APTITUDE EXAM

FOR SCHOLARSHIPS TO BE AWARDED IN SEPTEMBER 2019

WEDNESDAY 6th FEBRUARY 2019 - AFTERNOON
DURATION - 2 HOURS, 10 MINUTES
(to include 10 minutes reading time)

INSTRUCTIONS TO CANDIDATES

You are required to answer **ONE** question from Section A and **ONE** question from Section B.

In **Section A** you are asked to provide **THREE** initial solutions to a problem.
You will be marked on the following:

		Mark
a)	**Quality** of your **THREE** solutions – how well you solve the problem along with the flair and imagination of your ideas.	30
b)	**Technical knowledge** & **Reasoning** of your solution – how well they may work, with operating principals explained and justified. – how much technical / engineering knowledge you demonstrate in your ideas and annotations.	15
	SECTION A TOTAL	**45**

In **Section B** you are asked to solve a more focused problem, providing only **ONE** detailed solution.
You will be marked on the following:

		Mark
a)	The **functionality** of your given solution	30
b)	The consideration given to the choice of **materials** and **components** The consideration given to the method of **construction**	15
	SECTION B TOTAL	**45**

	Communication including diagrams & designs, annotations and readability	**10**

	GRAND TOTAL	**100**

Please fill in the information box at the bottom of each answer sheet with:

- Your candidate name and school name clearly printed on each sheet.
- The number of the question you have chosen to answer.
- The page number.

Please start each question on a fresh sheet of paper

Applicants must not discuss the exam on social media or in any other way

DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

Section A – Suggested time 1 hour

OPEN-ENDED QUESTIONS

In this section you will be assessed on your ability to solve the problem set in a CREATIVE AND INNOVATIVE way, by providing initial concepts.

Answer ONE question only from the following THREE questions.
Within your chosen question, you must provide three distinctly different solutions.

Question 1

Parents prefer their children to drink fruit juice rather than fizzy drinks. Design **three different**, hand-operated devices, for home-use, that can extract the juice from apples.

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Question 2

Houses have gutters that need to be cleaned regularly to keep them free of leaves, moss and soil. Home-owners may have a fear of heights or may not have easy access to the whole length of gutter.
Design **three different** devices that will allow a home-owner to safely clean the gutter either from ground level or from up a ladder, but without having to repeatedly reposition the ladder.

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Question 3

A crazy golf company wants to develop a new golf hole at their outdoor park. Produce **three concepts** where the movement or weight of the golf ball triggers a fun, mechanical reaction. You should focus on how the product functions rather than what it looks like.

End of Section A

Section B – Suggested time 1 hour

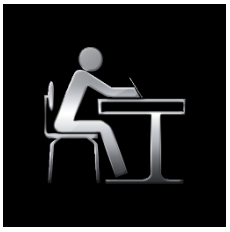
FOCUSED QUESTIONS

In this section you will be assessed on your ability to present ONE DETAILED TECHNICAL SOLUTION to the given problem focusing on functionality, components, materials and construction.

Answer ONE question only from the following THREE questions.

Question 4

Students in secondary schools can vary considerably in height. School desks are a standard height of 720mm, which means that many students can develop poor posture by working at a desk which is either too high or too low for them.



Size specification:

AGE	AVERAGE HEIGHT	RECOMMENDED TABLE HEIGHT
11	1.48m	640mm
18	1.8m	760mm

Design an ergonomic, height-adjustable desk that can be adjusted by a student at the start of a lesson.

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Question 5

Tennis players often want to practise their return of serve but sometimes cannot find a partner to play against. Design a device that will automatically feed them 20 tennis balls at 5 second intervals. A tennis ball is 66mm diameter.

The user of the device should be able to vary:

a) the speed of delivery of the ball, and
b) the direction of the delivery of the ball.

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Question 6

Large potted plants are difficult to move because of their weight and size. Design a device that will help home-owners move pots of different shapes and sizes around a patio so that the patio can be cleaned. The average pot base diameter is 400mm.
The device should:

a) be predominantly hand-operated, but may include electrical assistance;
b) be easy to store in a garden shed

END

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