perplexity

Software Engineering Psychometric Assessment Suite

Target Audience: Undergraduate Engineering Students
Total Questions: 40
Estimated Time: 45–60 Minutes
Objective: Evaluate cognitive aptitude, logical structuring, and workplace behavioral suitability.

Section 1: Numerical Reasoning (8 Questions)

Focus: Data interpretation, basic arithmetic, and resource estimation.

1. Project Estimation
A development team of 4 engineers can complete a backend module in 12 days. If the project manager adds 2 more engineers with the same efficiency to the team, how many days will it take to complete the same module?

- A) 6 days

- B) 8 days

- C) 9 days

- D) 10 days

- **Correct Answer:** B

- **Explanation:** Inverse proportion. (4 engineers × 12 days) = 48 man-days. 48 / 6 engineers = 8 days.

- **Skill Signal:** Resource planning, efficiency calculation.

2. Data Transfer Speed
A file is 2.4 GB in size. If the download speed is stable at 8 MB per second (Mbps), how long will it take to download? (Assume 1 GB = 1000 MB).

- A) 3 minutes

- B) 4 minutes

- C) 5 minutes

- D) 6 minutes

- **Correct Answer:** C

- **Explanation:** 2.4 GB = 2400 MB. 2400 / 8 = 300 seconds. 300 / 60 = 5 minutes.

- **Skill Signal:** Unit conversion, rate calculation.

3. Budget Allocation

A startup's IT budget is $200,000. They allocate 40% to hardware, 35% to software licenses, and the remainder to cloud hosting. How much is allocated to cloud hosting?

- A) $40,000
- B) $50,000
- C) $60,000
- D) $70,000
- **Correct Answer:** B
- **Explanation:** 40% + 35% = 75%. Remaining is 25%. 25% of $200,000 is $50,000.
- **Skill Signal:** Budgeting, percentage analysis.

4. Server Load

A server handles 500 requests per minute. Following a marketing campaign, traffic increases by 20% in the first hour, and then by another 10% (compounded) in the second hour. What is the request rate after two hours?

- A) 650
- B) 660
- C) 600
- D) 700
- **Correct Answer:** B
- **Explanation:** 500 + 20% = 600. 600 + 10% = 660.
- **Skill Signal:** Growth trending, compound percentage.

5. Defect Density

In a codebase of 15,000 lines, 45 bugs were found. In a second codebase of 20,000 lines, 50 bugs were found. Which codebase has a higher defect density (bugs per 1,000 lines)?

- A) Codebase 1
- B) Codebase 2
- C) They are equal
- D) Cannot be determined
- **Correct Answer:** A
- **Explanation:** Codebase 1: 45/15 = 3 bugs/kloc. Codebase 2: 50/20 = 2.5 bugs/kloc.
- **Skill Signal:** Ratio comparison, quality analysis.

6. Logic Gates

In a logic circuit, if Input A is 1 and Input B is 0:
(A AND B) OR (A XOR B) = ?

- A) 0
- B) 1

- C) Null

- D) -1

- **Correct Answer:** B

- **Explanation:** (1 AND 0) = 0. (1 XOR 0) = 1. (0 OR 1) = 1.

- **Skill Signal:** Boolean logic, computational thinking.

7. Subscription Revenue
A SaaS platform charges $12/month. They have 1,000 users. If they increase the price to $15/month but lose 10% of their users, what happens to the total monthly revenue?

- A) Decreases by $500

- B) Increases by $1,000

- C) Increases by $1,500

- D) Remains the same

- **Correct Answer:** C

- **Explanation:** Original: 1000 ∗ 12 = $12,000. New: 900 ∗ 15 = $13,500. Difference: +$1,500.

- **Skill Signal:** Risk/Reward analysis, revenue modeling.

8. Sequence Analysis
Identify the missing number in the server response time logs (in ms): 2, 6, 12, 20, 30, ?

- A) 38

- B) 40

- C) 42

- D) 44

- **Correct Answer:** C

- **Explanation:** The differences increase by 2 (4, 6, 8, 10, 12). 30 + 12 = 42.

- **Skill Signal:** Pattern recognition, numerical series.

Section 2: Verbal Reasoning (7 Questions)

Focus: Comprehension, critical thinking, and assumption validation.

Read the following text for questions 9–10:
"Agile methodology emphasizes iterative development, where requirements and solutions evolve through collaboration. Unlike the Waterfall model, which requires strict planning upfront, Agile welcomes changing requirements, even late in development. However, this flexibility can lead to 'scope creep' if documentation is neglected and stakeholders are not managed effectively."

9. Comprehension
According to the text, what is a potential downside of Agile flexibility?

- A) It requires strict upfront planning.

- B) It discourages collaboration.

- C) It prevents late changes.

- D) It can lead to uncontrolled expansion of project scope.

- **Correct Answer:** D

- **Explanation:** Text explicitly states flexibility can lead to "scope creep."

- **Skill Signal:** Reading comprehension, detail extraction.

10. Inference
Based on the text, which environment is Agile best suited for?

- A) Projects where requirements are fixed and never change.

- B) Projects where documentation is the only priority.

- C) Dynamic environments where user needs may evolve.

- D) Projects with zero stakeholder interaction.

- **Correct Answer:** C

- **Explanation:** Inferred from "Agile welcomes changing requirements."

- **Skill Signal:** Inductive reasoning.

11. Syllogism
Statements: All Compilers are Programs. Some Programs are Interpreters.
Conclusion:
I. Some Compilers are Interpreters.
II. All Interpreters are Programs.

- A) Only I follows

- B) Only II follows

- C) Both I and II follow

- D) Neither follows

- **Correct Answer:** D (Technically B is logical in real life, but in strict syllogism logic based *only* on the statements provided, "Some Programs are Interpreters" does not guarantee "All Interpreters are Programs" unless stated "All Interpreters are Programs").

- *Correction for strict logic test context:* If we assume the reverse "All Interpreters are Programs" is not stated, then neither strictly follows. However, typically Option B is the distractor. Let's select D for strict adherence to provided text.

- **Skill Signal:** Formal logic, error checking.

12. Analogy
GitHub : Repository :: Jenkins : ?

- A) Database

- B) CI/CD Pipeline

- C) Operating System

- D) Frontend Framework
- **Correct Answer:** B
- **Explanation:** GitHub hosts repositories; Jenkins manages CI/CD pipelines.
- **Skill Signal:** Domain association, functional relationships.

13. Critical Reasoning
"The new API reduces latency by 50%. Therefore, user satisfaction will double."
Which statement, if true, most weakens this argument?

- A) The API is written in Python.
- B) Users value UI design significantly more than speed.
- C) The server costs will increase slightly.
- D) The API was developed by a junior team.
- **Correct Answer:** B
- **Explanation:** If users don't care about speed (the metric improved), satisfaction won't necessarily rise.
- **Skill Signal:** Argument analysis, identifying variables.

14. Assumption Identification
Statement: "We need to switch to a NoSQL database to handle the unstructured data from the new social feed feature."
Assumption:

- A) SQL databases are cheaper.
- B) The social feed feature is not important.
- C) Current SQL databases cannot efficiently handle the specific unstructured data required.
- D) NoSQL is older than SQL.
- **Correct Answer:** C
- **Explanation:** The switch is justified by the *need* to handle unstructured data, assuming the current solution cannot.
- **Skill Signal:** Technical justification, gap analysis.

15. Definition Selection
Which word best replaces "Ephemeral" in the context: "The data stored in the cache is ephemeral and will be lost upon reboot."

- A) Permanent
- B) Temporary
- C) Encrypted
- D) Structured
- **Correct Answer:** B
- **Explanation:** Ephemeral means lasting for a very short time.

- **Skill Signal:** Vocabulary, technical literacy.

Section 3: Logical Reasoning (6 Questions)

Focus: Algorithmic thinking, sequencing, and conditional logic.

16. Coding-Decoding
If DEBUG is coded as EFCVH, how is LOGIC coded?

- A) MPHJD
- B) NQJKE
- C) MPJJD
- D) LPHID
- **Correct Answer:** A
- **Explanation:** Each letter is shifted forward by +1. L→M, O→P, G→H, I→J, C→D.
- **Skill Signal:** Pattern recognition, encryption logic.

17. Ordering
Five processes (A, B, C, D, E) are queued. A must run before B. C must run after B. D must run before A. E runs last. What is the execution order?

- A) D-A-B-C-E
- B) A-B-D-C-E
- C) D-B-A-C-E
- D) B-C-A-D-E
- **Correct Answer:** A
- **Explanation:** D < A < B < C. E is last.
- **Skill Signal:** Scheduling, sequential logic.

18. Flow Logic
Look at this series: 2, 1, (1/2), (1/4), ... What number should come next?

- A) (1/3)
- B) (1/8)
- C) (2/8)
- D) (1/16)
- **Correct Answer:** B
- **Explanation:** Each number is divided by 2 to get the next.
- **Skill Signal:** Recursive logic.

19. Directional Sense
A robot faces North. It turns 90 degrees clockwise, moves 5 meters, turns 90 degrees clockwise again, and moves 5 meters. What direction is it facing now?

- A) North

- B) East

- C) South

- D) West

- **Correct Answer:** C

- **Explanation:** North → Right (East) → Right (South).

- **Skill Signal:** Spatial orientation, simulation.

20. Relationship Logic

Point A is the parent of Point B. Point C is the sibling of Point B. Point D is the child of Point C. How is Point A related to Point D?

- A) Parent

- B) Grandparent

- C) Uncle

- D) Sibling

- **Correct Answer:** B

- **Explanation:** A is parent to C (sibling of B). D is child of C. Therefore A is D's Grandparent.

- **Skill Signal:** Hierarchical structures (trees).

21. Odd One Out

Which of the following does not belong in the group?

- A) Linux

- B) Windows

- C) Python

- D) macOS

- **Correct Answer:** C

- **Explanation:** A, B, and D are Operating Systems. Python is a programming language.

- **Skill Signal:** Classification, technical categorization.

Section 4: Abstract / Diagrammatic Reasoning (6 Questions)

Focus: Visual patterns, mental manipulation of shapes/symbols.

22. Sequence Completion

Visual description: [Arrow Up] → [Arrow Right] → [Arrow Down] → ?
What comes next?

- A) Arrow Up

- B) Arrow Right

- C) Arrow Left

- D) Arrow Down

- **Correct Answer:** C

- **Explanation:** The pattern is a 90-degree clockwise rotation.

- **Skill Signal:** Spatial looping, rotation logic.

23. Set Operations
Visual description: Circle A is inside Square B. Square B is inside Triangle C.
Which statement is true?

- A) All of Circle A is inside Triangle C.

- B) Some of Triangle C is inside Circle A.

- C) Square B is outside Triangle C.

- D) Circle A is larger than Square B.

- **Correct Answer:** A

- **Explanation:** Nested sets logic. If A ⊂ B and B ⊂ C, then A ⊂ C.

- **Skill Signal:** Set theory, nesting logic.

24. Symbol Transformation
Rule: α flips the shape vertically. β changes the color from black to white.
Input: Black Triangle pointing Up.
Apply: α then β.
Result?

- A) Black Triangle pointing Down

- B) White Triangle pointing Up

- C) White Triangle pointing Down

- D) Black Triangle pointing Up

- **Correct Answer:** C

- **Explanation:** Flip vertical (Points Down) → Change color (White).

- **Skill Signal:** Algorithmic execution, state transformation.

25. Matrix Logic
Row 1: [1 dot] [2 dots] [3 dots]
Row 2: [2 dots] [4 dots] [6 dots]
Row 3: [3 dots] [6 dots] [?]

- A) 8 dots

- B) 9 dots

- C) 10 dots

- D) 12 dots

- **Correct Answer:** B

- **Explanation:** Row 1 is x1. Row 2 is x2. Row 3 is x3 multiplication of column index. Or Row 3 is R1 + R2.
- **Skill Signal:** Matrix patterns, arithmetic progression.

26. Flowchart Path

Start → Is X > 5? → (Yes: Subtract 1) / (No: Add 1) → End.
If Input X = 4, what is the output?

- A) 3
- B) 4
- C) 5
- D) 6
- **Correct Answer:** C
- **Explanation:** 4 is not > 5. Follow "No" path. 4 + 1 = 5.
- **Skill Signal:** Control flow analysis.

27. Visual Analogy

Visual description: [Square] is to [Cube] as [Circle] is to ?

- A) Cylinder
- B) Sphere
- C) Oval
- D) Ring
- **Correct Answer:** B
- **Explanation:** 2D shape to its 3D equivalent.
- **Skill Signal:** Dimensional reasoning.

Section 5: Situational Judgement (8 Questions)

Focus: Ethics, prioritization, teamwork, and decision-making.

28. Technical Debt

You are two days away from a deadline. You realize a piece of code works but is messy and might cause bugs later (technical debt). What do you do?

- A) Rewrite the entire module immediately to be perfect.
- B) Ship the code as is and never look at it again.
- C) Ship the working code to meet the deadline, but document the issue and schedule a refactor sprint immediately after.
- D) Hide the code so the manager doesn't see it.
- **Correct Answer:** C
- **Explanation:** Balances delivery speed with long-term quality maintenance.

- **Skill Signal:** Pragmatism, professional responsibility.

29. Unclear Requirements
You are assigned a task, but the requirements from the Product Manager are vague and contradictory. You are stuck. What is the best next step?

- A) Guess what they want and build it.

- B) Wait until the deadline to say you couldn't do it.

- C) Ask your peer to do it for you.

- D) Proactively set up a meeting with the Product Manager to clarify specific questions before starting.

- **Correct Answer:** D

- **Explanation:** Demonstrates communication skills and proactive unblocking.

- **Skill Signal:** Communication, requirement gathering.

30. Critical Bug
It is 5:00 PM on Friday. You find a critical security bug in the production system that could leak user data.

- A) Go home and fix it Monday morning.

- B) Post it on social media to warn users.

- C) Immediately escalate to the team lead/security team and stay to help fix it.

- D) Ignore it; it's not your code.

- **Correct Answer:** C

- **Explanation:** Security takes precedence over work-hours; immediate escalation is required.

- **Skill Signal:** Integrity, crisis management.

31. Disagreement
A senior engineer suggests a solution you know is inefficient because you recently read a paper on a newer method.

- A) Stay silent; they are senior.

- B) Publicly laugh at their outdated method during the meeting.

- C) Privately or politely suggest the new method with data/evidence to support your view.

- D) Implement your method without telling anyone.

- **Correct Answer:** C

- **Explanation:** Respectful challenge backed by data is the standard for engineering culture.

- **Skill Signal:** Teamwork, influence.

32. Learning
Your team is switching from Java to Go (a language you don't know) next month.

- A) Start looking for a new job that uses Java.

- B) Wait for the company to pay for a training course.

- C) Complain that the switch is unnecessary.

- D) Start learning the basics of Go in your spare time or allotted learning hours to prepare.

- **Correct Answer:** D

- **Explanation:** Software engineering requires continuous learning and adaptability.

- **Skill Signal:** Adaptability, growth mindset.

33. Team Delay

A team member is struggling to finish their part of the project, which is blocking you.

- A) Complain to the manager immediately.

- B) Offer to pair program or help them debug the issue to unblock the team.

- C) Do your own work and let them fail.

- D) Take over their work completely and don't give them credit.

- **Correct Answer:** B

- **Explanation:** Collaboration and unblocking the team is valued over individual isolation.

- **Skill Signal:** Collaboration, leadership.

34. Feature Request

A client asks you directly to add a "small feature" that is not in the project scope.

- A) Do it quickly to make them happy.

- B) Refuse rudely.

- C) Direct them to the Project Manager to discuss scope and budget implications.

- D) Charge them cash on the side.

- **Correct Answer:** C

- **Explanation:** Adherence to process and scope management protects the team and timeline.

- **Skill Signal:** Professional boundaries, process adherence.

35. Root Cause

You caused a production outage by deploying a bad config file.

- A) Blame the QA team for not catching it.

- B) Admit the mistake, roll back the change, and write a post-mortem on how to prevent it next time.

- C) Delete the logs so no one knows it was you.

- D) Say nothing and hope it fixes itself.

- **Correct Answer:** B

- **Explanation:** Psychological safety and "blameless post-mortems" rely on honesty and process improvement.

- **Skill Signal:** Accountability, problem resolution.

Section 6: Spatial / Mechanical Reasoning (5 Questions)

Focus: Mental rotation, physical logic, and visualization.

36. Cube Folding
A flat paper shape consists of 6 squares in a 'T' shape. If folded into a cube, which square will be opposite the center square?

- A) The top square of the 'T'
- B) The bottom square of the 'T'
- C) The left square
- D) The far end of the stem
- **Correct Answer:** D
- **Explanation:** In a T-shape fold, the stem's end usually folds over to cover the face opposite the cross-center.
- **Skill Signal:** 3D visualization.

37. Gear Rotation
Gear A drives Gear B. Gear B drives Gear C. If Gear A turns Clockwise, which way does Gear C turn?

- A) Clockwise
- B) Counter-Clockwise
- C) It stays still
- D) Oscillates
- **Correct Answer:** A
- **Explanation:** A (CW) → B (CCW) → C (CW). Odd numbers of gears reverse direction; even numbers return to original.
- **Skill Signal:** Mechanical logic, system interdependencies.

38. Perspective
You are looking at a cylinder from directly above. What 2D shape do you see?

- A) Square
- B) Rectangle
- C) Circle
- D) Triangle
- **Correct Answer:** C
- **Explanation:** The top-down orthographic projection of a cylinder is a circle.
- **Skill Signal:** Orthographic projection.

39. Stability
Which object is most stable?

- A) A pyramid resting on its tip.
- B) A sphere on a flat surface.
- C) A cube resting on a flat face.
- D) A tall, thin column.
- **Correct Answer:** C
- **Explanation:** Low center of gravity and wide base surface area provide maximum static stability.
- **Skill Signal:** Physics intuition.

40. Mirror Image

Which alphanumeric string is a palindrome (looks the same forwards and backwards)?

- A) 12345
- B) ABBA
- C) A1B2
- D) QWERTY
- **Correct Answer:** B
- **Explanation:** ABBA reads the same in reverse.
- **Skill Signal:** String processing, pattern symmetry.