APTITUDE EXAM

FOR SCHOLARSHIPS TO BE AWARDED IN SEPTEMBER 2018

WEDNESDAY 7th FEBRUARY 2018 - 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 concept 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)	**Reasoning** of your concepts – how well they may work, with operating principals explained and justified.	10
c)	**Technical knowledge** – how much technical / engineering knowledge you demonstrate in your ideas and annotations.	10
	SECTION A TOTAL	**50**

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 proposal	30
b)	The consideration given to the choice of **materials** and **components**	10
c)	The consideration given to the method of **construction**	10
	SECTION B TOTAL	**50**

	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

Plastic pollution is a global issue that has a major impact on our oceans and sea life. It is predicted that by 2050 there will be more plastic in the seas than fish. Sea currents cause much of this waste plastic material to gather with other rubbish in large floating garbage patches.

Design **three distinctly different** mechanical methods of gathering this floating garbage. Each solution must be capable of being mounted on a boat and then bringing the material on board for later separation and recycling.

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Question 2

Environmental changes have resulted in many countries experiencing flooding, and communities are often isolated without medical equipment, food or water.

Design **three distinctly different** temporary engineering solutions for a structure/system that will safely transport emergency aid across a five-metre-wide stream.

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Question 3

Very often gardeners need to sieve earth to remove stones. Manual shaking of a sieve can be very time consuming and back-breaking work.

Design **three distinctly different** hand or machine operated devices that would each accept a bucket full of earth and sieve it to remove stones down to a diameter of twenty millimetres.

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

Babies often like to be rocked to sleep. Design a device that can be attached to a rocking cradle that will gently rock a baby to sleep. The device should run for ten minutes and then stop. It should also operate automatically when the baby cries.

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Question 5

A sports shoe manufacturer wishes to test the potential life of a new sole concept. Design a test rig that can be used to simulate regular use. Once activated the test rig should run for 2000 cycles.

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Question 6

An amateur disc jockey would like to build up his lighting effects. Design a lighting unit that can be hung above the dance floor. It must contain a powerful light source and four different coloured translucent sheets (gels) that sit in front of the light source in turn and automatically change once every 5 seconds. Your answer should focus on the changing of the gels.

END

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