

## APTITUDE PAPER

FOR SCHOLARSHIPS TO BE AWARDED  
IN SEPTEMBER 2005

**WEDNESDAY 2<sup>nd</sup> FEBRUARY 2005**  
**DURATION 2 HOURS**

### INSTRUCTIONS TO CANDIDATES

You are required to answer **ONE** question only. In your answers you should;

	Mark	Suggested Time In Minutes
a) Develop a full specification that offers supporting reasons behind each important point	15	20 mins
b) Show a range of initial concepts, which demonstrate <b>flair and imagination</b> that relate to the specification.	45	60 mins
c) Develop a final solution from your initial concepts. You should address the following: <ul style="list-style-type: none"> <li>◆ Materials</li> <li>◆ Construction</li> <li>◆ Function</li> <li>◆ Features</li> <li>◆ Sizes/Dimensions</li> </ul>	30	40 mins
d) Demonstrate an organised, logical and well presented response.	10	
<b>TOTAL MARKS</b>	<b>100</b>	

**ALL YOUR A3 ANSWER SHEETS MUST HAVE IN THE TOP RIGHT HAND CORNER**

- ◆ Your name and school clearly printed
- ◆ The number of the question you have chosen to answer.
- ◆ The page number

**DO NOT TURN OVER UNTIL YOU ARE  
INSTRUCTED TO DO SO**

**ALL ANSWERS MUST CLEARLY SHOW ALL CONSTRUCTIONAL DETAILS, MECHANISMS AND/OR CIRCUITS.**

**QUESTION 1**

Your favourite Group has agreed to perform at a local Music Festival. As part of their stage act an illusion of snow falling is simulated. A considerable volume of white polystyrene beads will fall at either the front or back of the stage. The stage manager has asked you to devise a method of controlling the rate of fall and also a means of collecting and reusing the snow so the process can run continuously throughout that number of days.

Water, electricity and compressed air are all available at the site for your use in the display.

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**QUESTION 2**

Road traffic accidents have become a daily occurrence. Incidents on motorways attract attention from passing traffic and this can cause secondary accidents.

Emergency services have asked you to design a temporary screening system. This will be used at the site of an accident to shield the incident from the view of passing traffic. It is intended that all emergency vehicles will carry a temporary screen unit.

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### QUESTION 3

The type of litter left in public places has changed in recent years due to new forms of packaging, a general increase in the use of fast food outlets and sadly, the use of banned substances/drugs. Some of this waste can be dangerous to both humans and wildlife, and also damaging to the environment. Litter picking grabber devices are effective in part and are used widely by local authorities, but there are limitations and safety implications.

Your local council has asked you to design a unit that will pick up hazardous/ dangerous waste, sharp objects and everyday litter. How items are retained safely either within a unit or by the operator is of real importance. It has been decided that the operator must not come into direct contact with collected materials. A battery pack is available should one be required.

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