Eton College King's Scholarship Examination 2014

GENERAL I **(One and a half hours)**

You must answer all three questions.
Each of the three questions is worth the same number of marks.

You need not answer the questions in the order set,
but you must start each one on a separate piece of paper.

Remember to write your candidate number on every sheet of answer paper used.
If you have not finished a question after 30 minutes, you are strongly advised to leave it and go on to another. Return to any unfinished question if you have time left at the end of the paper.

You are permitted fifteen minutes' reading time before starting this paper. It is recommended that you use this time to familiarise yourself with the outline of the questions rather than trying to work out any of the answers in detail. ***You may not write anything during this period.***

ADDITIONAL MATERIALS: SINGLE DOUBLE-SIDED SHEET COLOUR INSERT

Do not turn over until told to do so.

 [Question 1 begins on Page 3]

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Question 1 : *START A NEW SHEET OF PAPER NOW*
THIS QUESTION REFERS TO SOURCES ON THE INSERT

Read the following three definitions of opera. You do not need any knowledge of opera other than that provided in order to answer this question.

DEFINITION 1

> A poetical tale or fiction, represented by vocal and instrumental musick, adorned with scenes, machines, and dancing.
>
> (Dr Samuel Johnson, *A dictionary of the English Language*, 1755)

DEFINITION 2

> An art form in which singers and musicians perform a dramatic work combining text and a musical score usually in a theatrical setting.
>
> (Wikipedia, retrieved February 2014)

DEFINITION 3

> An exotic and irrational entertainment which has always been combated and has always prevailed.
>
> (Dr Samuel Johnson, *Lives of the English Poets,* 1779-81)

(a) Discuss briefly the similarities and differences between these three Definitions.

[8]

Now study Sources A and B on the Insert. They give information about scenes in two productions of different operas.

(b) With reference to Sources A and B (and not to any other operas you may have seen), discuss the extent to which opera in the time since Dr Johnson has remained "exotic and irrational".

[8]

(c) The operas of Handel and Wagner are still often performed, yet the same opera houses only rarely stage works written in the last half-century. Using the Definitions above and the information in the Sources, suggest some reasons why the performance of opera has developed in this way.

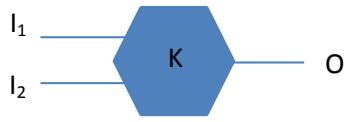
[9]

[Question 2 begins overleaf]

Question 2 : *START A NEW SHEET OF PAPER NOW*

Sal de Salis owns a family-run water supply business. Water either contains salt (salt water) or not (fresh water). Sal's relatives are all inventors who have designed machines which add salt to or remove salt from water in complicated ways.

For example, his son Kripe has invented a machine which has two water intakes, I_1 and I_2, and one water outlet, O. If salt water enters the machine through either intake or both, the outlet emits salt water. Only if fresh water enters through both intakes does the outlet emit fresh water. Sal summarises Kripe's machine using the following diagram and table:

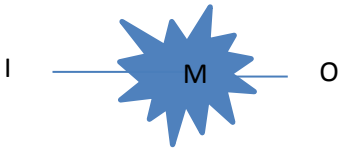


I_1	Fresh	Salt	Fresh	Salt
I_2	Fresh	Fresh	Salt	Salt
O	Fresh	Salt	Salt	Salt

His daughter Gatza has invented a machine which similarly has two water intakes, I_1 and I_2, and one water outlet, O. But it works differently: this time, if fresh water enters through either intake or both, the outlet emits fresh water. Only if salt water enters through both intakes does the outlet emit salt water. Sal summarises Gatza's machine using the following diagram and table:

I_1	Fresh	Salt	Fresh	Salt
I_2	Fresh	Fresh	Salt	Salt
O	Fresh	Fresh	Fresh	Salt

His nephew Melach has invented a machine with only one intake, I, and one outlet, O. Melach's machine simply changes whichever sort of water flows into it into the other sort. Sal uses the notation:



I	Fresh	Salt
O	Salt	Fresh

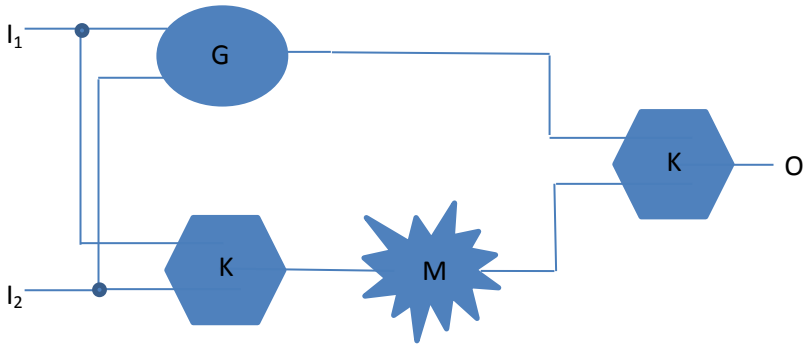
All these machines can be connected together so that the outlet from one flows directly into the intake of another. When diagrams are drawn of connected machines, water is assumed to flow from left to right. A single flow of water can also be split in two so that it feeds two distinct intakes.

[Question 2 continues overleaf]

[Question 2 continued]

(a) Sal makes the following connections of machines. Copy and complete the table showing how the final outlet O depends on intakes I_1 and I_2.

[4]



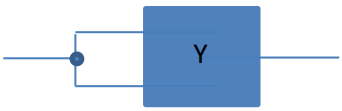
I_1	F	S	F	S
I_2	F	F	S	S
O				

(b) Sal's wife Yan has also invented a machine which is notated below. Show how her machine can be constructed by connecting together some or all of the three basic machines K, G, M.

[4]

I_1	F	S	F	S
I_2	F	F	S	S
O	S	F	F	F

(c) Yan claims that in fact, each of the three basic machines can be constructed purely by connecting together her machines. Here is how a M machine is made from a Y machine.



Show how **each** of the other two basic machines K, G can be constructed from Y machines.
[You will need to use more than one Y machine in each case.]

[6]

(d) Show how the behaviour of the combination of machines in part (a) can be reproduced by connecting together several Y machines. [Greater credit will be given for solutions using a smaller number of Y machines: the minimum required is four.]

[6]

(e) A machine is needed which has the following table. Design it by connecting Y machines together.

[5]

I_1	F	S	F	S
I_2	F	F	S	S
O	F	S	F	F

[Question 3 begins overleaf]

Question 3 : *START A NEW SHEET OF PAPER NOW*

Read the following passage carefully.

TELETRANSPORTATION

Suppose that you enter a cubicle in which, when you press a button, a scanner records the states of all the cells in your brain and body, destroying both while doing so. This information is then transmitted at the speed of light to some other planet, where a replicator produces a perfect copy of you*****. Since the brain of your Replica is exactly like yours, it will seem to remember living your life up to the moment when you pressed the button, its character will be just like yours, and it will be in every other way psychologically continuous with you. This psychological continuity will not have its normal cause, the continued existence of your brain, since the causal chain will run through the transmission by radio of your "blueprint".

Several writers claim that, if you chose to be teletransported, believing this to be the fastest way of travelling, you would be making a terrible mistake. This would not be a way of travelling, but a way of dying. It may not, they concede, be quite as bad as ordinary death. It might be some consolation to you that, after your death, you will have this Replica, which can finish the book that you are writing, act as parent to your children, and so on. But, they insist, this Replica won't be you. It will merely be someone else, who is exactly like you. This is why this prospect is nearly as bad as ordinary death.

(Derek Parfit, *Divided Minds and the Nature of Persons,* 1987)

*** This process will be referred to as teletransportation.**

Now answer the following questions:

(a) Considering the passage as a whole, what grounds might there be for believing that "this Replica won't be you"?

[5]

(b) Parfit goes on to state that there must be an answer to the question of whether or not the Replica is you: either it is or it isn't. Do you agree with him?

[10]

(c) Would you undergo teletransportation? Explain your reasoning.

[10]