

Andhra Pradesh State Council of Higher Education

Notations :

- 1.Options shown in green color and with ✓ icon are correct.
- 2.Options shown in red color and with ✗ icon are incorrect.

Question Paper Name :	CS2
Subject Name :	Computer Science and Information Technology
Creation Date :	2025-06-06 16:37:28
Duration :	120
Total Marks :	120
Display Marks:	No
Share Answer Key With Delivery Engine :	Yes
Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Computer Science and Information Technology

Group Number :	1
Group Id :	83189668
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No

Break time : 0
Group Marks : 120

Computer Science and Information Technology

Section Id : 83189668
Section Number : 1
Section type : Online
Mandatory or Optional : Mandatory
Number of Questions : 120
Number of Questions to be attempted : 120
Section Marks : 120
Maximum Instruction Time : 0
Sub-Section Number : 1
Sub-Section Id : 83189668
Question Shuffling Allowed : Yes

Question Number : 1 Question Id : 8318968041 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In how many ways can a chairperson, a secretary, and a treasurer be chosen from a group of 10 people, if each person can hold only one position?

Options :

840

1. ✖

2. ✖ 5040

3. ✖ 1240

4. ✔ 720

Question Number : 2 Question Id : 8318968042 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A sub graph H of a graph G is called a clique if_____.

Options :

1. ✔ $V(G) = V(H)$

2. ✖ $V(H) \subseteq V(G)$

3. ✖ H contain all edges of G

4. ✖ H is also a complete graph

Question Number : 3 Question Id : 8318968043 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

For a given graph G having v vertices and e edges which is connected and has no cycles, which of the following statements is true?

Options :

1. ✖ $v = e$

2. ✔ $v = e + 1$

3. ✖ $v + 1 = e$

4. ✖ $v = e - 1$

Question Number : 4 Question Id : 8318968044 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Assume G is a simple undirected graph and some vertices of G are of odd degree. Add a node v to G and make it adjacent to each odd degree vertex of G , then the resultant graph is sure to be _____.

Options :

1. ✓ Euler
2. ✗ complete
3. ✗ Hamiltonian
4. ✗ clique

Question Number : 5 Question Id : 8318968045 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Dijkstra's algorithm fails for graphs with_____.

Options :

1. ✓ Negative weights
2. ✗ Disconnected components
3. ✗ Directed edges
4. ✗ Self-loops

Question Number : 6 Question Id : 8318968046 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In propositional logic $P \leftrightarrow Q$ is equivalent to ($\sim$ denotes NOT)_____.

Options :

1. ✗ $\sim(P \vee Q) \wedge \sim(Q \vee P)$
2. ✓ $(\sim P \vee Q) \wedge (\sim Q \vee P)$

3. ✖ $(P \vee Q) \wedge (Q \vee P)$

4. ✖ $\sim(P \vee Q) \rightarrow \sim(Q \vee P)$

Question Number : 7 Question Id : 8318968047 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The Boolean function $\sim((\sim P \wedge Q) \wedge \sim(\sim P \wedge \sim Q)) \vee (P \vee R)$ is equal to the Boolean function:

Options :

1. ✖ Q

2. ✖ R

3. ✖ $P \vee Q$

4. ✔ P

Question Number : 8 Question Id : 8318968048 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A graph is self-complementary if it is isomorphic to its complement.

For all self-complementary graphs on n vertices, n is _____.

Options :

1. ✖ a multiple of 4
2. ✖ even
3. ✖ odd
4. ✔ congruent to 0 mod 4 or 1 mod 4

Question Number : 9 Question Id : 8318968049 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Suppose R_1 and R_2 are reflexive relations on a set A.

Which of the following statements is correct?

Options :

1. ✖ $R_1 \cap R_2$ is reflexive and $R_1 \cup R_2$ is irreflexive
2. ✖ $R_1 \cap R_2$ is irreflexive and $R_1 \cup R_2$ is reflexive

Both $R_1 \cap R_2$ and $R_1 \cup R_2$ is irreflexive

3. ✖

Both $R_1 \cap R_2$ and $R_1 \cup R_2$ is reflexive

4. ✔

Question Number : 10 Question Id : 8318968050 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

There are three cards in a box, Both sides of one card are black, both sides of one card are red, and the third card has one black side and one red side. We pick a card at random and observe only one side. What is the probability that the opposite side is the same colour as the one side we observed?

Options :

3/4

1. ✖

2/3

2. ✖

3. ✖ $1/2$

4. ✔ $1/3$

Question Number : 11 Question Id : 8318968051 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

An 8-bit number X is 00001100, then -X is in 1's complement
is_____.

Options :

1. ✖ 12 in binary

2. ✔ 243 binary code in 8 bit

3. ✖ 111011100

4. ✖ 111110101

Question Number : 12 Question Id : 8318968052 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Assuming 5-bit addition is done on registers, the sum $12+7$ leads to_____.

Options :

- 1.  Overflow
- 2.  -12
- 3.  19
- 4.  -14

Question Number : 13 Question Id : 8318968053 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In a 4-bit ripple carry adder, the worst-case delay occurs when_____.

Options :

- 1. ✖ all input bits are 0
- 2. ✔ a carry propagates through all full adders
- 3. ✖ no carry is generated
- 4. ✖ the sum exceeds 15

Question Number : 14 Question Id : 8318968054 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The output of a JK flip-flop for inputs $J=1$, $K=1$ and clock transition from 1 to 0 is _____.

Options :

- 1. ✖ no change

2. ✖ reset

3. ✔ toggle

4. ✖ set

Question Number : 15 Question Id : 8318968055 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The IEEE 754 single-precision floating-point representation of 0.375
is _____.

Options :

1. ✖ 0 01111100 100000000000000000000000

2. ✖ 0 01111101 100000000000000000000000

3. ✖ 0 01111101 110000000000000000000000

0 01111100 110000000000000000000000

4. ✓

Question Number : 16 Question Id : 8318968056 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In a hardwired control unit, the sequence of control signals is
generated by_____.

Options :

Microprogrammed ROM

1. ✗

State machine/circuitry

2. ✓

Operating system

3. ✗

Interrupt handler

4. ✗

Question Number : 17 Question Id : 8318968057 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In DMA mode, the CPU is bypassed for data transfer between_____.

Options :

CPU and I/O devices

1. ✖

Registers and ALU

2. ✖

Memory and I/O devices

3. ✔

Cache and secondary storage

4. ✖

Question Number : 18 Question Id : 8318968058 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A 4-way set-associative cache with 256 blocks divides memory addresses into_____.

Options :

1. ✖ 256 sets

2. ✔ 64 sets

3. ✖ 4 sets

4. ✖ 16 sets

Question Number : 19 Question Id : 8318968059 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

$AB \oplus (A+B)$ is equivalent to_____.

Options :

1. ✔ A^1B+AB^1

2. ✖ $AB+A^1B^1$

3. ✖ A^1B+A^1B

4. ✖ $A+B$

Question Number : 20 Question Id : 8318968060 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of these flip – flops cannot be used to construct a serial shift register?

Options :

1. ✖ D – flip flop

2. ✖ SR flip – flop

3. ✔ T flip – flop

4. ✖ JK flip – flop

Question Number : 21 Question Id : 8318968061 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

How many AND gates are required to realize $Y = CD + EF + G$?

Options :

1. ✖ 4

2. ✖ 5

3. ✖ 3

4. ✔ 2

Question Number : 22 Question Id : 8318968062 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The purpose of an interrupt vector table is to _____.

Options :

1. ✖ Store CPU registers during context switch

Map interrupt requests to service routine addresses

2. ✓

Hold page tables for virtual memory

3. ✗

Cache frequently used instructions

4. ✗

Question Number : 23 Question Id : 8318968063 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

What is the output of the following code fragment?

```
int x=24;  
printf("%d\n",printf("%3d %3d\n",x,x));
```

Options :

24 24

1. ✗ 10

24 24

2. ✖ 9

24 24

3. ✔ 8

4. ✖ Error

Question Number : 24 Question Id : 8318968064 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

How many times “*Hi*” message will be displayed when we execute the following for loop?

```
int i;
```

```
for(i=0;i%2?0:1;i++)
```

```
printf(“Hi \n”);
```

Options :

1. ✖ 3

2. ✖ 2

3. ✔ 1

4. ✖ 0

Question Number : 25 Question Id : 8318968065 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

If one wants to add and delete elements quickly without reshuffling
the rest, then which data structure suits the best?

Options :

1. ✔ Linked list

2. ✖ Tree

B-Tree

3. ✖

Array

4. ✖

Question Number : 26 Question Id : 8318968066 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The height of a binary tree with 31 nodes (assuming no single-child nodes) is _____.

Options :

4

1. ✔

5

2. ✖

6

3. ✖

7

4. ✖

Question Number : 27 Question Id : 8318968067 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In a max-heap, the largest element is always located at the_____.

Options :

1. ✖ leftmost leaf
2. ✖ rightmost leaf
3. ✔ root node
4. ✖ middle of the heap

Question Number : 28 Question Id : 8318968068 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The recurrence $T(n)=2T(n/2)+n$ has a solution of_____.

Options :

1. ✖ $O(n)$

2. ✔ $O(n \log n)$

3. ✖ $O(n^2)$

4. ✖ $O(\log n)$

Question Number : 29 Question Id : 8318968069 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

What is the time complexity to insert an element at the beginning of a dynamic array?

Options :

1. ✖ $O(1)$

2. ✔ $O(n)$

3. ✖ $O(n \log n)$

4. ✖ $O(\log n)$

Question Number : 30 Question Id : 8318968070 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The inorder traversal of a BST gives elements in_____.

Options :

1. ✖ level order

2. ✔ ascending order

3. ✖ descending order

4. ✖ random order

Question Number : 31 Question Id : 8318968071 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A threaded binary tree is a binary tree in which every node that does not have right child has a thread to its _____.

Options :

Pre-order successor

1. ✖

In-order successor

2. ✔

In-order predecessor

3. ✖

Post-order successor

4. ✖

Question Number : 32 Question Id : 8318968072 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which notation represents the tightest upper bound of an algorithm's running time?

Options :

1. ✖ $O(n)$

2. ✖ $\Omega(n)$

3. ✔ $\Theta(n)$

4. ✖ $\omega(n)$

Question Number : 33 Question Id : 8318968073 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The minimum possible time complexity to sort n integers in the range $[1, n^2]$ is_____.

Options :

1. ✔ $O(n)$

2. ✖ $O(n \log n)$

3. ✖ $O(n^2)$

4. ✖ $O(\log n)$

Question Number : 34 Question Id : 8318968074 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The greedy approach is optimal for _____.

Options :

1. ✖ 0/1 Knapsack

2. ✔ Fractional Knapsack

3. ✖ Longest Increasing Subsequence

4. ✖ Matrix Chain Multiplication

Question Number : 35 Question Id : 8318968075 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Best case complexity of insertion sorting is_____.

Options :

1. ✓ $O(n)$

2. ✗ $O(n \log n)$

3. ✗ $O(n^2)$

4. ✗ $O(\log n)$

Question Number : 36 Question Id : 8318968076 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A problem is NP-complete if it is_____.

Options :

1. ✗ solvable in polynomial time

NP-hard and is NP

2. ✓

reducible to P

3. ✗

Non-deterministic but decidable

4. ✗

Question Number : 37 Question Id : 8318968077 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The time complexity to compute the 15th Fibonacci number using
dynamic programming is_____.

Options :

$O(1)$

1. ✗

$O(n)$

2. ✓

$O(n \log n)$

3. ✗

$$O(\log n)$$

4. ✖

Question Number : 38 Question Id : 8318968078 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

One way to build a heap is to start at the end of the array (the leaves)
and push each new value up to the root. Its time complexity is

Options :

$$O(n)$$

1. ✖

$$O(\log n)$$

2. ✖

$$O(n \log n)$$

3. ✔

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

4. ✖

Question Number : 39 Question Id : 8318968079 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

If the recursive call keeps calculating the same things over and over again, we can use _____ which stores partial results already calculated and to be used again.

Options :

Divide and conquer algorithm

1. ✖

Recursive

2. ✖

Dynamic Programming

3. ✔

Greedy method

4. ✖

Question Number : 40 Question Id : 8318968080 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The _____ process updates the costs of all the vertices V , connected to a vertex U , if we could improve the best estimate of the shortest path to V by including (U,V) in the path to V .

Options :

1. ✓ relaxation
2. ✗ improvement
3. ✗ shortening
4. ✗ costing

Question Number : 41 Question Id : 8318968081 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The minimum number of states in a DFA accepting
 $L = \{w \mid w \text{ ends with } 01\}$ over $\Sigma = \{0,1\}$ is:

Options :

1. ✖ 2

2. ✔ 3

3. ✖ 4

4. ✖ 5

Question Number : 42 Question Id : 8318968082 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The language $L = \{\langle M \rangle \mid M \text{ halts on all inputs}\}$ is _____.

Options :

1. ✖ decidable

2. ✔ undecidable but recognizable

3. ✖ not recognizable

4. ✖ regular

Question Number : 43 Question Id : 8318968083 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Inherited attributes in SDTs are used for_____.

Options :

1. ✖ passing information up the parse tree

2. ✔ passing information down the parse tree

3. ✖ storing symbol table entries

4. ✖ generating target code

Question Number : 44 Question Id : 8318968084 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The output of a syntax-directed translation scheme is_____.

Options :

Abstract Syntax Tree

1. ✖

Three Address Code

2. ✖

Postfix Notation

3. ✖

Depends on the SDT rules

4. ✔

Question Number : 45 Question Id : 8318968085 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Subset Construction method refers to_____.

Options :

Conversion of NFA to DFA

1. ✓

DFA minimization

2. ✗

Eliminating Null references

3. ✗

DFA to NFA

4. ✗

Question Number : 46 Question Id : 8318968086 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The maximum number of transitions which can be performed over a state in a DFA? $\Sigma = \{a, b, c\}$

Options :

8

1. ✗

2

2. ✗

3. ✓ 3

4. ✗ 7

Question Number : 47 Question Id : 8318968087 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following is a regular language?

Options :

A string whose length is a sequence of prime numbers

1. ✗

A string with substring ww^r

2. ✗

A palindrome

3. ✗

A string with even number of zero's

4. ✓

Question Number : 48 Question Id : 8318968088 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The minimum number of nodes in a DFA that recognizes strings over $\{a, b\}$ with $\text{length} \bmod 3 = 0$ are_____.

Options :

4

1. ✖

2

2. ✖

3

3. ✔

1

4. ✖

Question Number : 49 Question Id : 8318968089 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

If the production rules are given as:

$$S \rightarrow XY \mid W$$

$$X \rightarrow aXb \mid \varepsilon$$

$$Y \rightarrow cY \mid \varepsilon$$

$$W \rightarrow aWc \mid Z$$

$$Z \rightarrow bZ \mid \varepsilon$$

Then the language generated by these rules is_____.

Options :

$$\{a^i b^j c^k / i, j, k \geq 0\}$$

1. ✖

$$\{a^i b^j c^k / i, j, k \geq 1\}$$

2. ✖

$$\{a^i b^j c^k / i, j, k \geq 0, i=j \text{ or } i=k\}$$

3. ✖

$$\{a^i b^j c^k / i, j, k \geq 0, i=j \text{ or } i \neq k\}$$

4. ✔

Question Number : 50 Question Id : 8318968090 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Let P be a regular language and Q be a context free language such that Q is subset of P . Then which of the following is ALWAYS regular?

Options :

1. ✖ $P \cap Q$

2. ✖ $P - Q$

3. ✔ $\Sigma^* - P$

4. ✖ $\Sigma^* - Q$

Question Number : 51 Question Id : 8318968091 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which one of the following is FALSE?

Options :

1. ✖ Every NFA can be converted to an equivalent PDA
2. ✖ Complement of every context free language is recursive
3. ✖ There is a unique minimal DFA for every regular language
4. ✔ Every nondeterministic PDA can be converted to equivalent deterministic PDA

Question Number : 52 Question Id : 8318968092 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following is not a three-address code statement?

Options :

1. ✖ $x = y + z$
2. ✖ if x goto L

3. ✖ $x = *y$

4. ✔ $x = y ** z$

Question Number : 53 Question Id : 8318968093 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following is not shared among threads in the same process?

Options :

1. ✖ Heap memory

2. ✔ Stack

3. ✖ File Descriptors

4. ✖ Code section

Question Number : 54 Question Id : 8318968094 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The primary advantage of user-level threads over kernel-level threads is_____.

Options :

1. ✓ lower context-switch overhead
2. ✗ better parallelism on multicore CPUs
3. ✗ no need for synchronization
4. ✗ higher priority scheduling

Question Number : 55 Question Id : 8318968095 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A program uses environment variables to_____.

Options :

store data between login sessions

1. ✖

pass configuration settings to other programs

2. ✔

store data persistently

3. ✖

pass data to the operating system

4. ✖

Question Number : 56 Question Id : 8318968096 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which is not a CPU scheduling criterion?

Options :

CPU utilisation

1. ✖

Reliability

2. ✔

Response time

3. ✖

Waiting time

4. ✖

Question Number : 57 Question Id : 8318968097 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Among priority inversion between two processes, one with high priority and other with low priority that share a critical section will cause which of the following problem?

Options :

High priority process executes before low priority process and finishes faster than it should.

1. ✖

Low priority process executes before high priority process and finishes faster than it should.

2. ✖

3. ✓ High priority process waits for low priority process to finish,
but the low priority process never gets scheduled.

4. ✗ Low priority process changes priority temporary to the
priority of the high priority process.

Question Number : 58 Question Id : 8318968098 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A currently running process can be put on a ready queue or one of
the I/O queues by each of the following except_____.

Options :

1. ✗ the process issued an i/o request

2. ✓ the process did an illegal memory access

3. ✗ there was an interrupt

the process issued a system call

4. ✖

Question Number : 59 Question Id : 8318968099 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following component of program state is shared across threads in a multithreaded process?

Options :

Registers

1. ✖

Auto variables

2. ✖

Heap memory

3. ✔

Stack memory

4. ✖

Question Number : 60 Question Id : 8318968100 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following frees the CPU from having to deal with transfer of memory to or from I/O device?

Options :

1. ✖ Interrupts
2. ✔ Direct Memory Access
3. ✖ Buffer cache
4. ✖ Device Driver

Question Number : 61 Question Id : 8318968101 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In FCFS, I/O bound processes may have to wait long in the ready queue waiting for a CPU bound job to finish. This is known as _____.

Options :

1. ✖ Aging
2. ✔ Convoy effect
3. ✖ Priority inversion
4. ✖ Belady's anomaly

Question Number : 62 Question Id : 8318968102 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In general, there will be _____ inodes than directories in Unix
File system.

Options :

1. ✖ zero
2. ✖ less

3. ✖ same

4. ✔ more

Question Number : 63 Question Id : 8318968103 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

To ensure that the _____ condition never occurs in the system,
we must guarantee that, whenever a process requests a resource, it
does not have any other resource.

Options :

1. ✖ mutual exclusion

2. ✖ no-preemption

3. ✖ circular wait

4. ✓ hold and wait

Question Number : 64 Question Id : 8318968104 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A _____ architecture assigns only a few essential functions to the kernel, including address spaces, Interprocess communication (IPC) and basic scheduling.

Options :

1. ✗ monolithic kernel

2. ✓ micro kernel

3. ✗ macro kernel

4. ✗ mini kernel

Question Number : 65 Question Id : 8318968105 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Among the four criteria for synchronization mechanism, which of the two criteria are mandatory?

Options :

Mutual Exclusion and Progress

1. ✓

Progress and Architectural neural

2. ✗

Bounded wait and mutual exclusion

3. ✗

Bounded wait and progress

4. ✗

Question Number : 66 Question Id : 8318968106 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which SQL operation is not part of the ACID properties?

Options :

1. ✖ COMMIT
2. ✖ ROLLBACK
3. ✔ CREATE INDEX
4. ✖ SAVEPOINT

Question Number : 67 Question Id : 8318968107 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A B⁺ tree is preferred over a B-tree for databases because_____.

Options :

1. ✔ it supports range queries efficiently
2. ✖ it has a smaller node size

it allows faster insertion/deletion

3. ✖

it uses less disk space

4. ✖

Question Number : 68 Question Id : 8318968108 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A relation $R(A,B,C,D)$ with functional dependencies $\{A \rightarrow B, B \rightarrow C\}$
is in _____.

Options :

1NF but not 2NF

1. ✖

2NF but not 3NF

2. ✔

3NF but not BCNF

3. ✖

BCNF

4. ✖

Question Number : 69 Question Id : 8318968109 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In two-phase locking (2PL), a transaction must be_____.

Options :

release all locks before acquiring new ones

1. ✖

acquire all locks before releasing any

2. ✔

use only shared locks

3. ✖

avoid deadlocks by timeouts

4. ✖

Question Number : 70 Question Id : 8318968110 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The isolation level that prevents dirty reads but allows non-repeatable reads is_____.

Options :

read uncommitted

1. ✖

read committed

2. ✔

repeatable read

3. ✖

serializable

4. ✖

Question Number : 71 Question Id : 8318968111 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The maximum number of keys in a B-tree of order 5 with height 3
is_____.

Options :

31

1. ✖

2. ✓ 156

3. ✗ 624

4. ✗ 3125

Question Number : 72 Question Id : 8318968112 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In _____ relation, each tuple has relation R within it.

Options :

1. ✗ primary

2. ✗ prime

3. ✓ nested

4. ✖ atomic

Question Number : 73 Question Id : 8318968113 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The rule which states that addition of same attributes to the right side and left side will result in other valid dependency is classified as

_____.

Options :

1. ✔ Augmentation rule

2. ✖ Inference rule

3. ✖ Referential rule

4. ✖ Reflexive rule

Question Number : 74 Question Id : 8318968114 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The separation of the data definition from program is known
as _____.

Options :

- 1. ✖ Data dictionary
- 2. ✔ Data independence
- 3. ✖ Data integrity
- 4. ✖ Referential integrity

Question Number : 75 Question Id : 8318968115 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which is the candidate key for the relation R(ABCDE) with
functional dependencies $F = \{A \rightarrow BC, B \rightarrow D, CD \rightarrow E, E \rightarrow A\}$

Options :

- 1. ✓ A
- 2. ✗ CD
- 3. ✗ B
- 4. ✗ E

Question Number : 76 Question Id : 8318968116 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Natural Join can also be termed as _____.

Options :

- 1. ✗ combination of Union and Cartesian Product
- 2. ✗ combination of Selection and Cartesian Product

3. ✓ combination of Projection and Cartesian Product

4. ✗ combination of Projection and Union

Question Number : 77 Question Id : 8318968117 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

If $A \rightarrow B$ has trivial functional dependency, then_____.

Options :

1. ✓ B is a subset of A

2. ✗ A is a subset of B

3. ✗ A is a subset of A'

4. ✗ B is a subset of B'

Question Number : 78 Question Id : 8318968118 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following commands is used to delete all rows and free up space from a table?

Options :

1. ✖ Drop
2. ✖ Delete
3. ✔ Truncate
4. ✖ Alter

Question Number : 79 Question Id : 8318968119 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

_____ uses Quantifiers that can be either Existential (*) or Universal ($\forall$).

Options :

1. ✖ Domain Relational Calculus

Tuple Relational Calculus

2. ✓

Distributed Relational Calculus

3. ✗

NoSQL

4. ✗

**Question Number : 80 Question Id : 8318968120 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0**

The database design that consists of multiple tables that are linked together through matching data stored in each table is called a_____.

Options :

Relational database

1. ✓

Network database

2. ✗

3. ✖ Object oriented database

4. ✖ Hierarchical database

Question Number : 81 Question Id : 8318968121 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The incremental model of software development is_____.

Options :

1. ✖ a reasonable approach when requirements are well defined

2. ✔ a good approach when a working core product is required quickly

3. ✖ the best approach to use for projects with large development teams

a revolutionary model that is not used for commercial products

4. ✖

Question Number : 82 Question Id : 8318968122 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The cyclomatic complexity metric provides the designer with information regarding number of_____.

Options :

cycles in the program

1. ✖

errors in the program

2. ✖

independent logic paths in the program

3. ✔

statement in the program

4. ✖

Question Number : 83 Question Id : 8318968123 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In the spiral model of software development, the primary determinant in selecting activities in each iteration is _____.

Options :

- 1. ✖ iteration size
- 2. ✖ cost
- 3. ✔ risk
- 4. ✖ adopted process such as rational unified process or extreme programming

Question Number : 84 Question Id : 8318968124 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The optimizer that explores the space of all query-evaluation plans is called _____.

Options :

1. ✓ cost-based
2. ✗ plan-based
3. ✗ estimate-based
4. ✗ count-based

Question Number : 85 Question Id : 8318968125 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The term that optimizes subexpressions shared by different expressions in a program is called _____.

Options :

1. ✗ multiple subexpression elimination
2. ✓ common subexpression elimination

parametric subexpression elimination

3. ✖

shared subexpression elimination

4. ✖

Question Number : 86 Question Id : 8318968126 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Frequency of failure and network recovery time after a failure are
measures of the _____ of a network.

Options :

performance

1. ✖

reliability

2. ✔

security

3. ✖

feasibility

4. ✖

Question Number : 87 Question Id : 8318968127 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A Gantt chart is least useful for tracking_____.

Options :

1. ✖ task dependencies
2. ✖ resource allocation
3. ✖ critical path
4. ✔ code complexity

Question Number : 88 Question Id : 8318968128 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which phase of the SDLC typically consumes the most resources?

Options :

Requirements gathering

1. ✖

Testing

2. ✖

Maintenance

3. ✔

Coding

4. ✖

Question Number : 89 Question Id : 8318968129 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Regression testing is performed to ensure that_____.

Options :

new code doesn't break existing functionality

1. ✔

all paths are covered

2. ✖

users accept the system

3. ✖

compliance with laws

4. ✖

Question Number : 90 Question Id : 8318968130 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The COCOMO model estimates_____.

Options :

project risk

1. ✖

software cost

2. ✔

team productivity

3. ✖

user satisfaction

4. ✖

Question Number : 91 Question Id : 8318968131 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

At which OSI layer does MAC address filtering occur?

Options :

1. ✖ Network
2. ✔ Data Link
3. ✖ Transport
4. ✖ Physical

Question Number : 92 Question Id : 8318968132 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Token Ring networks avoid collisions by_____.

Options :

1. ✖ CSMA/CD

- 2. ✓ Token passing
- 3. ✗ Exponential backoff
- 4. ✗ Priority queuing

Question Number : 93 Question Id : 8318968133 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which routing algorithm guarantees shortest paths even with negative edge weights?

Options :

- 1. ✗ Dijkstra's
- 2. ✓ Bellman-Ford
- 3. ✗ Link-State

4. ✖ OSPF

Question Number : 94 Question Id : 8318968134 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A TCP header includes all except_____.

Options :

1. ✖ Sequence number

2. ✖ Checksum

3. ✔ TTL

4. ✖ Window size

Question Number : 95 Question Id : 8318968135 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The three-way handshake in TCP ensures_____.

Options :

1. ✖ Encryption setup
2. ✔ Synchronized sequence numbers
3. ✖ QoS negotiation
4. ✖ Multicast membership

Question Number : 96 Question Id : 8318968136 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

An IPv4 datagram with header length=5 and total length=400 bytes
carries_____.

Options :

1. ✔ 380 bytes payload

2. ✖ 400 bytes payload

3. ✖ 20 bytes header

4. ✖ 320 bytes payload

**Question Number : 97 Question Id : 8318968137 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0**

Which protocol uses port 53 by default?

Options :

1. ✖ HTTP

2. ✖ FTP

3. ✔ DNS

4. ✖ SMTP

Question Number : 98 Question Id : 8318968138 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A switch differs from a hub because, it_____.

Options :

1. ✖ operates at Layer 1

2. ✖ broadcasts all frames

3. ✔ uses MAC tables for forwarding

4. ✖ only supports half-duplex

Question Number : 99 Question Id : 8318968139 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Digital signatures provide_____.

Options :

1. ✖ confidentiality
2. ✔ non-repudiation
3. ✖ key exchange
4. ✖ firewall bypass

**Question Number : 100 Question Id : 8318968140 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0**

In asynchronous transmission, the gap time between bytes is _____.

Options :

1. ✖ fixed
2. ✔ variable

3. ✖ a function of the data rate

4. ✖ zero

Question Number : 101 Question Id : 8318968141 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In Java, when we implement an interface method, it must be declared as _____.

Options :

1. ✖ private

2. ✖ protected

3. ✔ public

4. ✖ friend

Question Number : 102 Question Id : 8318968142 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following control fields in TCP header is used to specify whether the sender has no more data to transport.

Options :

1. ✓ FIN

2. ✗ RST

3. ✗ SYN

4. ✗ PSH

Question Number : 103 Question Id : 8318968143 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In XML, DOCTYPE declaration specifies to include a reference to _____ file.

Options :

- 1. ✖ document type declaration
- 2. ✔ document type definition
- 3. ✖ document type language
- 4. ✖ document transfer definition

Question Number : 104 Question Id : 8318968144 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The CSS used inside HTML elements alongside style attribute is called_____.

Options :

- 1. ✖ external CSS
- 2. ✖ internal CSS

3. ✓ inline CSS

4. ✗ outline CSS

Question Number : 105 Question Id : 8318968145 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A web client sends a request to a web server. The web server transmits a program to that client and is executed at client which creates a web document. Such web documents are_____.

Options :

1. ✗ dynamic

2. ✗ static

3. ✓ active

4. ✖ passive

Question Number : 106 Question Id : 8318968146 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Cascading Style Sheets define style and appearance using_____.

Options :

1. ✖ functions with parameters and return values

2. ✔ rules with selectors, properties and their values

3. ✖ techniques with block and inline elements

4. ✖ heuristics with rules and maps

Question Number : 107 Question Id : 8318968147 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

What is the correct HTML for making a hyperlink?

Options :

1. ✓ `<a href="http:// abc.com">abc</a>`

2. ✗ `<a name="http://abc.com">abc</a>`

3. ✗ `<http://abc.com</a>`

4. ✗ `url="http://abc.com">`

Question Number : 108 Question Id : 8318968148 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

What is the correct HTML for adding a background color?

Options :

1. ✗ `<body color="yellow">`

2. ✓ `<body bgcolor="yellow">`

3. ✗ `<background>yellow</background>`

4. ✗ `<body background="yellow">`

Question Number : 109 Question Id : 8318968149 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which is the correct syntax to link XML file with CSS?

Options :

1. ✗ `<?xml type="text/css" href="file.css"?>`

2. ✗ `<?xml type="text/css" src="file.css"?>`

3. ✓ `<?xml-stylesheet type="text/css" href="file.css"?>`

<?xml-stylesheet type="text/css" src="file.css"?>

4. ✖

Question Number : 110 Question Id : 8318968150 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

A Session variable is created_____.

Options :

when the application is first placed on a web server.

1. ✖

when the web server is first started.

2. ✖

when the first client requests a URL resource.

3. ✖

every time a new client interacts with the web application.

4. ✔

Question Number : 111 Question Id : 8318968151 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Let A, B be two events and $\bar{A}$ be the complement of A . If

$P(\bar{A}) = 0.7, P(B) = 0.7$ and $P(B|A) = 0.5$, then $P(A \cup B) = \underline{\hspace{1cm}}$

Options :

1. ✖ 0.65

2. ✔ 0.85

3. ✖ 0.75

4. ✖ 0.50

Question Number : 112 Question Id : 8318968152 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Let a random variable X have a binomial distribution with mean 8 and standard deviation 2. If $P(X < 2) = \frac{k}{2^{16}}$, then the value of k is _____

Options :

1. ✓ 17

2. ✗ 16

3. ✗ 136

4. ✗ 137

Question Number : 113 Question Id : 8318968153 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Let $A = \{1,2,3\}$. Which of the following is the number of distinct relations on A ?

Options :

1. ✗ 256

2. ✗ 158

3. ✓ 512

4. ✗ 1024

Question Number : 114 Question Id : 8318968154 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

In any Lattice L, $((a \wedge b) \vee a) \wedge b =$ _____

Options :

1. ✗ $a \vee b$

2. ✓ $a \wedge b$

3. ✗ $(a \wedge b) \vee a$

4. ✗ $((a \vee b) \wedge a) \vee b$

Question Number : 115 Question Id : 8318968155 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

If the system of linear equations $x + 2y + z = 5$, $2x + \lambda y + 4z = 12$, $4x + 8y + 12z = 2\mu$ have infinite number of solutions, then the values of λ and μ are _____

Options :

1. ✖ $\lambda = 4, \mu = 28$

2. ✔ $\lambda = 4, \mu = 14$

3. ✖ $\lambda = 8, \mu = 14$

4. ✖ $\lambda = 8, \mu = 28$

Question Number : 116 Question Id : 8318968156 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

If the product and sum of eigenvalues of a 2×2 matrix $\begin{pmatrix} 3 & x \\ x & y \end{pmatrix}$ are -3 and 5 , respectively, then $x + y =$ _____

Options :

1. ✖ -5

2. ✖ $-6 \pm i3\sqrt{2}$

3. ✖ $-2 \pm i3$

4. ✔ -1

Question Number : 117 Question Id : 8318968157 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Given that the value of the integral $\int_1^9 (x^2 - 2) dx$ calculated using the Simpson's 1/3 rule with four uniform subintervals over the interval $[1,9]$ is given by $f(1) + \alpha^2 + \frac{8}{3}$, then the possible value of α is _____

Options :

1. ✔ $\alpha = 15$

2. ✖ $\alpha = 14$

3. ✖ $\alpha = 13$

4. ✖ $\alpha = 12$

Question Number : 118 Question Id : 8318968158 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 1} \left(\frac{x^x - x}{x - 1 - \log x} \right) = \underline{\hspace{2cm}}$$

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ $1/2$

Question Number : 119 Question Id : 8318968159 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the following integral is un-bounded?

Options :

1. ✖ $\int_0^{\pi/4} \tan(x) dx$

2. ✖ $\int_0^{\infty} x e^{-x} dx$

3. ✔ $\int_0^a \frac{1}{a-x} dx$

4. ✖ $\int_0^{\infty} x e^x dx$

Question Number : 120 Question Id : 8318968160 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Let $f(x) = x^3 - \frac{9}{2}x^2 + 6x - 2$ be a function defined on the closed interval $[0,3]$. Then, the global maximum value of $f(x)$ is _____

Options :

1. ✖ 4.5

2. ✖ 0.5

3. ✔ 2.5

4. ✖ 3.0