

SYLLABUS / EXAM OUTLINE

INTERNATIONAL SCIENCE AND TECHNOLOGY COMPETITIONS (ISTC) 2026 KUALA LUMPUR, MALAYSIA

This syllabus outlines the topics and competency indicators covered in the ISTC 2026 Computer-Based Test (CBT). Each competition field consists of **50 multiple-choice questions** to be completed within **90 minutes**. The minimum passing score is **70** out of 100. Questions are drawn from Junior High School (SMP/equivalent) curriculum standards.

1	Environmental Technology	50
2	Smart Robotics	50
3	Science In Action	50
4	Mathematic	50

1. ENVIRONMENTAL TECHNOLOGY — 50 Questions

- Waste Management & 3R/5R Principles
 - Reduce, Reuse, Recycle, Refuse, Rot concepts
 - Composting & organic waste processing
 - E-waste and hazardous waste
- Renewable Energy
 - Solar panels, wind turbines, hydroelectric
 - Biogas, bioethanol, biodiesel
 - Geothermal & wave energy
- Water & Air Quality
 - Desalination, filtration, phytoremediation
 - Air pollution (CO, CFC, acid rain)
 - Rainwater harvesting & drip irrigation
- Sustainable Technology & Green Living
 - Green buildings, vertical farming, aquaponics
 - Electric vehicles, LED lighting, smart cities
 - Carbon footprint & ozone layer protection

2. SMART ROBOTICS — 50 Questions

- Robot Components & Systems
 - Sensors: ultrasonic, LDR, PIR, DHT11, infrared, flame, rain

- Actuators: DC motor, servo motor, stepper motor, buzzer
- Power & control: battery, relay, transistor, capacitor, resistor
- Microcontroller & Programming (Arduino)
 - Arduino IDE, setup() and loop() functions
 - Digital I/O: digitalWrite(), digitalRead(), delay()
 - PWM signal for motor speed control
 - Logic structures: if-else, for, while
- Robot Types & Applications
 - Line follower, wheeled robot, humanoid, arm manipulator
 - Autonomous robot (UAV, ROV/AUV, AGV)
 - Computer vision, GPS navigation, IoT connectivity
- Electronics Fundamentals
 - Breadboard wiring, jumper cables, VCC & GND
 - Bluetooth module (HC-05), Wi-Fi, LCD display
 - Castor wheel, potentiometer, proximity sensor IR

3. SCIENCE IN ACTION — 50 Questions

- Scientific Method & Laboratory
 - Variables: independent, dependent, control
 - Measuring instruments: vernier caliper, graduated cylinder
 - Laboratory safety symbols
- Physics Concepts
 - Newton's Laws, friction force, work & kinetic energy
 - Heat transfer: conduction, convection, radiation
 - Light: reflection, refraction, dispersion, lenses & mirrors
 - Sound propagation; Archimedes' principle; Ohm's Law
- Chemistry Concepts
 - Acid-base indicators (litmus, pH scale)
 - Mixtures & separation: filtration, distillation, sublimation
 - Elements, compounds, molecules; neutralisation reactions
- Biology Concepts
 - Cell organelles: chloroplast, mitochondria
 - Osmosis, photosynthesis, plant movements
 - Human body systems: circulatory, respiratory, reproductive
 - Classification of living things; microbiology (bacteria)

4. MATHEMATIC — 50 Questions

- Numbers & Social Arithmetic
 - Integer operations, fractions, exponents
 - Percentage, discount, profit & loss



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– GCF, LCM, map scale & ratio

- Algebra

- Simplifying algebraic expressions
- Linear equations & inequalities (one variable)
- Functions $f(x)$, gradients, parallel lines

- Geometry

- Area & perimeter: square, triangle, parallelogram, kite
- Volume: cube, cuboid, cylinder
- Pythagorean theorem; diagonal of a cube; circle (circumference & area)
- Angles: right, straight, triangle interior angles

- Statistics & Probability

- Mean, median, mode of data sets
- Probability of simple events (dice, coin)
- Arithmetic sequences; factorials

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