + A\bar{B} + AB\bar{I}_3 \\ &= B(\bar{A} + AI_3) + \bar{B}(\bar{A}C + A) \\ &= B(\bar{A} + I_3) + \bar{B}(A + C) \end{aligned}$$

... (i)

$$\begin{aligned} \text{Let } I_3 &= A, & F &= B(A + \bar{A}) + \bar{B}(A + C) = B + \bar{B}(A + C) \\ && &= (B + \bar{B})(A + B + C) \\ && &= A + B + C \end{aligned}$$

 Let  $I_3 = C$ ,

$$\begin{aligned} \therefore F &= B(\bar{A} + C) + \bar{B}(A + C) \\ &= \bar{A}B + BC + A\bar{B} + C\bar{B} \\ &= \bar{A}B + C + A\bar{B} \neq A + B + C \end{aligned}$$

 Let  $I_3 = 0$ ,

$$\begin{aligned} \therefore F &= B(\bar{A} + 0) + \bar{B}(A + C) \\ &= \bar{A}B + A\bar{B} + \bar{B}C \neq A + B + C \end{aligned}$$

**B** 0

**C** C

**D** All of the above

### QUESTION ANALYTICS


**Q. 53**
[Have any Doubt ?](#)


Consider the following schedule with data item  $x$ .

$S : W_1(x), R_2(x), W_3(x), R_4(x), W_5(x), R_6(x), W_7(x), R_8(x)$

The number of serial schedules which are view equal to schedule(s) but not conflict equal to schedule(s) are \_\_\_\_\_.

5

Correct Option

Solution :

5

$$S : [W_1(x)R_2(x)] [W_3(x)R_4(x)] [W_5(x)R_6(x)] [W_7(x)R_8(x)]$$

$W_7(x) R_8(x)$  must execute last but  $W_1 - R_2, W_3 - R_4, W_5 - R_6$ , write-read sequence can execute in any order. Total  $3! = 6$  view equal serial schedules for  $S$  and only one conflict equal serial schedule for  $S$ . So, total 5 serial schedules of  $S$  which are view equal but not conflict equal.

QUESTION ANALYTICS



Q. 54

Have any Doubt ?



Consider Host-A want to transmit data of size 105000 B to Host-B. The communication between Host-A and Host-B is bidirectional with bandwidth of link between them is 100 Mbps in both direction. Data will be transferred in packet of size 1500 Byte and header size is 40 B. The size of ACK packet is 40 B including header and ACK is generated for every received packet. Propagation time between Host-A and Host-B is 5 msec. Assume all other time are negligible i.e. process time. The throughput for this transfer if stop wait protocol with pipelining is used \_\_\_\_\_ (in Kbps)

144.06

Correct Option

Solution :

144.06

Each packet can hold data = 1500 B - 40 B = 1460 B

$$\text{So number of packet needed} = \left\lceil \frac{105000}{1460} \right\rceil = 71$$

$$\text{i.e. } (71 \times 1460 + 1340)B = 105000 B$$

Transmission time:

$$\text{For 1460 B packet} = \frac{(1460 \times 8) \text{ Bits}}{100 \text{ Mbps}} = 0.12 \text{ msec}$$

$$\text{For 40 B ACK} = \frac{40 \times 8 \text{ Bits}}{100 \text{ Mbps}} = 0.0032 \text{ msec}$$

$$\text{For 1340 B packet} = \frac{(1340 \times 8) \text{ Bits}}{100 \text{ Mbps}} = 0.1104 \text{ msec}$$

$$\text{So, 1 RTT time} = 2 \times \text{Propagation time} + \text{TT (1460 B)} + \text{TT (40 B)}$$

$$= 2 \times 5 \text{ msec} + 0.12 + 0.0032$$

$$= 10.1232 \text{ msec}$$

$$\text{Total time} = (10.1232 \times 71) + 5 + 0.1104 + 5 + 0.0032 \text{ msec}$$

$$= 728.8608 \text{ msec}$$

$$\text{So, throughput} = \frac{\text{Total data}}{\text{Total time}}$$

$$= \frac{105000 \text{ B}}{728.80 \text{ msec}} = \frac{105000 \text{ B}}{728.80} = 144.06 \text{ Kbps}$$

QUESTION ANALYTICS



Q. 55

Have any Doubt ?



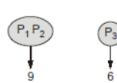
Consider a scenario where 3 processes  $P_1, P_2$  and  $P_3$  are sharing ' $x$ ' resources of the same type. The maximum need of the three processes is 4, 8, 6. It is also known that the maximum combined need of both processes  $P_1$  and  $P_2$  at a time is 9 and they always execute only in combined manner. Then the value of  $x + 7$  is \_\_\_\_\_.

21

Correct Option

Solution :

21



So number of process required for no deadlock

$$= 8 + 5 + 1 = 14$$

$$x + 7 = 14 + 7 = 21$$

QUESTION ANALYTICS



Q. 56

Have any Doubt ?



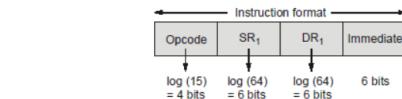
Consider a computer has 64 registers and support 15 different instructions. Each instruction has 4 fields i.e. opcode, source register, destination register and immediate value of 6 bits. If each instruction in byte aligned and 50 instructions are present in memory, then the size of memory needed to store these instructions are \_\_\_\_\_ (in byte).

150

Correct Option

Solution :

150



So, instruction size =  $4 + 6 + 6 + 6$   
 $= 22$  bits

1 instructions are byte aligned = 3 bytes  
So, for 50 instructions needed =  $3 \times 50 = 150$  B

#### QUESTION ANALYTICS

Q. 57

Have any Doubt?

Consider the following floating point format:



The single precision normalized value BEC00000, has equivalent decimal number representation is \_\_\_\_\_. (Upto 3 decimal places).

-0.375 (-0.370 - -0.378)

Correct Option

Solution :

-0.375 (-0.370 - -0.378)  
Normalized value is : BEC00000

Sign	Exponent	Mantissa
1	01111101	100 0000 0000 0000 0000 0000

$$\begin{aligned} \text{Exponent field} &= (01111101)_2 = (125)_{10} \\ \text{True binary exponent} &= \text{Biased exponent} - \text{Bias} \\ &= 125 - 127 \quad [\because 2^8 - 1 = 127] \\ &= -2 \end{aligned}$$

$$\begin{aligned} \text{Mantissa field} &= 100 0000 0000 0000 0000 0000 \\ \text{Adding hidden bit} &= 1.100 0000 0000 0000 0000 0000 \\ &= 1.1 \times 2^{\text{exponent (True)}} \\ &= (1.1 \times 2^{-2}) \\ &= 0.011 \\ &= (0.125 + 0.25) \\ &= 0.375 \text{ decimal} \end{aligned}$$

Since sign bit is 1, so decimal value = -0.375.

#### QUESTION ANALYTICS

Q. 58

Have any Doubt?

Consider the following table:

Character	a	b	c	d
Frequency	14	3	6	10

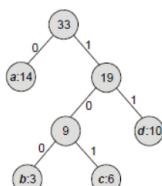
The number of bits that are needed to encode a string containing 14 a's, 3 b's, 6 c's and 10 d's using the Huffman coding are \_\_\_\_\_.

61

Correct Option

Solution :

61



$$\begin{aligned} a &= 0, b = 100, c = 101, d = 11 \\ 14 \text{ a's} + 3 \text{ b's} + 6 \text{ c's} + 10 \text{ d's} &= 14 \times 1 + 3 \times 3 + 6 \times 3 + 10 \times 2 \\ &= 14 + 9 + 18 + 20 = 61 \end{aligned}$$

#### QUESTION ANALYTICS

Q. 59

Have any Doubt?

Which of the following statement(s) is/are correct for deadlock avoidance algorithm.

A Every unsafe system leads to deadlock

Correct Option

B Every deadlock system implies unsafe.

Correct Option

C Safe system at some point of time can lead to deadlock.

Correct Option

D Unsafe system at some point of time can never result in safe state.

YOUR ANSWER - NA

CORRECT ANSWER - b,c

STATUS - SKIPPED

**Solution :**

- (b, c)  
A system in safe state if there exist safe sequence otherwise it is in unsafe states.  
• If state sequence exist then no deadlock occurs in system.  
• Unsafe system may lead to deadlock.  
• deadlock has no safe sequence.  
• Every deadlock is unsafe but every unsafe may not be deadlock.

QUESTION ANALYTICS



Q. 60

Have any Doubt ?



Which of the following is true?

A Insertion sort typically has a smaller constant factor than merge sort i.e.,  $C_1 \cdot n^2$  for insertion sort and  $C_2 \times (n \log n)$  where  $C_1 > C_2$ . Correct Option

B Worst case of insertion sort occurs when the array is sorted in reverse order. Correct Option

C For smaller inputs merge sort is better than insertion sort.

D Worst case of insertion sort occurs when array is already sorted.

YOUR ANSWER - NA

CORRECT ANSWER - a,b

STATUS - SKIPPED

**Solution :**

- (a,b)  
• Option (a) is true constant factor of insertion sort is smaller than the merge sort constant. This is why insertion sort performs better than merge for smaller inputs.  
• Option (b) is also true in case of reverse order the (comparison + swap) for n elements become  $O(n^2)$ .  
• Option (c) is false.  
• Option (d) is also false. In best case of insertion sort array is already sorted.

QUESTION ANALYTICS



Item 51-60 of 65 « previous 1 2 3 4 5 6 7 next »



Kunal Jha

 Course: GATE  
 Computer Science Engineering(CS)

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

## FULL SYLLABUS DEMO TEST : (CS) - REPORTS

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


Which of the following are adaptive sorting?

 A Insertion sort

[Correct Option](#)
 B Selection sort

 C Merge sort

 D All of these

YOUR ANSWER - NA

CORRECT ANSWER - a

STATUS - SKIPPED

**Solution :**

(a)  
 Adaptive sorting algorithm: A sorting algorithm is adaptive if it takes advantage of existing order in its input. It benefits from the pre-sortedness in the input sequence.  
 Example - Insertion sort  
 Selection and merge sort are not adaptive.

QUESTION ANALYTICS


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


Which of the following statements is/are correct with respect to K-maps?

 A K-map simplification does not demand for the knowledge of boolean algebraic theorems.

[Correct Option](#)
 B Usually it requires less number of steps when compared to algebraic minimization technique.

[Correct Option](#)
 C Complexity of K-map simplification process increases with the increase in the number of variables.

[Correct Option](#)
 D The minimum expression obtained might not be unique.

[Correct Option](#)

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c,d

STATUS - SKIPPED

**Solution :**

(a, b, c, d)  
 All the statements are correct.

QUESTION ANALYTICS


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


Which of the following is/are true?

 A The set of negative integers is countable.

[Correct Option](#)
 B The set of integers that are multiples of 7 is countable.

[Correct Option](#)
 C The set of even integers is countable.

[Correct Option](#)
 D The set of real numbers between 0 and  $\frac{1}{2}$  is countable.

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c

STATUS - SKIPPED

**Solution :**

(a, b, c)  

- The set of negative integers is countable.
- The set of integers that are multiples of 7 is countable.
- The set of even integers is countable.
- The set of real numbers between 0 and  $\frac{1}{2}$  is countable. This is not true because we can not count set of real numbers.

QUESTION ANALYTICS



Q. 64

[Have any Doubt ?](#)

The probability that the ace of the spades will be drawn from a pack of well-shuffled cards atleast once in 104 consecutive trials is \_\_\_\_\_ (in % upto 1 decimal place)

86.5 (86.5 - 86.7)

Correct Option

**Solution :**

86.5 (86.5 - 86.7)

$$\text{Probability of ace of spades } (P) = \frac{1}{52}$$

Number of trials ( $n$ ) = 104

$$\lambda = nP$$

$$= 104 \times \frac{1}{52} = 2$$

 $r$  = atleast once

$$P(r) = P(1) + P(2) + P(3) \dots \dots \dots P(104)$$

$$= 1 - P(0)$$

$$= 1 - \frac{e^{-\lambda} \times \lambda^0}{0!}$$

$$= 1 - \frac{1}{e^2} = 1 - 0.135 = 0.865$$

in % =  $0.865 \times 100 = 86.5\%$ 

QUESTION ANALYTICS



Q. 65

[Have any Doubt ?](#)

An eigen vector corresponding to one of eigen values is given by  $\begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$  for the matrix  $\begin{bmatrix} 2 & 0 & 1 \\ 0 & 3 & 0 \\ 1 & 0 & 2 \end{bmatrix}$ .

The product of rest of the eigen values is \_\_\_\_\_.

9

Correct Option

**Solution :**

9

$$AX = \lambda X$$

$$\begin{bmatrix} 2 & 0 & 1 \\ 0 & 3 & 0 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} = \lambda_1 \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} = \lambda_1 \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$$

From here  $\lambda_1 = 1$ .

$$\begin{aligned} \lambda_1 \times \lambda_2 \times \lambda_3 &= \text{Determinant of } A \\ &= 12 - 3 = 9 \end{aligned}$$

$$\lambda_2 \lambda_3 = \frac{9}{1} = 9$$

QUESTION ANALYTICS

