Summary in Graph

Exam Summary (GO Classes CS Test Series 2025 | MOCK GATE 14)

Qs. Attempted: **0**
                          0 + 0

Correct Marks: **0**
                          0 + 0

Correct Attempts: **0**
                          0 + 0

Penalty Marks: **0**
                          0 + 0

Incorrect Attempts: **0**
                          0 + 0

Resultant Marks: **0**
                          0 + 0

Total Questions: **66**
                          32 + 34

Total Marks: **100**
                          32 + 68

Exam Duration: **180 Minutes**

Time Taken: **0 Minutes**

[EXAM RESPONSE] [EXAM STATS] [FEEDBACK]

- -

Aptitude

Q #1 [Multiple Choice Type] [Award: 1] [Penalty: 0.33] [Verbal Aptitude]

If ' $\rightarrow$ ' denotes increasing order of intensity, then the meaning of the words [smile $\rightarrow$ giggle $\rightarrow$ laugh] is analogous to [disapprove $\rightarrow$ _____ $\rightarrow$ chide]

Which one of the given options is appropriate to fill the blank?

    A. reprove
    B. praise
    C. reprise
    D. grieve

[Your Answer:] [Correct Answer: A] [Not Attempted] [Time taken: 00min 01sec] [Discuss]

Q #2 [Multiple Choice Type] [Award: 1] [Penalty: 0.33] [Quantitative Aptitude]

Two alloys A and B contain copper and zinc in the ratio $7 : 2$ and $5 : 3$ respectively. How many kg of A and B must be melted in order to get an alloy of 44 kg containing copper and Zinc in the ratio $3 : 1$?

    A. 24 kg, 20 kg
    B. 30 kg, 14 kg

C. 28 kg, 16 kg

D. 36 kg, 8 kg

Your Answer: | **Correct Answer: D** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #3 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Quantitative Aptitude

A can complete a piece of work in 4 days. B takes double the time taken by A, C takes double that of B, and D takes double that of C to complete the same task. They are paired in groups of two each. One pair takes two-thirds the time needed by the second pair to complete the work. Which is the first pair?

A. A, B

B. A, C

C. B, C

D. A, D

Your Answer: | **Correct Answer: D** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #4 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Quantitative Aptitude

The expression $\dfrac{(x + y) - |x - y|}{2}$ is equal to :

A. The maximum of x and y

B. The minimum of x and y

C. 1

D. None of the above

Your Answer: | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss
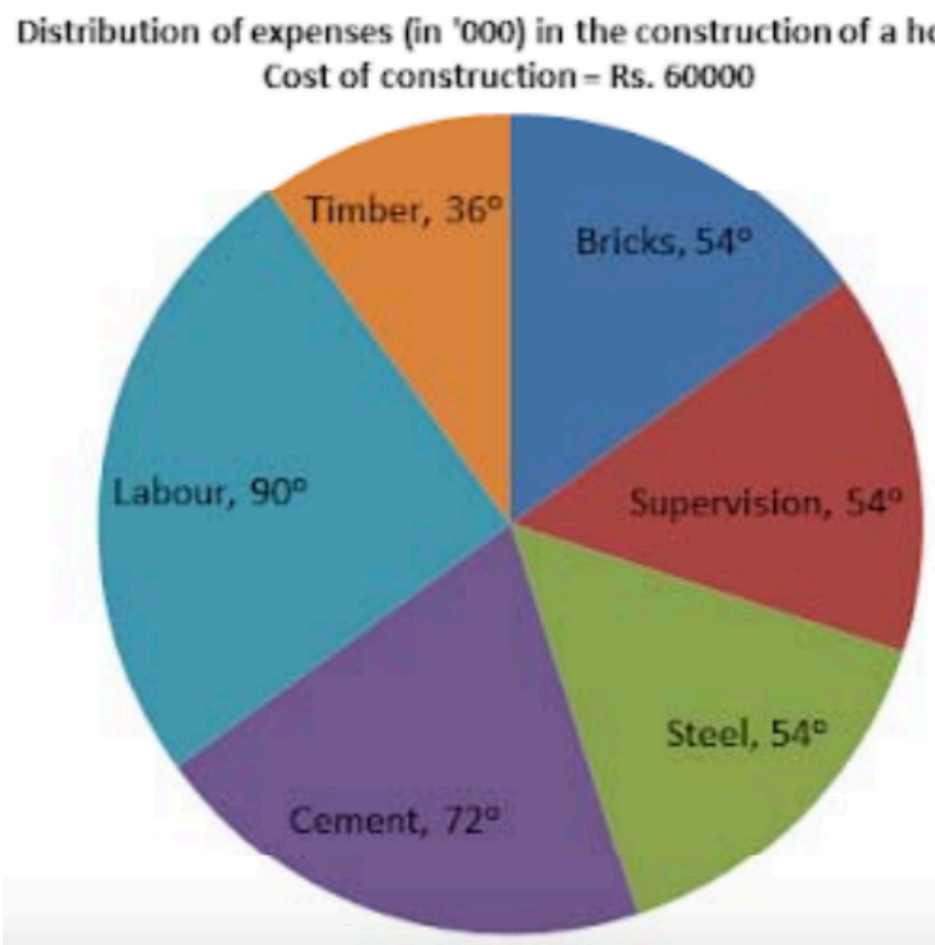

Q #5 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Analytical Aptitude

Refer to the following pie chart and answer the questions that follow.

Distribution of expenses (in '000) in the construction of a h
Cost of construction = Rs. 60000

The amount spent on LABOUR exceeds the amount spent on STEEL by?

    A. 5% of total cost
    B. 10% of total cost
    C. 12% of total cost
    D. 15% of total cost

Your Answer: | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #6 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Verbal Aptitude

In the given text, the blanks are numbered (i)-(iv). Select the best match for all the blanks.

Prof. P __(i)__ merely a man who narrated funny stories. __(ii)__ in his blackest moments he was capable of self-deprecating humor.

Prof. Q ___(iii)__ a man who hardly narrated funny stories. ___(iv)___ in his blackest moments was he able to find humor.

    A. (i) was (ii) Only (iii) wasn't (iv) Even
    B. (i) wasn't (ii) Even (iii) was (iv) Only
    C. (i) was (ii) Even (iii) wasn't (iv) Only
    D. (i) wasn't (ii) Only (iii) was (iv) Even

Your Answer: | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #7 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Quantitative Aptitude

Let x, y be two positive numbers such that $x + y = 1$. Then, the minimum value of

$$\left(x + \frac{1}{x}\right)^2 + \left(y + \frac{1}{y}\right)^2 \text{ is}$$

    A. 12
    B. 20
    C. 12.5
    D. 13.3

Your Answer: | **Correct Answer: C** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #8 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Quantitative Aptitude

For all non-negative integers x and y, $f(x, y)$ is defined as below

- $f(0, y) = y + 1$
- $f(x + 1, 0) = f(x, 1)$
- $f(x + 1, y + 1) = f(x, f(x + 1, y))$

Then, what is the value of $f(1, 2)$?

    A. Two
    B. Four
    C. Three
    D. Cannot be determined

Your Answer: | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #9 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Quantitative Aptitude

There are 150 students in a class. The number of students who play Cricket, Hockey, and Basketball are 125, 130, 135 respectively. If 5 students do not play any of the three games, the number of students playing all the three games must be at least

A. 90
B. 95
C. 100
D. 105

Your Answer: | **Correct Answer: C** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #10 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Spatial Aptitude
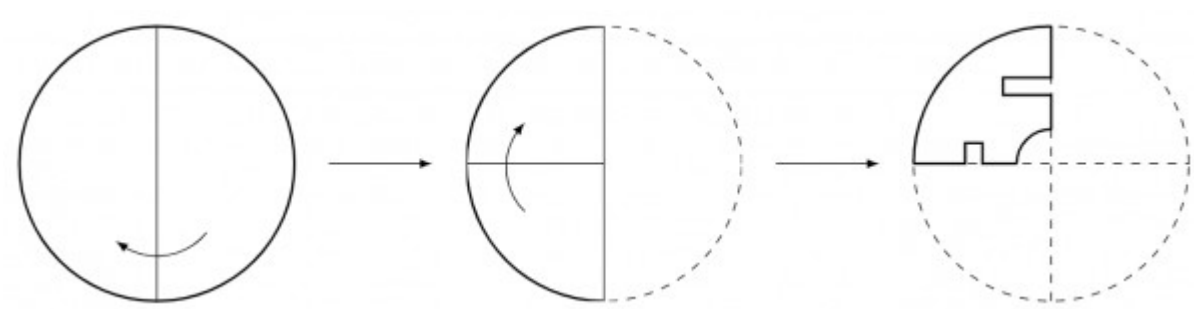
A circular sheet of paper is folded along the lines in the directions shown. The paper, after being punched in the final folded state as shown and unfolded in the reverse order of folding, will look like _____.

A.

B.

C.

D.

Your Answer: | **Correct Answer: A** | Not Attempted | Time taken: 00min 00sec | Discuss
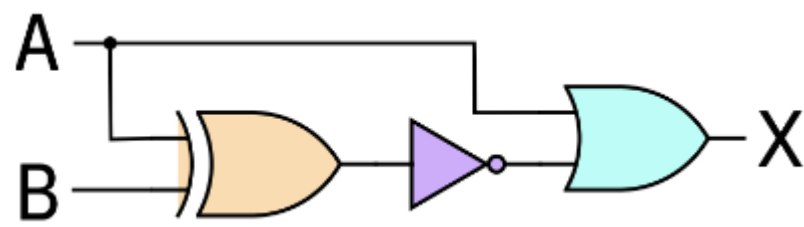
Technical

Q #1 Multiple Choice Type Award: 1 Penalty: 0.33 Digital Logic

Which Boolean expression is equivalent to the following circuit diagram?

A. $X = A' + (A \oplus B)$
B. $X = A + (A \oplus B)'$
C. $X = A \oplus (A + B)'$
D. $X = A + (A \oplus B')$

Your Answer: **Correct Answer: B** Not Attempted Time taken: 00min 00sec Discuss

Q #2 Multiple Choice Type Award: 1 Penalty: 0.33 Databases

Which among the following schedules is an irrecoverable Schedule?

(A)

T1	T2
	R(A)
	W(A)
R(A)	
W(A)	
	Commit
Abort	

(B)

T1	T2
R(A)	
W(A)	
	R(A)
	W(A)
Abort	
	Abort

(C)

T1	T2
R(A)	
W(A)	
Abort	
	R(A)
	W(A)
	Commit

(D)

T1	T2
R(A)	
W(A)	
	R(A)
	W(A)
	Commit
Abort	

Your Answer: **Correct Answer: D** Not Attempted Time taken: 00min 00sec Discuss

Q #3 Multiple Choice Type Award: 1 Penalty: 0.33 Databases

Consider the following relation instance:

A	B	C
1	2	3
2	3	5
1	4	3
2	3	6

Which of the following FD's are satisfied by the above relation instance?

    I. $A \rightarrow B$
   II. $A \rightarrow C$
  III. $C \rightarrow A$
  IV. $AB \rightarrow C$
   V. $BC \rightarrow A$
  VI. $AC \rightarrow B$

   A. II, III & V only
   B. III, IV & V only
   C. III & V only
   D. V only

Your Answer: **Correct Answer: C**   Not Attempted   Time taken: 00min 00sec   Discuss

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Q #4   Multiple Choice Type   Award: 1   Penalty: 0.33   Digital Logic

A MUX circuit shown in the figure below implements a logic function F_1.
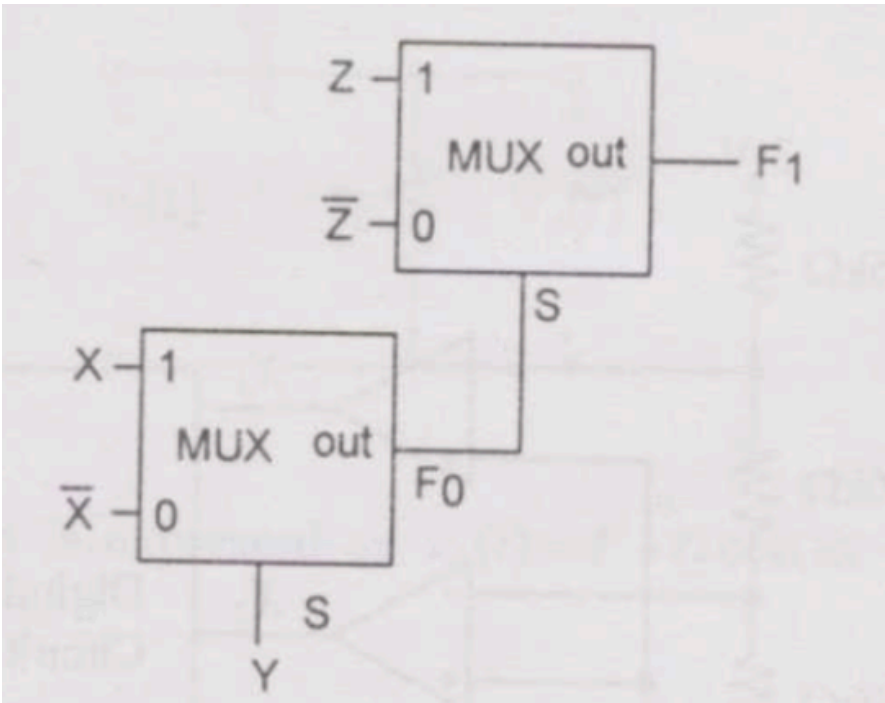
The correct expression for F_1 is ____.

   A. $\overline{(X \oplus Y)} \oplus Z$

   B. $\overline{\overline{(X \oplus Y)} \oplus Z}$

   C. $(X \oplus Y) \oplus \overline{Z}$

   D. $(X \oplus Y) + Z$

Your Answer: **Correct Answer: B**   Not Attempted   Time taken: 00min 00sec   Discuss

Q #5 Multiple Choice Type   Award: 1   Penalty: 0.33   Digital Logic

Which of the following statements is/are true?
I. Shifting a twos-complement integer right by one bit, and filling from the left with 0 , is always equivalent to dividing by 2.
II. An integer's ones-complement representation is never identical to its twos-complement representation.

    A. I only
    B. II only
    C. I and II Both
    D. None of the above

Your Answer: **Correct Answer: D**   Not Attempted   Time taken: 00min 00sec   Discuss

Q #6 Multiple Select Type   Award: 1   Penalty: 0   Mathematical Logic

Consider the open statement

$$p(x, y) : \quad y - x = y + x^2$$

where the universe for each of the variables x, y comprises all integers. Determine the truth value for each of the following statements.
Which of the following statements is/are true?

    A. $\exists y \ (p(1, y))$
    B. $\forall x \exists y \ p(x, y)$
    C. $\exists y \forall x \ p(x, y)$
    D. $\forall y \exists x \ p(x, y)$

Your Answer: **Correct Answer: D**   Not Attempted   Time taken: 00min 00sec   Discuss
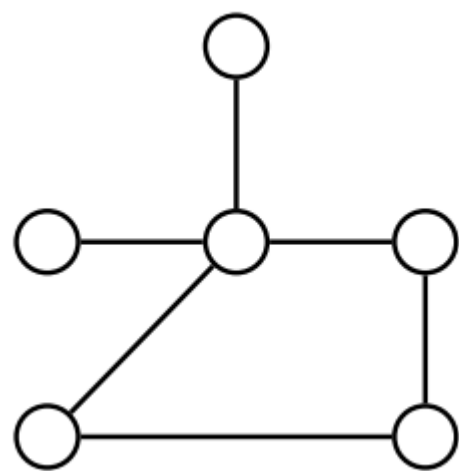
Q #7 Multiple Choice Type   Award: 1   Penalty: 0.33   Graph Theory

Consider the following undirected graph G. Which of the statements below is/are true?

    A. G has a clique of size 4
    B. G has the chromatic number 2
    C. G has a Hamiltonian circuit
    D. G has an Eulerian circuit

Your Answer: **Correct Answer: B**   Not Attempted   Time taken: 00min 00sec   Discuss

Q #8   Multiple Choice Type   Award: 1   Penalty: 0.33   Graph Theory

Which of the following statements are true?

I. Let G be a simple, undirected graph with 6 vertices, 5 edges and no cycles. Then it is not possible to have only one vertex in G with degree 1.

II. Let G be a simple, undirected graph with n vertices and e edges. If G is not connected, then $e < (n - 1)$.

III. All cycles in the graph $K_{3,4}$ have an even number of edges.

A. Only (i).
B. Only (i) and (ii).
C. Only (i) and (iii).
D. All of (i), (ii) and (iii).

Your Answer: Correct Answer: C   Not Attempted   Time taken: 00min 00sec   Discuss

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Q #9   Multiple Choice Type   Award: 1   Penalty: 0.33   Databases

Suppose we have a relation $R(A, B)$ with one tuple, both of whose components are NULL:

$$\begin{array}{c|c} A & B \\ \hline NULL & NULL \end{array}$$

Then the result of:

```
SELECT A, COUNT(B)
FROM R
GROUP BY A;
```

A. (NULL,NULL)
B. (NULL,0)
C. $(NULL, 1)$
D. Empty Table

Your Answer: Correct Answer: B   Not Attempted   Time taken: 00min 00sec   Discuss

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Q #10   Multiple Choice Type   Award: 1   Penalty: 0.33   Set Theory & Algebra

Given any non-empty finite set A, let $\mathcal{P}(A)$ be the power set of A and $\mathcal{C}$ any partition of A. Which of the following statements are always true?

I. $\exists S \in \mathcal{C}$ such that $S \subseteq \mathcal{P}(A)$.
II. $\exists S \in \mathcal{P}(A)$ such that $S \in \mathcal{C}$.
III. $\exists S \in A$ such that $\{S\} \in \mathcal{C}$.

A. Only (i).
B. Only (ii).
C. Only (i) and (ii).
D. Only (i) and (iii).

| Your Answer: | Correct Answer: B | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #11 Multiple Choice Type Award: 1 Penalty: 0.33 Set Theory & Algebra

Suppose A and B are finite sets and f and g are functions, which of the following statements are true?

  I. If $|A| > |B|$, then there is no surjection from A to B by the pigeonhole principle.
  II. If g and $g \circ f$ are surjections, then f must be a surjection.
  III. If $g \circ f$ is an identity function, then f or g is an identity function, or both f and g are identity functions.

  A. Only (i).
  B. Only (i) and (ii).
  C. Only (i) and (iii).
  D. None of the (i), (ii), (iii).

| Your Answer: | Correct Answer: D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #12 Multiple Choice Type Award: 1 Penalty: 0.33 Discrete Mathematics

If a term in the expansion of $\left(2x^2 + \frac{m}{y}\right)^3$ is $\frac{54x^2}{y^2}$, the value of m is

  A. 2
  B. 3
  C. 4
  D. 5

| Your Answer: | Correct Answer: B | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #13 Multiple Choice Type Award: 1 Penalty: 0.33 Databases

Suppose we have a relation $R(A, B)$ with one tuple, both of whose components are NULL:

A	B
NULL	NULL

Then the result of:

```
SELECT A, COUNT(B)
FROM R
GROUP BY A;
```

  A. (NULL,NULL)
  B. (NULL,0)
  C. $(NULL, 1)$
  D. Empty Table

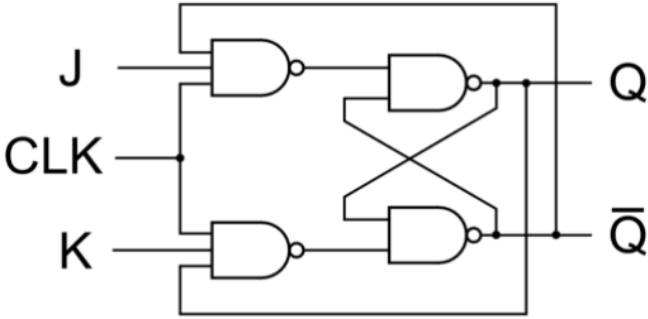| Your Answer: | Correct Answer: B | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #14 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Digital Logic

Consider the JK Flip flop made using NAND gates given below

What is the characteristic equation of JK Flip flop? (Q represents the present state and Q_n represents the next state of the flip flop)

A. $Q_n = \overline{J}Q + KQ$
B. $Q_n = J\overline{Q} + \overline{K}Q$
C. $Q_n = JQ + \overline{K}Q$
D. $Q_n = \overline{J}Q + K\overline{Q}$

| Your Answer: | Correct Answer: B | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #15 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Linear Algebra

Let $C = A^\top A - A\,A^\top$. Where A is matrix of size $n \times n$.

Which of the following is true?

A. C is a symmetric matrix only if A is symmetric matrix
B. C is a skew-symmetric matrix only if A is skew-symmetric matrix
C. C is a symmetric matrix
D. C is a skew-symmetric matrix

| Your Answer: | Correct Answer: C | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #16 | Multiple Select Type | Award: 1 | Penalty: 0 | Theory of Computation

Which of the following strings match the regular expression $a^*bb(ab \mid ba)^*$

A. abb
B. $aaba$
C. $abba$
D. $bbbaab$

| Your Answer: | Correct Answer: A;D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #17 | Multiple Select Type | Award: 1 | Penalty: 0 | Computer Networks

ICMP time *exceeded* can be sent by a host when

A. a datagram is processed and its time-to-live reaches 0 then the intermediate router discards it and notifies the sender.

B. if reassembly timer expires before all fragments from a given datagram arrives, the destination discards the datagram and notifies the sender.

C. the TCP timer for a message expires.

D. all of the above

Your Answer: | **Correct Answer: A;B** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #18 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Theory of Computation

Let E be an interval $[a, b]$ of real numbers with $b > a$. So, for any two real numbers a and b where $b > a$, $E = [a, b] = \{x \mid a \leq x \leq b; x$ is a real number $\}$.

Which of the following statements is necessarily true?

A. E is a finite set.

B. E is a countable set.

C. E is an uncountable set.

D. None of the above.

Your Answer: | **Correct Answer: C** | Not Attempted | Time taken: 00min 00sec | Discuss
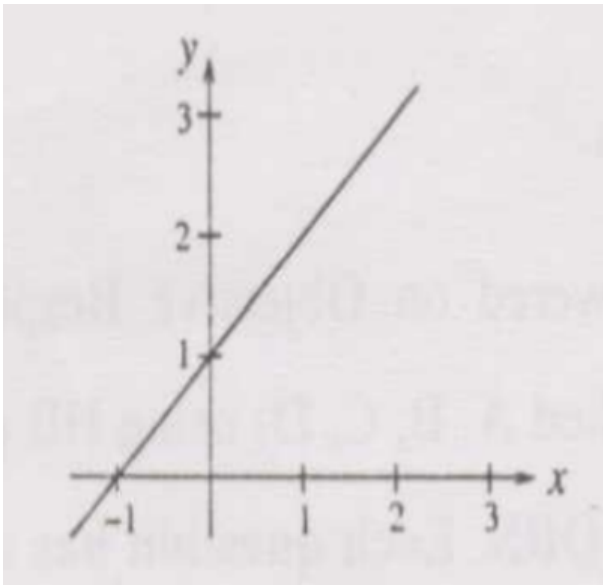

Q #19 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Calculus

The following plot shows a function y which varies linearly with x. The value of the integral $I = \int_{1}^{2} y \, dx$ is

A. 1.0

B. 2.5

C. 4.0

D. 5.0

Your Answer: | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #20 | Numerical Type | Award: 1 | Penalty: 0 | Operating System

Assume a four-CPU machine. Assume that the system provides a user-level threading package and no kernel-level threading. How many CPUs can a single process use, if the process has four user-level threads?

Your Answer: | **Correct Answer: 1** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #21 Numerical Type   Award: 1   Penalty: 0   Operating System

Consider a system which uses a hard disk for storage. The task of managing the hard disk comes under the operating system. It is very important to keep track of occupancy of the hard disk i.e., which block is empty or which block is already occupied. A particular disk unit uses a bit string to record the vacancy and occupancy of its tracks, with 0 denoting vacant and 1 denoting occupied. A 32 bit segment of this string has hexadecimal value F1E0FA36. The percentage of empty track for the corresponding part of the disk, to the nearest percentage is _____ (upto two decimal places).

Your Answer: Correct Answer: 43.75   Not Attempted   Time taken: 00min 00sec   Discuss

Q #22 Multiple Choice Type   Award: 1   Penalty: 0.33   DS

Heaps are usually implemented using arrays. Which of the following statement is correct?
The removal of an element from a heap(Implemented as an array) of size N where the array index is already known –

A. $\Theta(\log N)$
B. $\Theta(N)$
C. $\Theta(1)$
D. $\Theta\left(N^2\right)$

Your Answer: Correct Answer: A   Not Attempted   Time taken: 00min 00sec   Discuss

Q #23 Multiple Select Type   Award: 1   Penalty: 0   Computer Networks

The below table is a routing table using CIDR. Address bytes are in hexadecimal. The notation "/12" in C4.50.0.0/12 denotes a netmask with 12 leading 1 bits, that is, FF.F0.0.0.

Net/MaskLength	NextHop
C4.5E.2.0/23	A
C4.5E.4.0/22	B
C4.5E.C0.0/19	C
C4.5E.40.0/18	D
C4.4C.0.0/14	E
C0.0.0.0/2	F
80.0 .0 .0 / 1	G

State to what next hop the following will be delivered.

A. C4.4B.31.2E will be delivered to F.
B. C4.5E.05.09 will be delivered to C.
C. C4.5E.05.09 will be delivered to D.
D. C4.4D.31.2E will be delivered to E.

Your Answer: Correct Answer: A;D   Not Attempted   Time taken: 00min 00sec   Discuss

Q #24 Multiple Choice Type   Award: 1   Penalty: 0.33   Computer Networks

Which of the following statements about datagrams sent by a node in a network using $\mathrm{IPv4}$ protocol is (are) true?

I. Datagrams at the source must be the size of the smallest maximum transmission unit (MTU) of all the links on a path to the destination.
II. Datagrams may be fragmented during routing.
III. Datagrams are reassembled only at the destination.

A. I only
B. II only
C. III only
D. II and III

| Your Answer: | Correct Answer: D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #25 | Multiple Select Type | Award: 1 | Penalty: 0 | Theory of Computation

The set of Finite languages is closed under?

A. Union
B. Intersection
C. Complement
D. Reverse

| Your Answer: | Correct Answer: A;B;D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #26 | Multiple Select Type | Award: 1 | Penalty: 0 | Algorithms

Which of the following(s) is/are correct?

A. $n^{\log n} = O\left((\log n)^n\right)$
B. $n^{\log n} = \Omega\left((\log n)^n\right)$
C. $n^{\log \log \log n} = O((\log n)!)$
D. $n^{\log \log \log n} = \Omega((\log n)!)$

| Your Answer: | Correct Answer: A;C | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #27 | Multiple Select Type | Award: 1 | Penalty: 0 | Algorithms

If $g(n) = \Omega(n)$ and $h(n) = O(n)$ then $g(n).h(n)$ will be -

A. $\Theta(n)$
B. $O(n)$
C. $\Omega(n)$
D. None of these

| Your Answer: | Correct Answer: D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #28 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Compiler Design

Assume a lexical analyzer is based on regular expressions from the table below. Which of the offered sequences represents the output of the lexical analyzer for the following input string: $cadadaab$?

Regular expression	Action
ab	print("r1")
cad	print("r2")
a / d	print("r3")
(a | d)a	print("r4")
ca	print("r5")
b	print("r6")

A. r5 r4 r4 r1

B. r5 r4 r4 r3 r6

C. r2 r3 r4 r6

D. r2 r3 r4 r1

Your Answer: **Correct Answer: D**   Not Attempted   Time taken: 00min 00sec   Discuss

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Q #29   Numerical Type   Award: 2   Penalty: 0   Compiler Design

Consider the given grammar below: $S \rightarrow bab \mid bA$ A $\rightarrow d \mid cA$ How many times do we need to backtrack to parse the string "bcd" using a recursive descent backtrack parser? If a production fails (i.e., returns false), we count it as 1 backtrack.

Your Answer: **Correct Answer: 2**   Not Attempted   Time taken: 00min 00sec   Discuss

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Q #30   Multiple Choice Type   Award: 2   Penalty: 0.67   Compiler Design

Using the grammar and the associated semantic actions, calculate the value of $G.p$ after parsing the expression $\neg(A \wedge (A \Rightarrow B))$.

$G \rightarrow F$	$G.p = F.p$
$F \rightarrow F_1 \wedge F_2$	$F.p = \text{And}(F_1.p, F_2.p)$
$F \rightarrow F_1 \vee F_2$	$F.p = \text{Or}(F_1.p, F_2.p)$
$F \rightarrow \neg F_1$	$F.p = \text{Neg}(F_1.p)$
$F \rightarrow F_1 \implies F_2$	$F.p = \text{Or}(\text{Not}(F_1.p), F_2.p)$
$F \rightarrow (F_1)$	$F.p = F_1.p$
$F \rightarrow id$	$F.p = id.\text{lexeme}$

A. $\text{And}(A, \text{Or}(A, B))$

B. $\text{Not}(\text{And}(A, \text{Or}(\text{Not}(A), B)))$

C. $\text{Or}(A, \text{Not}(\text{And}(A, B)))$

D. $\text{Not}(\text{Or}(A, \text{And}(\text{Not}(A), B)))$

Your Answer: **Correct Answer: B**   Not Attempted   Time taken: 00min 00sec   Discuss

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Q #31   Multiple Choice Type   Award: 2   Penalty: 0.67   Databases

A student can register for at most p courses and each course can have at most v students. Each student is enrolled to at least one course and each course has at least one student.

This schema is normalized into three tables:

Student, Registers, Courses

The number of tuples in student and course tables are X and Y respectively. Which of the following need not be correct?

    A. $Y \geq 1$
    B. $Y \leq p^* X$
    C. $X \geq v^* Y$
    D. $X > 0$

| **Your Answer:** | **Correct Answer: C** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #32 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Databases

Suppose that two relations $R(A, B)$ and $S(A, B)$ have exactly the same schema. Consider the following equalities in relational algebra?

    I. $R \cap S = R - (R - S)$
    II. $R \cap S = S - (S - R)$
    III. $R \cap S = R$ NATURAL-JOIN S
    IV. $R \cap S = R \times S$

Which of the equalities hold in relational algebra?

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

| **Your Answer:** | **Correct Answer: C** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #33 | Numerical Type | Award: 2 | Penalty: 0 | Digital Logic

A bit counting machine reads a binary input vector (a, b, c, d) and produces a binary number (S_2, S_1, S_0) that counts the number of $1's$ in the input bits. For example when $(a, b, c, d) = (0, 1, 1, 1)$, we have output $(S_2, S_1, S_0) = (0, 1, 1)$, and when $(a, b, c, d) = (1, 0, 1, 0)$, we have output $(S_2, S_1, S_0) = (0, 1, 0)$. Let $Y(a, b, c, d)$ be a boolean function such that Y is 1 for any input combination (a, b, c, d) if and only if both S_1, S_0 are both 1 for that input combination. The number of Prime Implicants in Y?

| **Your Answer:** | **Correct Answer: 4** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #34 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | CO and Architecture

Consider a direct mapped cache having $\log_2 P$ bits as tag and block size of M bytes. Suppose the main memory comprises C blocks. What should the cache size be ?(Assume that P, M, and C are powers of 2.)

    A. C / P
    B. $M C / P$
    C. $M P$
    D. $M \log_2 P$

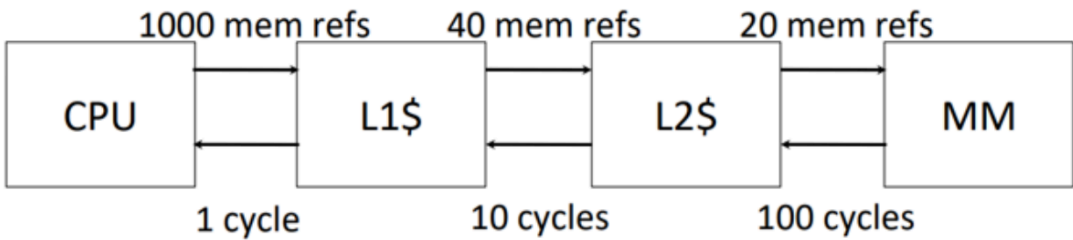| **Your Answer:** | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #35 | Numerical Type | Award: 2 | Penalty: 0 | CO and Architecture |


```
        1000 mem refs      40 mem refs       20 mem refs
   ┌──────────┐       ┌──────────┐       ┌──────────┐       ┌──────────┐
   │   CPU    │ ───▶  │   L1$    │ ───▶  │   L2$    │ ───▶  │    MM    │
   └──────────┘ ◀───  └──────────┘ ◀───  └──────────┘ ◀───  └──────────┘
        1 cycle           10 cycles          100 cycles
```

What is the sum of the local miss rate for $L2\$$, $L1\$$, and the global miss rate of $L2\$$? (Round off each to 2 decimal places) _____.

| **Your Answer:** | **Correct Answer: 0.56** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #36 | Multiple Select Type | Award: 2 | Penalty: 0 | CO and Architecture |

Consider the following code:

```
    I0: r1 = r2 + r3;
    I1: r3 = r1 + r1;
    I2: r4 = r1 + r3
    I3: r1 = r2 * r3;
5.  I4: r3 = r1 / r4;
```

Identify all data dependencies (potential data hazards) in the given code snippet.

   A. Number of RAW dependencies $= 6$
   B. Number of WAR dependencies $= 6$
   C. Number of WAW dependencies $= 2$
   D. Number of RAR dependencies $= 7$

| **Your Answer:** | **Correct Answer: A;C** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #37 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | CO and Architecture |

Write the following binary number as an **IEEE** single-precision float: $0.10101010\ldots$, that is, bits 10 repeating infinitely many times to the right of the binary point.

   A. 0xAAAAAAAA
   B. 0x3F2AAAAA
   C. 0x3FFAAAAA
   D. 0x332FAAAA

| **Your Answer:** | **Correct Answer: B** | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #38 | Multiple Select Type | Award: 2 | Penalty: 0 | Linear Algebra |

If we have m vectors $u_1, u_2, \ldots, u_m$ in $\mathbb{R}^n$, then we can form the matrix A whose columns are $u_1, \ldots, u_m$. Let B be the echelon form of A.

Suppose we are given the following matrix B :

$$\begin{pmatrix} 3 & 0 & -1 & 5 \\ 0 & 0 & 2 & -1 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

Since B is the echelon form of A, both A and B have the same size -3 rows and 4 columns.

Which if the following is/are CORRECT?

A. $\{u_1, u_3\}$ are linearly independent.
B. There exist a vector $w \in \mathbb{R}^n$ that we can add to the set $\{u_1, \ldots, u_m\}$ to guarantee that $Ax = b$ has a solution for any $b \in \mathbb{R}^n$.
C. $Ax = 0$ and $Bx = 0$ have the same solutions.
D. If we erase the last row of zeros in B then the columns of the resulting matrix would be linearly independent.

| Your Answer: | Correct Answer: A;B;C | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #39 Multiple Select Type   Award: 2   Penalty: 0   Programming in C

Consider the following declaration of C code where a and p are variables inside main function.

```
int a[10];
int (*p)[10];
p = &a;
```

If variable **a** is not initialized with integers then which of the following may give a run-time error?

A. ` (p+1)`

B. ` (p+1)[2]`

C. ` p[2]`

D. ` *p[2]`

| Your Answer: | Correct Answer: D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #40 Multiple Select Type   Award: 2   Penalty: 0   DS

We have an AVL tree that contains the integers $1, 2, 3, \ldots 20$. We do not know what order the values were inserted into the tree. Possible values that could appear as the root.

A. 3
B. 5
C. 7
D. 16

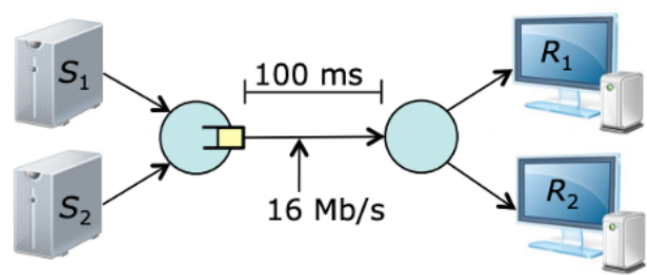| Your Answer: | Correct Answer: B;C;D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #41 Multiple Select Type   Award: 2   Penalty: 0   Computer Networks

The diagram shows two TCP senders at left and the corresponding receivers at right. Both senders use TCP Tahoe. Assume that the MSS is 1 KB, that the one-way propagation delay for both connections is 100 ms and that the link joining the two routers has a bandwidth of 16 Mb/s. Let $cwnd_1$ and $cwnd_2$ be the values of

the senders' congestion windows.

Please note that TCP Tahoe goes to slowstart on triple duplicate ACK or timeout. It sets threshold to $\frac{cwnd}{2}$ and cwnd to 1

Assume that the link buffer overflows whenever $cwnd_1 + cwnd_2 \geq 600$ KB. Buffer overflow is a situation of packet loss.

Let Initially both $S_!$ and S_2 are in slow start with $cwnd_1 = 250$ KB and $cwnd_2 = 50$ KB.
After 20 RTTs, approximately what are the values of $cwnd_1$ and $cwnd_2$?

A. $cwnd_1$ is about 260 KB $cwnd_2$ is about 62 KB
B. $cwnd_1$ is about 266 KB $cwnd_2$ is about 64 KB
C. $cwnd_1$ is about 262 KB $cwnd_2$ is about 64 KB
D. $cwnd_1$ is about 266 KB $cwnd_2$ is about 66 KB

| Your Answer: | Correct Answer: A | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #42   Multiple Select Type   Award: 2   Penalty: 0   Theory of Computation

Consider the following language:

$$L = \{ \text{"M"}: M \text{ is a TM, M halts on the input 0 and M doesn't halt on the input 1}\}.$$

Which of the following is true?

A. Both L and complement of L are recognizable.
B. L is RE but complement of L is Not RE.
C. L is Not RE but complement of L is RE.
D. Neither L nor complement of L is RE.

| Your Answer: | Correct Answer: D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #43   Multiple Choice Type   Award: 2   Penalty: 0.67   Operating System

The page table is moved to the main memory and accessed via a TLB. Each main memory access takes 50 ns and each TLB access takes 10 ns. Each virtual memory access involves:

- mapping VPN to PPN using TLB (10 ns)
- if TLB miss: mapping VPN to PPN using page map in main memory (50 ns)
- accessing main memory at appropriate physical address (50 ns)

Assuming no page faults (i.e. all virtual memory is resident) what TLB hit rate is required for an average virtual memory access time of 61 ns.

A. 0.98
B. 0.95
C. 0.96

D. 0.90

| Your Answer: | Correct Answer: A | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #44 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Computer Networks |

Assume a link has a round-trip propagation delay of 100 msec. Also, assume an 8 Kbps transmitter and a frame with 3 bit sequence numbers. What is the minimum frame size that can guarantee a 50% channel utilization assuming the selective repeat protocol?

   A. 80 bits
   B. $800/7$ bits
   C. $800/6$ bits
   D. 200 bits

| Your Answer: | Correct Answer: B | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #45 | Numerical Type | Award: 2 | Penalty: 0 | Probability |

Due to the current COVID pandemic conditions, assume that positive or negative status of any individual are equally likely. There are 3 members in a family. If one of the members has tested COVID positive, the conditional probability that at least 2 members are COVID positive is _____ (rounded off to three decimal places).

| Your Answer: | Correct Answer: 0.570:0.572 | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #46 | Multiple Select Type | Award: 2 | Penalty: 0 | Programming in C |

Consider the following program fragment.

```
    void moo(char* to_print)
    {
        char* cheerful = "printf is awesome\n";
        printf("%s", to_print);
 5. }
```

Between the time that the programmer writes the above code and the time that the program's output actually appears, there are few phases.
compile time, link time, load time, and run time.
The following options mention the kind of information and the earliest phase at which they are available.
Which of the following option(s) is/are correct? (Mark all the correct options)

   A. The number of arguments that moo() passes to printf() is known at compile time.
   B. The virtual addresses of the instructions that implement printf() are known at link time.
   C. The virtual address (on the stack) of printf()'s second argument is known at run time.
   D. To start executing the program, first time PC (Program counter) value is known at load time.

| Your Answer: | Correct Answer: A;B;C;D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #47 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | DS |

Suppose that stacks and queues are provided as opaque data types, offering only operations to add elements, to remove elements, and to test for emptiness. Suppose that a programmer wants to count the number of elements in a given stack or queue C, which is currently in some state t, using only one auxiliary stack or queue D.

The structures C and D can be used in any way possible based on the methods they offer, but C must be restored to its state t after counting its elements.

Counting elements as described above is possible for which of the following data types?

   I. C is a queue and D is a queue.
  II. C is a stack and D is a stack.
 III. C is a queue and D is a stack.

A. None
B. I and II only
C. I and III only
D. I, II and III only

Your Answer: **Correct Answer: D**   Not Attempted   Time taken: 00min 00sec   Discuss

---

Q #48   Multiple Choice Type   Award: 2   Penalty: 0.67   Theory of Computation

Let L be a language over an alphabet Σ. The equivalence relation $\sim_L$ on the set Σ^* of all finite length strings over Σ is defined by $u \sim_L v$ if and only if for all $w \in \Sigma^*$ it is the case that $uw \in L$ if and only if $vw \in L$. Suppose that $L = L(M)$ is the language accepted by a deterministic finite automaton M. For each $u \in \Sigma^*$, let $s(u)$ be the unique state of M reached from the initial state after inputting the string u.
Now consider the following statements :

  1. $s(u) = s(v)$ implies $u \sim_L v$.
  2. $u \sim_L v$ implies $s(u) = s(v)$.

Which of the above statements is correct?

A. Only 1
B. Only 2
C. Both
D. None

Your Answer: **Correct Answer: A**   Not Attempted   Time taken: 00min 00sec   Discuss

---

Q #49   Numerical Type   Award: 2   Penalty: 0   Theory of Computation

Let $\Sigma = \{a, b\}$ and let $L = \{w \in \Sigma^* \mid w$ has the same number of a's and b's $\}$

Consider the following CFGs (Context-Free Grammars):

  1. $S \rightarrow aSb|bSa|\varepsilon$
  2. $S \rightarrow abS|baS|\varepsilon$
  3. $S \rightarrow abSba \mid baSab \mid \varepsilon$
  4. $S \rightarrow SbaS \mid SabS |\varepsilon$

How many of the above CFGs describe language L?

Your Answer: **Correct Answer: 0**   Not Attempted   Time taken: 00min 00sec   Discuss

Q #50 Multiple Choice Type   Award: 2   Penalty: 0.67   DS

Given a binary search tree T, we insert n elements, but when the size of tree become doubled then we balance the tree. for example if we insert 2^{k-1} element then when the size become to 2^k then we balance T. what is tightest time complexity insert n items in such tree?

A. $O(n)$
B. $O\left(n^2\right)$
C. $O(n \log n)$
D. $O\left(n^2 \log n\right)$

Your Answer: Correct Answer: B   Not Attempted   Time taken: 00min 00sec   Discuss

Q #51 Multiple Choice Type   Award: 2   Penalty: 0.67   Algorithms

The procedure operates on three arrays $A[0 \ldots 99], B[0 \ldots 99]$ and $C[0 \ldots 99]$, which are initialized with integer values.

```
     procedure mystery () {
          for (i=0; i<100; i++) {C[i] = A[i];}
          p=99;
          for (i=0; i<100; i++) {
5.            B[p] = C[0];
              p = p-1;
              for (j=1; j<100; j++){
                  C[j - 1] = C[j];
              }
10.        }
     }
```

When the procedure terminates, which of the following statements can be asserted about the array B?

A. All elements of B are equal to $A[0]$

B. B contains the elements of A sorted in descending order

C. All values of B are the same

D. B contains the elements of A in reverse order

Your Answer: Correct Answer: D   Not Attempted   Time taken: 00min 00sec   Discuss

Q #52 Multiple Choice Type   Award: 2   Penalty: 0.67   Algorithms

What is the time complexity of the code given?

```
     int i = 1, j = 2;
     while (i <= n) {
          sum += 1;
          i = i * j;
5.        j = j * 2;
     }
```

A. $\Theta(n)$
B. $\Theta(\sqrt{\log n})$
C. $\Theta\left(n^2\right)$
D. $\Theta\left((\log n)^2\right)$

| Your Answer: | Correct Answer: B | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #53 | Multiple Select Type | Award: 2 | Penalty: 0 | DS

Consider the function mystery which takes the head of a singly linked list as an argument.

```
    int mystery(Node* head)
    {
        if (head == NULL) return 0;
        else return head->data - mystery(head->next);
5. }
```

If the linked list contains integers from 1 to n in the order, where the head is pointing to 1.

Which of the following is/are true about the function call mystery(head)?

A. It returns -50 if n is 99
B. It returns 50 if n is 99
C. It returns -50 if n is 100
D. It returns 50 if n is 100

| Your Answer: | Correct Answer: B;C | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #54 | Multiple Select Type | Award: 2 | Penalty: 0 | DS

Consider the following function **printNthNode()**.

```
    void printNthNode(Node *head){
        Node *p, *q;
        p = q= head;
        while(q){
5.          p = p->next;
            q = q->next ? q->next->next : NULL;
        }
        printf("%d", p->data);
    }
```

We pass the head of the singly linked list to the above function. Which of the option(s) is/are correct about a linked list of length n $(n \geq 2)$?

The length of a linked list is the number of nodes in it.

A. Function prints $n/2$ node value if n is even
B. Function prints $n/2 + 1$ node value if n is even
C. Function prints $(n-1)/2 + 1$ node value if n is odd
D. Function prints $(n+1)/2 + 1$ node value if n is odd

| Your Answer: | Correct Answer: B;D | Not Attempted | Time taken: 00min 00sec | Discuss |

Q #55 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Programming in C

What will be the output of the following lines of code?

```
    int i = 0;
    int j = 0;
    char *s = "ceded";
    while (s[i] != '\0') {
5.      j = j + s[i] - 'b';
        i = i + 1;
    }
    printf("%d %d\n", i, j);
```

A. 5 11
B. 4 16
C. 5 16
D. 4 11

Your Answer: | **Correct Answer: A** | Not Attempted | Time taken: 00min 00sec | Discuss

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Q #56 | Numerical Type | Award: 2 | Penalty: 0 | Programming in C

What will be the output of the following C program?

```
    #include<stdio.h>
    int main()
    {
        static int p[] = {1, 2, 3, 0, 5, 6};
5.      static int *q[] = {p+2, p+1, p, p+3, p+4, p+5};
        static int **r[] = {q+4, q+5, q+1, q, q+2, q+3};
        int ***pt;
        pt = r + 2;
        printf("%d", ***(pt+3)-**(q+1));
10. }
```

Your Answer: | **Correct Answer: -2** | Not Attempted | Time taken: 00min 00sec | Discuss

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