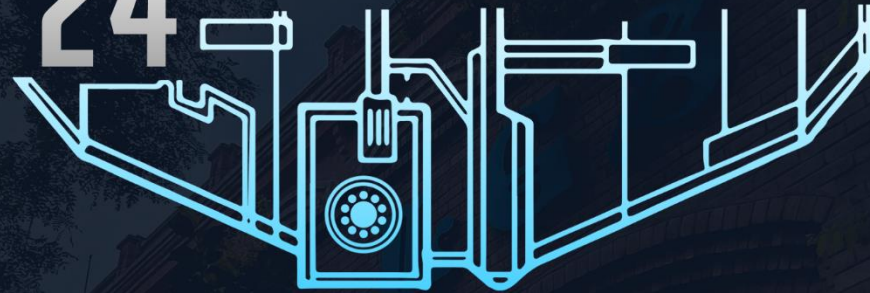


LAHORE GRAMMAR SCHOOL JOHAR TOWN FOR BOYS

INNOVENTIONS

'24 **INDULGE. INVENT. INNOVATE.**



Daedalus' Apprentice
(Study Guide)



11th-13th OCTOBER

Round 1: Metric Mastery

Delegate cap: 2

Description: An engineer should be able to accurately take measurements, estimate and deal with unit conversions. We expect that participants have a strong command on metric units, unit conversions, prefixes, and standard form. 'Metric Mastery' will have 2 parts. The first part will be based on the estimations of properties of various objects placed along various stations. In the second part, teams will be required to do simple unit conversions within a set time.

Part 1: There will be around 5-10 stations in this part. About two-thirds of the stations will be direct estimation, while one third will require some sort of calculation. Delegates will write their estimates on a paper provided to them within 30 seconds at each station, while clearly mentioning the station number as well. Each estimation will have a 20% uncertainty leeway. This means that the estimate can be 20% lower or higher than the actual magnitude of the property.

Part 2: This part will involve a written exam based on unit-conversion problems. Most units will be metric units. If it's an imperial unit or a made-up one, additional information will be provided in the problem. The problems will be structured, with long statements.

Round 2: Daedalus' Conundrum

Delegate cap: 3

Description:

A total of 5 real-world problems alongside specific guidelines will be released after round 1. Delegates will be required to engineer solutions and present them the next day in round 2. Each presentation will last 6 minutes, with a 2 minute Q&A time afterwards.

Presentations must delve into both high-level aspects and intricate details of your product, along with estimates of the costs of the components. Engineers should ideally develop newer technologies only when necessary. If a suitable third-party technology already exists, use it instead of reinventing the wheel. For this purpose, we have allowed the use of third-party technologies in the solutions. We also suggest the use of emerging technologies, especially technologies that have recently hit the market.

Like the labyrinth that Daedalus crafted, our solutions must weave together a variety of elements into a coherent system. Teams, therefore, are required to involve systems thinking in their solutions and use system engineering terminologies in proper contexts while presenting their solutions. Delegates will also be marked on the incorporation of visual aids such as hand-drawn images, CAD designs, or circuit designs. Remember that even hand-drawn diagrams are highly appreciated. Delegates will also be required to streamline the testing process and mention all the third-party tools used. Lastly, be careful. Any loopholes, contradictions, or plagiarism will hurt your team's chances, so double-check your work before presenting.

Round 3: Spaghetti Bridge

Delegate cap: 4

Description:

The last round will require contestants to design, build and optimize a spaghetti bridge - using actual uncooked spaghetti. In this final battle of hands-on skill and structural engineering, teams will race against time to create the bridge that is able to withstand the greatest weight. Teams will be required to follow certain dimensional specifications and only use the materials provided by the category heads. As you're building, ensure that you consider essential principles such as the weight distribution, tension, compression, and center of gravity in your designs. Be creative with your designs, adding more complex structures like trusses or pillars for stability and better load distribution. You can even use suspension bridges for inspiration, or the hundreds of videos on the internet as a reference. Finally, masses will be added to the bridge incrementally. They will be stacked up at the symmetrical center. The greatest mass your bridge is able to withstand before collapsing will determine the team's score.