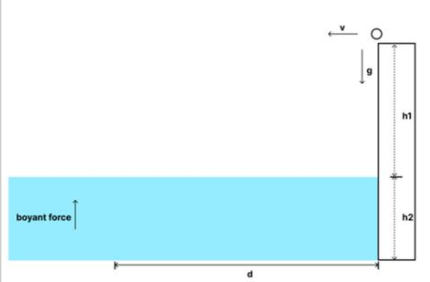
Juspay MCQs

1. In a survey conducted among 150 employees, 60 are skilled in Java, 50 in Python, and 40 in C++. Additionally, 20 employees are skilled in both Java and Python, 10 in both Python and C++. and 15 in both Java and C++. 5 employees are skilled in all three languages. How many employees are skilled in none programming language? **(Maths - 20)**
2. 50
3. 40
4. 45
5. 30
6. Detective Ravi is investigating a crime in a small town.From past experience, he knows that 80% Of the crimes in this town are committed by locals, and by Outsiders. Additionally, When a crime is committed by a there’s a 90% chance that a local witness will report. seeing the suspect. However. if the crime is committed by an Outsider. There’s Only a 30% Chance Of a witness report. Now, a witness has reported seeing the suspect. What is the probability that the crime was committed by a local? **(Maths - 5)**
7. 0.85
8. 0.92
9. 0.95
10. 0.77
11. A ball is thrown horizontally from height h1 = 50 meters above a pond. The ball needs to hit a point that is d = 100 meters horizontally from the point where it was thrown and 70 meters below the initial height (i.e., h2 = 20 meters below the surface of the water). The ball will travel through the air and then enter the water. where it experiences buoyancy. Let us say its volume is V and mass M. The goal is to find the initial horizontal velocity v with which the ball should be thrown so that it reaches the target point under the water. Assume that fluid resistance is negligible. g 10m/s^2. Density Of fluid 1 Kg/m^3, volume of the ball 0.5 m^3 of ball 1 Kg. **(Physics - 11)**
12. 16.69 m/s
13. 21 m/s
14. 14.71 m/s
15. 22.83 m/s
16. Two trains are concentric circular tracks in anticlockwise. The inner train (Train A) travels a track with a radius of r1 = 1 km. while the outer train (Tram B) travels a track with a radius of r2 = 1.1 km. Both trains move at the speed of 20 m/s. and each train has a length of 100 meters. How fast should run, along the direction of trains, so that you appear to be stationary to your friend Train A facing outside. Just to be clear - You are on train A. If you draw a radius from the center to yourself and your friend then you will all fall on the same line. **(Physics - 3)**
17. 1.1m/s
18. 3 m/s
19. 1.82 m/s
20. 2 m/s
21. How are indexes saved in the databases? **(Systems - 12)**
22. They make the tree during the execution of the query.
23. They maintain a tree structure from the start.
24. They are saved along with the table data in the form of rows,
25. It is saved in the disk in the similar way tables are saved but with different data structures.
26. If a CPU can do an operation at the rate Of 1GHz (Giga = 10^9) when humans do in 1 second, how big (approximately) is a human second terms of CPU time? **(Systems - 21)**
27. 32 seconds
28. 32 days
29. 32 years
30. 32 million years
31. Question: A CPU uses round-robin scheduling with a time quantum of 10 milliseconds. The following three processes are running:

Process A: Needs CPU for 15 ms

Process B: Needs CPU for 25 ms

Process C: Needs CPU for 15 ms

Assume context switching takes 1 ms and all processes are in the ready queue in order A, B, C when the CPU starts executing. What is the total time taken for all processes to complete? **(Systems - 27)**

1. 40 ms
2. 47 ms
3. 50 ms
4. 61 ms
5. The CAP theorem is a theory in distributed computing that states that a distributed system can only support two out of three of the following properties:

Consistency: All members of a distributed system have an up-to-date view of the data

Availability: Data is always accessible for reading and updating

Partition tolerance: The system continues to operate even if a network failure prevents some members from reaching others

In a distributed system with 5 nodes. a network partition occurs, isolating 3 nodes from the other 2. The system has been designed to prioritize Availability over Consistency.

What is the most likely behavior of the system during this network partition?

a. The system will ensure that all nodes remain operational, but the data might become inconsistent across partitions.

b. The system will prioritize consistency, and one side of the partition will halt operations to prevent data conflicts.

c. The system will allow both partitions to continue operating independently, but they may diverge in state.

d. The system will wait for the partition to be resolved before allowing any of the nodes to process further requests. **(Systems - 65)**

1. a,c
2. b,c
3. b,c,d
4. a,d
5. Imagine a scenario where there are 100 servers running, each handling an equal share of traffic with a 10% CPU utilization. Suddenly, 20 servers experience a failure, and the remaining 80 servers must handle the redistributed traffic. What will be the new CPU utilization on each of the remaining servers? **(Systems - 18)**
6. 20%
7. 12.50%
8. 25%
9. 17.50%
10. A CPU s clock speed 3GHz and running an instruction which requires 250 CPU cycles complete, how many times can the CPU execute this instruction 1s? (K = 1000 and M = 10,00,000) **(Systems - 5)**
11. 120K times
12. 12M times
13. 120M times
14. 12B times
15. The CAP theorem is a theory in distributed computing that states that a distributed system can only support two out of three of the following properties:

Consistency: All members of a distributed system have an up-to-date view of the data

Availability: Data is always accessible for reading and updating

Partition tolerance: The system continues to operate even if a network failure prevents some members from reaching others

In a system that prioritizes availability, two sides of a partition continue processing requests independently. Once the partition heals, the system must reconcile the data.

What might happen when the system tries to reconcile the data? **(Systems - 63)**

1. System will reject both outputs during the partition incident and revert to to a state which is fine earlier
2. The system will overwrite one side's updates with the other side's updates to maintain consistency.
3. The system will discard all updates made during the partition and force users to retry their requests.
4. The system will keep all updates but mark the data as conflicting, requiring manual reconciliation.
5. Let us say we have a linked list (with pointers to both start & end elements) & dynamic array whose size can change at runtime(implemented exactly like vectors). Which of the following operations will take different amortized(average) time complexity to execute? **(CS1 - 01)**
6. Adding an element at the end of both data structures
7. Adding an element at the start of both data structures
8. Adding an element in the middle of both data structures
9. Deleting an element from the end of both data structures
10. Which of the following data structures could be used for range search queries? If you find more than one option that could be used,

choose the one that is more efficient. **(CS2 - 10)**

1. Linked List
2. Stack
3. HashMap
4. Binary Search Tree
5. Clear Answer
6. You are working with a large dataset where stability is crucial—meaning that the order of equal elements must be preserved. Which of the following sorting algorithms would you choose to maintain stability while handling large datasets? **(CS3 - 05)**
7. Quick Sort
8. Merge Sort
9. Selection Sort
10. Heap Sort
11. In which scenario would you choose a greedy algorithm to solve a problem? **(CS4 - 01)**
12. When the problem requires finding all possible solutions to tho problem
13. When the problem has overlapping subproblems
14. When local optimal choices lead to a global optimal solution
15. When the problem requires memorization Of old computed values
16. In the heap sort algorithm, after building a Max-Heap, you repeatedly extract the largest element (root) and reduce. fill the blanks to complete the heap sort function. (CS5) **(CS5 - 08)**

void heapify(int arr[], int n, int i){

int largest = i;

int left = 2\*i+1;

int right = 2 \* i +2;

if ((left < n)&& (arr[left]> arr[largest])) {

largest = left;

}

if ((right < n) && (arr[right] > arr[largest])) {

largest = right;

}

if (largest != i) {

std::swap(arr[i], arr[largest]);

heapify(arr, n, largest);

}

void heapSort(int arr[], int n) {

buildHeap(arr, n);

for (int i=n - 1; i > 0;i--) {

std::swap(arr[0], arr[i]);

heapify(arr,\_\_\_\_\_, \_\_\_\_\_\_\_\_);

}

}

1. i+1, 0
2. i, 0
3. n, I