One Page Formula Sheets

Use this for the final 6 hours.

Quant formulas

Percentage

```
x% of y = xy/100
Increase % = (increase/original) × 100
Decrease % = (decrease/original) × 100
```

Successive change:

```
a + b + ab/100
```

If one increase and one decrease:

```
a - b - ab/100
```

Profit/loss

```
Profit = SP - CP
Loss = CP - SP
Profit% = Profit/CP × 100
Loss% = Loss/CP × 100
Discount% = Discount/MP × 100
```

Interest

```
SI = PRT/100
A = P(1 + R/100)^T
CI = A - P
```

Average

```
Average = Sum / Count
Sum = Average × Count
```

Ratio

```
a:b => ax:bx
share = total × part/sum_of_parts
```

Time and work

```
1 day's work = 1/days
Together = xy/(x+y)
```

Speed

```
Speed = Distance/Time
km/h to m/s = ×5/18
m/s to km/h = ×18/5
```

LCM/HCF

```
Product of two numbers = LCM × HCF
```

Technical one-page sheet

Data Structures

- Stack: LIFO
- Queue: FIFO
- BFS: Queue
- DFS: Stack/recursion
- Array access: O(1)
- Linked list search: O(n)
- Binary search: O(log n), sorted array required
- Hashing average search: O(1)
- Heap: priority queue

Sorting

Sort	Worst
Bubble	$O(n^2)$
Selection	$O(n^2)$
Insertion	$O(n^2)$
Merge	O(n log n)

Sort	Worst
Quick	$O(n^2)$
Heap	O(n log n)

OS

- Process: program in execution
- Thread: lightweight, shares process memory
- Round Robin: time quantum
- Deadlock: mutual exclusion, hold and wait, no preemption, circular wait
- Paging: fixed-size
- Segmentation: variable-size
- Page fault: page not in RAM
- Thrashing: too many page faults

Networking

- TCP: reliable, connection-oriented
- UDP: connectionless, faster
- DNS: 53
- HTTP: 80
- HTTPS: 443
- SSH: 22
- Switch: MAC
- Router: IP
- ARP: IP to MAC
- DHCP: automatic IP

Embedded

- Microcontroller: CPU + memory + I/O
- Microprocessor: CPU only
- ADC: analog to digital
- DAC: digital to analog
- Polling: CPU repeatedly checks
- Interrupt: device/event notifies CPU
- UART: async serial
- SPI: MOSI/MISO/SCLK/SS
- I2C: SDA/SCL
- Watchdog: resets hung system

QA

- Verification: building product right
- Validation: building right product

- Unit: individual module
- Integration: module interaction
- System: complete system
- Smoke: basic build check
- Regression: old features after change
- Severity: impact
- Priority: urgency
- Selenium: web automation
- Postman: API testing
- JMeter: load/performance

Pseudocode sheet

- `WHILE`: condition checked first
- `REPEAT UNTIL`: runs at least once
- Integer division drops decimal
- `%` gives remainder
- Nested loop total = outer × inner if fixed
- Print before recursion = descending style
- Print after recursion = ascending style
- Always trace variable update order

Coding sheet

Memorize:

- prime check up to `sqrt(n)`
- GCD Euclid algorithm
- frequency map
- two pointers
- second largest
- palindrome
- anagram
- Kadane’s algorithm