

# Eton College King's Scholarship Examination 2019

## GENERAL I

(One and three-quarter hours)

**Remember to write your candidate number on every sheet of answer paper used.**

***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.***

*If you have not finished a question after 35 minutes, **you are strongly advised to leave it and go on to another.** Return to any unfinished questions if you have time left at the end of the paper.*

**ADDITIONAL MATERIALS: NONE**

**Do not turn over until told to do so.**

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**Question 1:** *START A NEW SHEET OF PAPER NOW.*

*If you have not finished this question after 35 minutes, you are strongly advised to leave it and go on to another.*

**Source :** Pictures of political buildings from four different countries.

1



2



3



4



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Look at the Source on the facing page.

This question does not assume and its assessment will not reward additional non-Source-based knowledge of the buildings in the Source.

Now answer the following:

- (a) Compare and contrast buildings 1 and 2.

[4]

- (b) Referring only to the four buildings of the Source, explain what effect you imagine that they have on those who visit them.

[8]

- (c) You have been selected to be the architect of a political building. Explain the criteria you would use in designing various features of the building and explain your reasons for including each feature you mention.

[13]

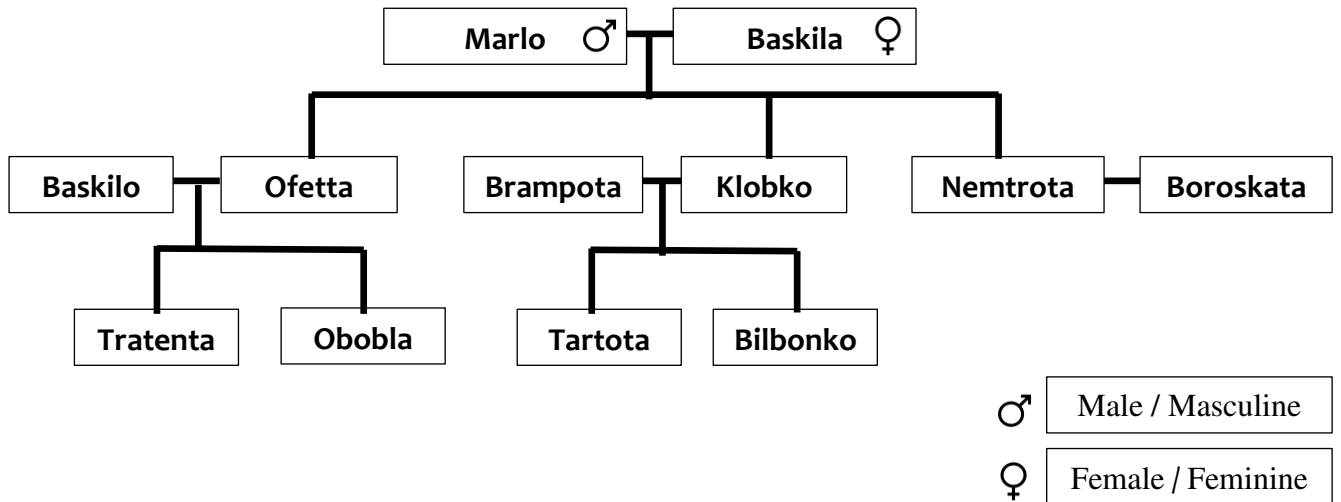
[Total mark for Question 1: 25]

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

*If you have not finished this question after 35 minutes, you are strongly advised to leave it and go on to another.*

Each part of this question builds on what has been learnt in the previous part; it is recommended that the parts are attempted in order.

The family tree below is that of the Sibulevatt family. At home, they speak in their first language, Yelrib. Yelrib has three grammatical genders, a few cases like Latin or Greek and, broadly speaking, the same subject – verb – object word order as English. Unlike English, there are no definite or indefinite articles (*the* or *a*).



In Yelrib, the grammatical gender of an individual's name is the same as their biological gender.

- (a) Explain very briefly how to identify an individual's gender in Yelrib.

[2]

- (b) The sentences below are all true:

- Baskila Marlovetti majem tris dimkus.**
- Klobko znazu synno Baskilae Marlovettie.**
- Ofetta Baskilovetti majem dvus dimkus.**
- Nemtrota znazu wobwoba Baskilae Marlovettie.**
- Nemtrota Boroskatavetti men majem dimkik.**

Identify which two of the sentences below are untrue and explain why:

- Ofetta znazu wobwoba Baskilae Marlovettie.**
- Obobla znazu synno Ofettae Baskilovettie.**
- Ofetta Baskilovetti men majem synnos.**
- Bilbonko znazu synno Brampotae Klobkovettie.**
- Dimky Baskilae Marlovettie majem tris dimkus.**

[4]

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- (c) The following sentence introduces a few more family members.  
Translate it into Yelrib:

Boroskata is not the daughter of Slaboroko and Dentrikulka.

[5]

Now read the sentences below carefully and study their translations:

**Nemtrotā mājē xiti vēm grūdik.**

Nemtrotā is forty-five years old.

**Tratenta Oboblavetti mājēm dvuziti vōor grūdus.**

Tratenta and Obobla are twenty-four years old.

**Tartota Bilbonkovetti mēn znazuu triplotty.**

Tartota and Bilbonko are not twins.

**Bilbonko starox Tartotae.**

Bilbonko is younger than Tartota.

**Tartota mājē ziti vēm grūdik.**

Tartota is thirty-five years old.

**Tartota mladax Bilbonkoe.**

Tartota is older than Bilbonko.

Use what you have now learnt to translate the following sentences into Yelrib:

- (d) Vobovo and Frumpata are twins.

[2]

- (e) Frumpata is younger than the son of Marlo and Baskila.

[5]

- (f) Slabosko is not twenty-five years old. His son is thirty-four years old.

[7]

[Total mark for Question 2: 25]

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

*If you have not finished this question after 35 minutes, you are strongly advised to leave it and go on to another.*

This question concerns a colony of highly intelligent rats. They recognise symbols and are capable of optimising a strategy instantly.

They are also obscenely greedy, and can consume buns instantaneously.

They are able to share a bun exactly, but will not leave behind any remains once they have started a particular bun.

The local baker sometimes discards buns. Whenever he does so, he poisons exactly one batch, in the hope of deterring the rats from visiting the bakery. Each batch of buns is marked with a different symbol; every bun in a particular batch bears the same symbol; the poisoned buns are only identifiable by their symbol.





If a rat eats any amount of a poisoned bun then it will die an hour later.

The bakery cat is an insomniac and so the premises can be visited by rats for a maximum of one hour per night.

The rats know and understand all of this.

Answer these questions about a week in the life of the colony:

- (a) On Monday, a convoy of rats visits the bakery. They find that the baker has discarded 4 batches of buns and decide that two rats, Roby and Toby, will risk death for the good of the colony and should test the batches as follows:

batch	Roby	Toby
	pass	pass
	pass	eat
	eat	pass
	eat	eat

After an hour, both test rats are still alive and the convoy conveys the three safe batches back to the starving colony. Which was the poisoned batch? Explain your answer very briefly.

[3]

- (b) On Tuesday, the convoy returns and finds that 8 batches of buns have been discarded. Devise a strategy whereby three rats are needed to identify the poisoned batch. For your strategy, explain the minimum number of buns consumed during testing and the total number of buns consumed by each test rat.

[5]

- (c) On Wednesday, the convoy returns and finds that 15 batches of buns have been discarded. What is the minimum number of rats needed to identify the poisoned batch? Of these, what is the maximum and minimum number which may survive?

[7]

- (d) On Thursday, the bakery has discarded 26 different batches of buns. The rats of the convoy realise that they will all need to take part in the testing, but devise a strategy such that at least two of them will definitely survive to convey the remaining buns back to the colony. How many rats are there in the convoy and what is their strategy?

[10]

[Total mark for Question 3: 25]

END OF PAPER

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