

KASO

2024



▶ **STUDY GUIDES** ◀

CELESTIA MECHANICA

ASTRONOMY MODULE

A sound knowlege of the following topics:

Kepler's Laws of Gravitation

Elliptical orbits

Hohmann Orbits

Stellar Evolution & HR Diagrams

Special Relativity

Classification and Properties of Galaxies

Black Holes and the Schwarzschild Radius

The Origin and Expansion of the Universe

Telescopes

Angular resolution

Rayleigh's criterion



SYNAPTIC FUSION

BIO-CHEMISTRY MODULE

A basic understanding of the topics is vital including a firm understanding of their practical applications.

For each topic, make sure to:

Understand key principles and concepts thoroughly

Practice solving problems and questions related to these topics

Review all reference materials

Focus on critical thinking and applying topics to real world applications

The following topics should be kept in focus:

Biology

Transport in Plants

Biological Molecules

Cell Structure and Functions

Immunity

Respiration

Biotechnology

DNA and Genes

Transport in Mammals

Microscopy

Mitosis

Selection and Evolution

Plant and Human Anatomy

Coordination and Control

Chemistry

Chemical Bonding

States of Matter

Organic Chemistry

Equilibria

Acids and Bases

Enthalpy

Electrolysis

Metals and Non-Metals

This paper will also test your ability to diagnose a variety of diseases. Understand their symptoms, treatment options and familiarize yourself with medical diagnosis techniques. You will not be tested outside this list

Huntington's Disease

Cystic Fibrosis

Ebola Virus Disease

Osteoporosis

Auto Brewery Syndrome

Cholera



DAEDALUS' DOWNFALL

CRIME MODULE

Round Details:

Round 1 - Introduction scene

You have been invited to a conference for inventors. However, not everything is what it seems. Be prepared to uncover the truth.

Round 1.5 - Digital Rabbit Hole

Between rounds, there will be an online labyrinth, where you must navigate an interconnected series of audio/visual clues. Who said this was going to be easy? (This will not take place during competition hours but at home at your own pace)

Round 2 - Room Investigation

What now? You have been placed with an opportunity to investigate the rooms of selected inventors in your journey to uncover the truth. Each team will be placed in a series of rooms and will be required to look for clues with a time limit of 5 minutes.

Round 3 - Courtroom Presentations

It's time for you to present your findings, over the course of the past three days, in a courtroom-style setting. Each team has 4.5 minutes to argue their case, so make sure it counts!

Requirements:

The online activity will require simple photo and audio editing software. (Photopea, Audacity, Install Python)

Knowledge of the following 10 ciphers is essential:

Pigpen

Caesar

ROT13

Vigenère

Atbash

Morse

Rail Fence

NATO Alphabet

ADFGVX

Dancing Men Cipher

Keep your eyes peeled, because you might be tested on any of the ciphers given, throughout the module.

NOTE: You will not be allowed to use your phones in certain rounds.



LOVELACE INTERFACE

COMPUTER SCIENCE MODULE

Necessary skills for this module include but are not limited to:

Comprehensive knowledge of basic programming constructs and concepts

Proficiency in Python

Additionally, C, C++, Python and Java are all allowed for programming, but Python is nonetheless still compulsory, and the module team must be informed in advance if any of the other languages are being used.

Basic theory and programming knowledge covered in the O and A level syllabus, which includes:

SQL queries

Logic gates

Input and output devices

File I/O

Base conversion as well as binary and hexadecimal arithmetic



RIDDLER'S REALM

LOGIC MODULE

You need to have knowledge of the following ciphers:

ADFGX
ADFGVX
Atbash
Base64
Beaufort
Binary codes
Binary to ASCII
Caesar
Caesar's box
Columnar
Columnar transposition
Four square
Hexadecimal codes
Hill cipher
Monoalphabetic Substitution
Morse Code
Multi Tap
NATO alphabet
Pigpen
Playfair
Rail Fence
Rot 13
Vigenere

You may also be tested on the following puzzles or games:

Chess
Sudoku
KenKen
Chess
Rubik's Cube
Anagram Translation



THE PI LIE

MATH MODULE

Round 1

Round one will be a paper round, where candidates' problem-solving and thinking skills will be tested. Participants will be given one hour to solve a question paper testing the following concepts:

Geometry
Trigonometry
Mathematical Induction
Summation
Combinatorics

***Participants will not be given access to a calculator or an MF19 sheet**

Round 2

In round 2, teams will go head-to-head against each other to solve integrals. Yes - it's all integrals. Teams will be split into groups of four and will face each other thrice in a round-robin format. The winner of each group advances to the final.

Participants should have a strong grasp of integration. Again, integrals are the only thing that will be tested in this round, so be prepared.

Round 3

In round 3, the winners of each group from the previous round will showdown in a jeopardy-style finale (rules of jeopardy apply). Finalists should have sound knowledge of math trivia and strong mental math skills.

Participants will not be allowed Calculators Nor MF19 sheets.
Concepts that will be tested:

Algebra	Induction
Geometry	Series (Geometric, Linear, Derivative, etc.)
Number Theory	2 and 3 dimensional vectors.
Summation	Calculus
	Trigonometry
	Arithmetic



PARTICLE PARADOX

PHYSICS MODULE

Round 1 & Round 2

Mechanics Fundamentals

Kinematics

Dynamics and Aerodynamics

Angular and Rotational motion

Equilibrium of a rigid body

Sliding and Toppling

Forces and Newton's Laws

Work, Energy, and Power

Conservation Laws

Deformation And Elasticity

Additional Information

Knowledge of Cambridge O and A level Mathematics, including calculus, vectors, and graphical solutions is assumed for all rounds. Use of Calculators is permitted for all rounds.

Further, both of these rounds will explore the following:-

Energy Interactions:

- Explore the interactions of energy forms within the protection design.
- Consider how energy changes throughout the fall without specifics.

Forces and Material Characteristics:

- Discuss the interplay of forces with material traits in a general sense.
- Consider how materials respond to forces without specific details.

Design Adaptability:

- Develop a broadly adaptable design for varied orientations and surfaces.
- Discuss the general flexibility of the protection mechanism.

Material Influence:

- Examine how materials, at a basic level, play a role in energy absorption.
- Discuss the broad impact of material properties on overall performance.

Round 3

Experimental Techniques in Particle Physics.

Particle Behavior and Interactions.

Unique Experimental Environments for Particle Studies.

Forces Influencing Particle Trajectories.

Uncommon Particle Reactions in Experimental Settings.

Detection of Quantum particles in Experimental Investigations.

Experimental Exploration of Physical Equivalence Principles.

Analyzing High-Energy Particle Interactions in Various Environments.

Investigating Nuclear Processes in Particle Studies.

Observations of Quantum Phenomena in Experimental Conditions.



FREUDIAN SLIPKNOT

PSYCHOLOGY MODULE

Module information can be found on either of the links below

<https://docs.google.com/document/d/1Kq3w9pl6H-5HPynz0TnwkPGXHhQDIlpT/edit?usp=sharing&oid=115796582858443439559&rtpof=true&sd=true>

<https://rb.gy/pk5dmm>

<http://bit.ly/3tPYfxx>



IMPORTANT NOTE

For the Gaming and Fandom modules, information will be provided either close or on the day of the events

These modules not being in this PDF is not a mistake

