

# AMCAT

## Aspiring Minds Computer Adaptive Test

### TEST STRUCTURE

#### **Test Modules**

The test is structured into the following modules.

#### *Compulsory Modules*

English Comprehension

Quantitative Ability

Logical Ability

#### *Optional Modules*

Computer Literacy

Computer Programming Principles and Application

Electronics and Semiconductor

Civil Engineering

Mechanical

Finance

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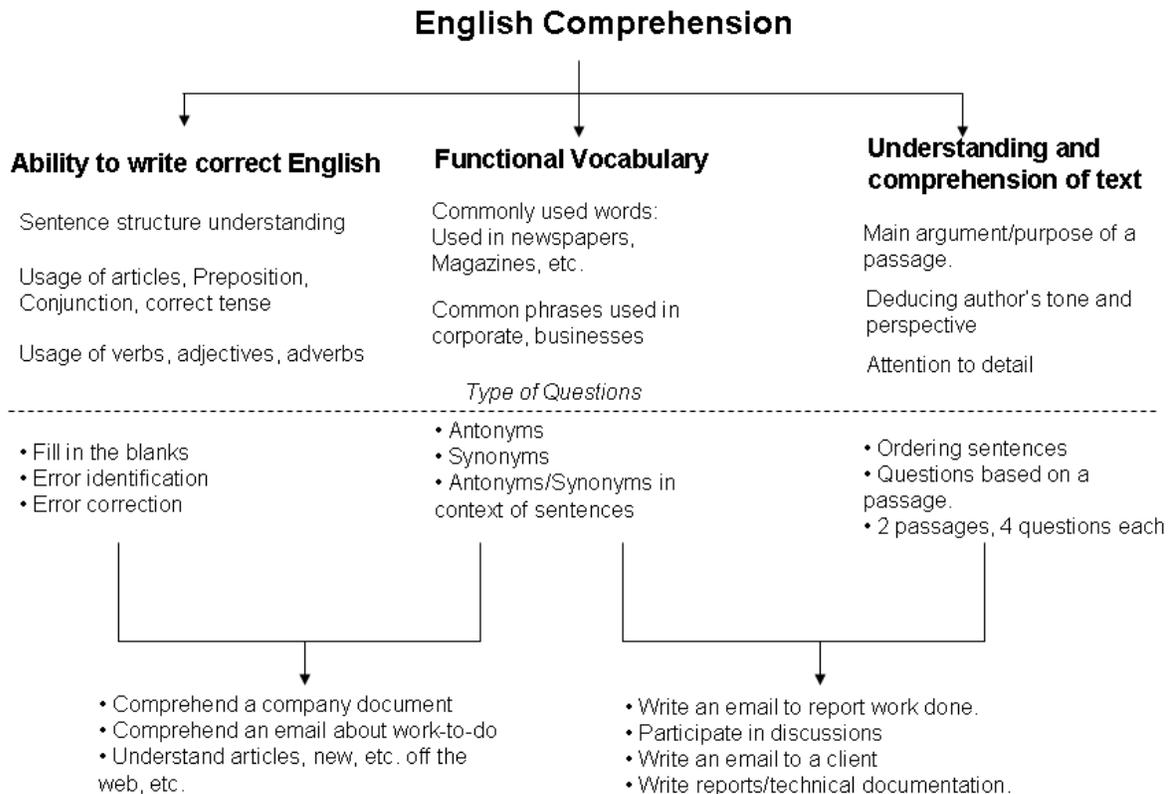
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# English Comprehension

Familiarity with English Language in its various nuances is an essential skill, especially in the current climate of global networking. Ideally, any recruitment should involve a test of skills in handling the Language in ways that promote the objectives of a company and establish desired rapport. Needless to state, an appropriate test is necessary.

Our English Test uses a variety of internationally standardized resources for framing questions aimed at determining the candidate's ability to understand (a) the written text (b) the spoken word and (c) communicate effectively through written documents. The test broadly covers the following areas:

1. A wide-ranging Vocabulary to cope with general and specific terminology
2. Syntax and sentence structure, the incorrect use of which distorts meaning and becomes a communication hurdle.
3. Comprehension exercises designed to test a candidate's ability to read fluently and understand correctly.
4. The ability to understand and use suitable phrases, which enrich the meaning of what, is conveyed.
5. Time management and accuracy in conformity with the examiner's criteria.



# Quantitative Ability

The Quantitative Ability assesses the ability of the candidate in the following two aspects:

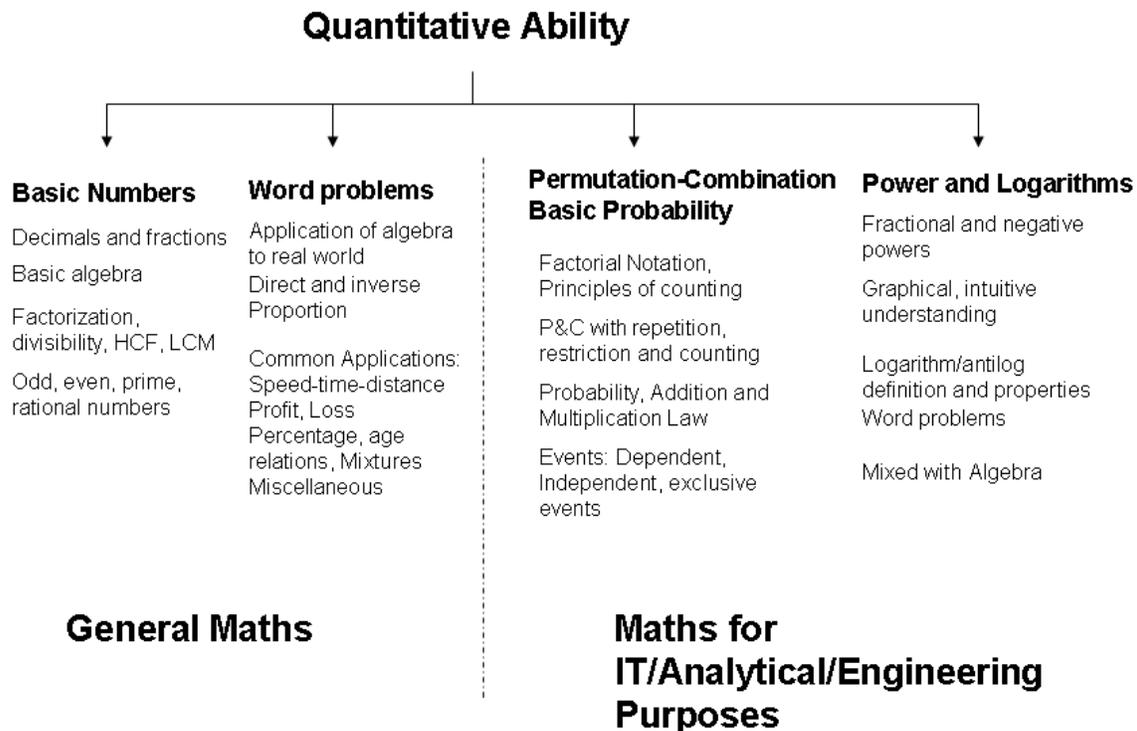
a. **Basic understanding of numbers and applications**

This section tests whether the candidate has understanding of basic number system, i.e., fractions, decimals, negative, positive, odd, even numbers, rational numbers, etc. The candidate should know how to do basic operations on these numbers, understand concepts of factors/divisibility and have good practice on algebra.

Apart from operations on numbers, the candidate should know how to convert a real-world problem into equations, which could be solved to find an unknown quantity. The candidate is tested on Word Problems representing various scenarios to assess the same.

b. **Analytical/Engineering Maths**

These are aspects of mathematics needed for Engineering disciplines and analysis of data. This includes permutation-combination, probability and understanding of logarithms.

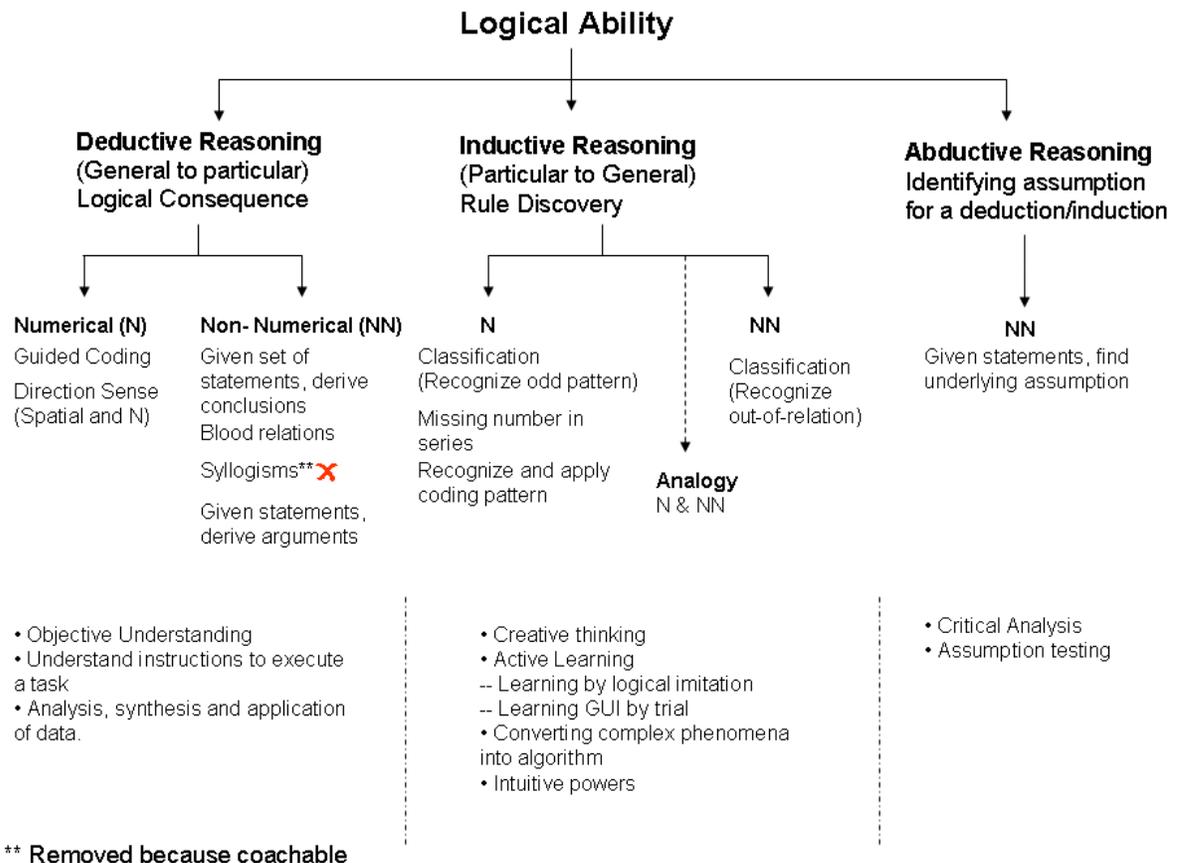


## Logical Ability

The logical ability section assesses capacity of an individual to interpret things objectively, to be able to perceive and interpret trends to make generalizations and be able to analyze assumptions behind an argument/statement. These abilities are primary for success of a candidate in the industry. Specifically, these are divided into following sections:

- a. **Deductive Reasoning:** Assesses the ability to synthesize information and derive conclusions.
- b. **Inductive Reasoning:** Assesses the ability to learn by example, imitation or hit-and-trial. This also provides an indication of how creative the individual is.
- c. **Abductive Reasoning:** Assesses the critical thinking ability of an individual to see through loopholes in an argument or group of statements.

All these abilities are tested both using numerical and verbal stimuli. Coachable questions have been identified and removed.



# Computer Programming Principles and Application

The Computer Programming Principles and Algorithms Module evaluate the suitability of the candidate in the software industry. It not only tests the knowledge and application of basic constructs of programming, but also concepts of data structures, algorithm analysis and object-oriented-programming.

The test is language-independent and all programming questions use a pseudo-code. Significant effort has been made to exclude memory-based and rote-learning questions.

The test contains questions on debugging programs, finding the output of programs, completing incomplete programs, finding complexity of algorithms, questions on implementation and operations on different data structures, etc.

The test contains the following sections:

## **A. Structure and constructs of Computer Programs**

1. Programming flow, Procedures, Functions and Arguments, Methods
2. Data-types, how data is stored in computers, input/output, manipulation, methods of referencing and assessing data (including pointers).
3. Iteration, decision-making, recursions
4. Algorithm Complexity: Space and time Complexity, Asymptotic Notation
5. Compilation, Linking and Execution; debugging, kinds of errors.

## **B. Data-structures and Basics Algorithms**

1. Data Storage Methods: Linked lists, Arrays, Queues, Stacks, Trees, Heaps, Hash tables, graphs; Stress on which data structure to use for a given application
2. Data retrieval, Insertion of new data, merging of data from two data structures
3. Data search and sorting, Methods of array sorting and trade-off

## **C. Object Oriented Programming Concepts**

1. Classes, objects and methods
2. Data Encapsulation, Data hiding, Inheritance
3. Polymorphism, Overloading, Abstraction

## **Electronics and Semiconductor**

The Electronics and Semiconductor test assesses the suitability of the candidate for the SOC, Embedded Systems, VLSI design, etc. companies. This test together with that of Programming assesses suitability of candidate for EDA companies. The test has the following sections:

### **A. Analog Electronics**

1. **Basic Components, their operations and Circuit Analysis:** Resistor, Capacitor, Inductor, Independent and Dependent Sources; Kirchoff Law, series/parallel combination, use of Thevenin/Norton, Superposition theorems; Energy and Power Consideration in circuits
2. **Active Components, Large, Small Signal and Circuit Analysis:** Diodes, BJT, MOSFET, Opamps Basics; Amplifiers, Current Sources; Gain Analysis of Circuits, Input-output impedance, cascading of circuits. (Stress MOSFETS)
3. **Frequency domain and time domain analysis of systems, Feedback and Stability:** Frequency domain (Laplace) representation of components, Impulse and Sinusoidal steady state response of systems; time constant, Initial Conditions; Frequency domain response; Bode plot; Poles and Zeros; Analysis of transistor/mos-based, RLC circuits, Oscillators, Filter realizations and identification
4. **Opamp based circuits and analysis:** Gain Stabilization of opamp using feedback; Integrator, differentiator, summers, difference amplifier; First order model of opamp, Effect on circuit frequency response
5. **Miscellaneous:** Basic concepts of Sample-Hold circuits, ADC/DAC,

### **B. Digital Electronics**

1. **Boolean Algebra, Minimization of Boolean Functions**
2. **Implementation and Analysis of logic gates:** NMOS/PMOS Implementation, CMOS Implementation, BJT based Implementations; Understanding of circuit characteristics like delay, input/output slope, fan-in/fan-out, Noise margin, input-output capacitance; Understanding of influence of device sizes on these characteristics
3. **Sequential blocks - flip-flops and latches:** Basic Operation, Different kinds of flip-flops; setup/hold times; Concept of feedback in design of flip-flops
4. **Digital Circuits and Blocks:** Arithmetic Circuits, Multiplexers, Decoder, Counters, Shift Registers, Sample & Hold circuits, Memory Elements, etc.
5. **State Machines and design of Complex sequential circuits**

# Computer Literacy

In the current scenario, knowing how to use the computer is essential for all professions. This module specifically assesses the suitability of candidates for the ITeS sector, Customer Support positions, Data Entry positions, Content Writers, Journalists, Marketing/Sales, etc.

The basic thrust of the module is not to test theoretical computer concepts, but test whether the candidate recognizes different parts of the computer and knows how to use the computer for day-to-day tasks such as word processing, using the Internet, making presentations, etc. The test also assesses whether the candidate has experience in debugging problems in computer hardware/operations and whether he/she knows how to change some basic settings. The test includes the following sections.

## A. Hardware Usage and Organization

1. Hardware devices: input and output, function, connection ports - usb drives, CD/DVD, keyboard, mouse, laptop/desktop, etc
2. Computer Usage and maintenance, Power Supply, Speed and Memory, Assessing and modifying Hardware Properties.

## B. Operating System Usage and Concepts

1. Basic Windows Usage, Task Manager, identification and purpose of key folders, file organization, operations on files and folders.
2. Searching files, Modifying settings, Power Management, Network Usage

## C. Basic Software and Internet

1. Word Processing (MS Word), Presentations (MS PowerPoint), Spread-sheet (MS Excel), PDF (Acrobat), Anti-virus, Outlook
2. Use of browsers for World Wide Web, Searching, Address (URL), Surfing the web, Favorites, History, Email Access, Blogs, AWARENESS, chatting
3. Networking - knowledge about protocols, FTP, HTTP etc

# CIVIL MODULE

Civil Engineering module assesses a student's skills, knowledge and understanding of the core ideas involved in the branch of civil engineering. The module focuses on testing a

student on theoretical knowledge and practical concepts which will help him perform a good job as an engineer in the industry.

1. Building Materials and Construction
  - a. Building Materials
  - b. Building Construction
2. Surveying
3. Applied Mechanics
4. Strength of Materials
5. Hydraulics
6. Waste Water and Supply Engineering
  - a. Waste Water engineering
  - b. Waste Supply engineering
7. Soil Mechanics
8. Concrete Technology
9. R.C.C Structure Design
10. Steel Structure Design
11. Irrigation
12. Highway Engineering
13. Construction Management
14. Theory of Structures
15. Structural Design Specifications
16. Estimating and Costing

## **MECHANICAL MODULE**

In this module, a student is tested for his understanding of mechanical engineering - theoretical and practical knowledge. Questions from different areas in this subject are asked so as to assess a student on his complete knowledge of the subject.

1. Thermodynamics
2. Strength of Materials
3. Fluid Mechanics
4. Design of Machines
5. Refrigeration and Air Conditioning
6. Production Management