

# Eton College King's Scholarship Examination 2004

GENERAL 1

(One and a half hours)

*Answer **all** the questions. The mark allocation is the same for each question.*

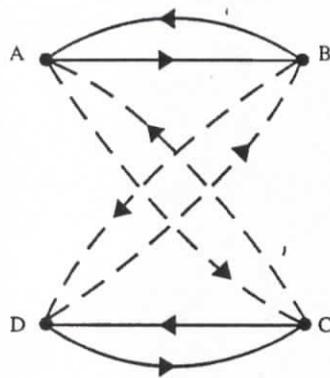
*You need not answer the questions in the order set, but you must start each one on a separate piece of paper. If you have not finished a question after about 20 minutes, you are advised to leave it and to go on to another. Return to any unfinished question if you have any time left at the end of the paper.*

**[Question 1 begins overleaf]**

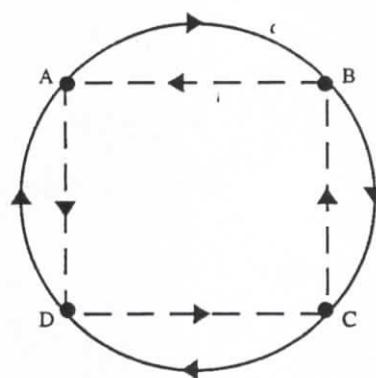
1. Montagu Island and Beaumont Island are two (imaginary) isolated Pacific islands, each occupied by four tribes A, B, C and D. The tribes enjoy peaceable relations with one another, and by long tradition marriage takes place between tribes according to certain rules. When children are born, they are not considered members of any tribe, but once they come of age (about 13), they leave home and become full members of a tribe. The tribe they join is determined by the tribe membership of their fathers.

In the diagrams, broken lines indicate marriage relationships; a man from the origin of the arrow may only marry a woman of the tribe to which the arrow points. The solid lines indicate "filiation" relationships; every child of a father at the start of an arrow becomes a member of the tribe to which the arrow points.

*The Beaumont Island system*



*The Montagu Island system*



- (a) Explain what you can say about the tribe to which the siblings (brothers and sisters) of an individual will belong. [2]
- (b) If an individual is a member of tribe A, explain what can be said about the tribe membership of his aunts and uncles in  
 i) The Beaumont Island system  
 ii) The Montagu Island system. [4]
- (c) When a child joins a tribe, he no longer has his parents to look after him. However he may have his grandparents available if they have survived. Explain why this might mean it is advantageous to be a member of one system rather than the other. [4]
- (d) When a male child has been in a tribe for a few years, it is traditional for him to visit the appropriate tribe to choose a wife. He may be helped in his choice by his own relatives within that tribe. Explain which relatives may be available to help him in his choice, and which system has the advantage in this respect. [4]

- (e) Relationships can be described as “reciprocal” or “sequential”. Use whichever of those words is appropriate to complete the following sentences:
- i) In the Beaumont Island system the marriage relationship and the filiation relationship are both .....
  - ii) In the Montagu Island system the marriage relationship and the filiation relationship are both.....
  - iii) In the Montagu Island system the marriage relationship is ..... to the filiation relationship. [3]
- (f) Draw a diagram to show a simple modification to the Montagu Island system in which children become members of the same tribes as their mothers. Describe advantages and disadvantages of this scheme in terms of the issues raised in sections (c) and (d). [8]

**[End of question 1. Question 2 begins on next page]**

2. Read the following information taken from a thirteenth-century treatise on signs denoting duration in Franconian notation, then answer the questions below.

*The perfect long is called perfect because it is measured by three "tempora", the ternary number being the most perfect number because it takes its name from the Holy Trinity, which is true and pure perfection. Its figure is quadrangular, with a descending tail on the right, representing length: ǀ*

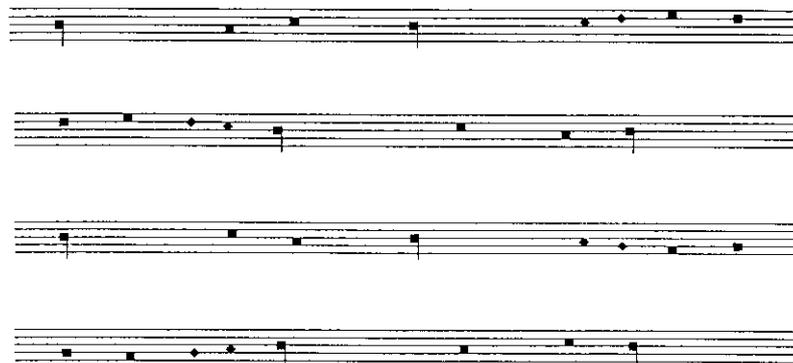
*The imperfect long has the same figure as the perfect, but signifies only two "tempora". It is called imperfect because it is never found except in combination with a preceding or following breve, which perfects it.*

*The duplex long, formed in this way: ǂ signifies two longs.*

*The breve, although it has two varieties, proper and altered, represents both by a quadrangular figure, without a tail: ■*

*Of the semibreve one variety is major, the other minor, although both are represented by the same lozenge-shaped figure: ◆*

- (a) Using each of the signs how many different quantities of "tempora" may be represented? [2]
- (b) How long is a breve? [1]
- (c) How many semibreves, of either variety, equal the length of a duplex long? Explain your answer. [3]
- (d) Look carefully at the following four lines of Franconian notation:



- i) Which sign is not used in any of the lines? [1]
- ii) Compare the first and second lines, then the first and third lines, then the first and fourth lines. Describe in as much detail as possible what you notice. [9]
- iii) Consider the information given in the first italicized paragraph. Explain to what extent the composer has achieved perfection. [9]

**[End of question 2. Question 3 begins on next page]**

3. Electronic tagging is a system increasingly used by the prison services to avoid some offenders having to stay in prison thereby decreasing the problem of overcrowding. In effect someone who is tagged wears a device around his ankle which tells a prison officer with a receiver where he is twenty-four hours a day. The tags cannot be removed other than by the person with the receiver.

Imagine that you are given five tags and a receiver and permission to fit them onto anyone. Explain whom you would choose to tag in order to be:

- (a) most useful to the police [4]
- (b) most useful to the Head Master of Eton [4]
- (c) most useful to you [4]
- (d) most amusing [4]
- (e) most controversial. [4]

There are some people who object to the use of these tags on various grounds.

- (f) Suggest and explain what objections might be raised to tagging. [5]

**[End of question 3. Question 4 begins on next page]**

4. Read this passage and then answer the questions which follow:

*It came to pass one day that in the quarter of the drapers, while the drapers had gone to dine, the Canon came with a great multitude of loose-living men; and climbing up to the shutters which the drapers place over their doors so that there may be darkness in the shops, to the end that none may see clearly the quality of their cloth, they cut and tore in pieces and destroyed all those shutters and all the blinds which prevent men from seeing the cloth which is shown to them. When the drapers returned from dining, they found the Canon and his companions at this work of destruction in their shops. Great was the strife between them, and on either side were evil words spoken. Then the drapers went to the Court and made complaint concerning the Canon and his companions. The bailiff and the judge of the city reprovved and reproached the Canon and his companions very severely, and blamed the Canon because he went about in the company of men so vile. The Canon, however, defended his actions and said: "I command that the light of the sun, wherewith it is God's will that men may see, be not taken from the shops by the false drapers who deceive those men that buy cloth of them. The gamblers and sinners who came with me conceal not their vices, but make them manifest to all; the drapers conceal that which justice commands shall be shown, wherefore the drapers are viler people than the gamblers and sinners."*

(260 words)

From Ramon Llull's *Blanquerna* (c. 1283)

- (a) Summarise the passage in about forty words. [5]
- (b) If you were the judge in charge of this case, would you find the Canon and his companions guilty or not guilty? Consider the arguments on both sides and make sure you explain the reasons for your final decision as fully as possible. [15]
- (c) Define what you understand by the word 'justice'. [5]

[End of paper]

# Eton College King's Scholarship Examination 2004

**GENERAL II**

**(One and a half hours)**

*Answer two questions.*

*Marks will be awarded for clear, interesting and considered arguments.*

*Spend about 45 minutes on each question.*

1. Is it better to know a little well than a lot superficially?
2. When does sanity become madness?
3. 'Only those who obey God's will are truly good.' Discuss.
4. Why has blood featured so much in art?
5. If a religious text contains murder, rape, war and deceit, how can it be considered a holy book?
6. 'People who are very enthusiastic about technology are always telling us what it will do for us. They almost never address the question of what it will undo.' Discuss.
7. Either: Is the idea of perfection meaningless?  
Or: Can there be nothing?
8. If miracles are possible, what then remains impossible?
9. To whom should the press be responsible?
10. 'It is nonsense to claim that all the major religions of the world are equally true.' Discuss.

**[End of paper]**



# Eton College King's Scholarship Examination, 2004

ENGLISH

(One and a half hours)

*Part I is worth 20 marks; Part II is worth 40 marks; Part III is worth 40 marks. Attempt all Parts and Questions.*

## Part I [20 marks]

Read the following passage and answer the questions that follow.

5 Samuel Pepys was the creator of three remarkable, and still surviving, things. The first, in order of their making, was his *Diary*. The second, was the civil administration of the Admiralty – the rule and order that still give permanence to the material form, fighting traditions and transmitted knowledge of the Royal Navy. A century after Pepys' death, at a time when his achievement as a diarist was still unknown and his name almost forgotten, Lord Barham – the man who shares with him the honour of being England's greatest naval administrator – testified that there was not a department of the Admiralty that was not governed by the rules he had laid down in the seventeenth century. It was Pepys who made the scabbard for the sword that Nelson, and the heirs of Nelson, used.

10 Pepys' third creative achievement sprang from the second. He had been described as the father of the Civil Service. Here, too, his orders hold. The rules he laid down and the administrative principles he elucidated have become part of the continuing life of his country. His family may have grown somewhat large of late, but it is still governed by the moral standards, integrity and tradition of inflexible service on which in his lifetime he insisted. It has become in the course of generations what he strove to make it: a permanent watchdog against corruption.

15 Yet the work for which Pepys is best remembered and loved remains his *Diary*. It extends to over a million and a quarter words: the length of a dozen fair-sized novels. After three centuries, there is not a page in it that does not arrest the reader and quicken his perception of humanity. It is probably the most searching and honest record of man's daily doings ever penned. It is also one of the most vivid. As historical material I know of nothing with such power to recreate the thought and daily *minutiae* of a vanished age. It is strange to reflect that this wonderful achievement should have been wrought at the end of crowded days of labour – the record of which is to be found not in the *Diary* but in Pepys' vast collection of naval and administrative papers.

(From Arthur Bryant's *Samuel Pepys: A Man in the Making*)

Answer, briefly but fully, the following questions.

1. Of the three things of which Pepys was creator, which two were related to one another? [2]
2. When was the greatness of Pepys' work first recognised, according to the passage? [2]
3. What is meant by 'the scabbard' (line 11)? [3]
4. What do you understand by the writer's use of the word 'family' (line 15). [3]
5. In your own words, re-write the phrase 'quicken his perception of humanity' (line 23). [4]
6. Why is the word 'minutiae' (line 26) italicised? [2]
7. Choose a word - not necessarily from the text - which in your view describes the essential quality both of Pepys' administration and his *Diary*. Explain your choice clearly. [4]

## Part II (40 marks)

Read the following extracts and answer the questions that follow.

### Extract A (*The Diary of Samuel Pepys*)

I having stayed in the city till above 7400 died in one week, and of them above 6000 of the plague, and little noise heard day nor night but tolling of bells; till I could walk Lombard Street and not meet twenty persons from one end to the other, and not fifty upon the Exchange; till whole families (ten and twelve together) have been swept away; till my very physician, Dr Burnet, ... died himself of the plague; till the nights (though much lengthened) are grown too short to conceal the burials of those that died the day before, people thereby constrained to borrow daylight for that service; lastly, till I could find neither meat nor drink safe, the butcheries being everywhere visited, my brewer's house shut up and my baker with his whole family dead of the plague.

### Extract C (John Fowles, *The Collector*)

October 16<sup>th</sup>

It's afternoon. I should be in life class. Does the world go on? Does the sun still shine? Last night, I thought - I am dead. This is death. This is hell. There wouldn't be other people in hell. Or just one, like him. The devil wouldn't be devilish and rather attractive but like him.

He is mad.

It is me. I am his madness.

For years he's been looking for something to put his madness into. And he found me.

### Extract B (Craig Brown, *Private Eye*)

#### *Madonna's Diary*

I'm at present devoting my emotional and artistic resources towards creating an ambient stage environment for my next World Tour. Like, I'm obsessed with black at the moment, like it means life and death and mystery and Pepsi, right? So we're gonna start off with this black curtain, and the black curtain will rise to reveal a stage totally black, okay? And then I'll be carried on by these six black guys, right? And I'll be dressed all in black with black hair and a black mask and the thing is, no one in the audience will even know I'm on stage for forty minutes so it'll be like church or something and then I'll sing my new number and it'll be like Picasso and Bosch and the Pope and Sigmund Freud rolled into one, just incredibly powerful and traumatic.

### Extract D (Helen Fielding, *Bridget Jones' Diary*)

Sunday 8<sup>th</sup> January

9st 2 (v. bloody g. but what is point?), alcohol units 2 (excellent), cigarettes 7, calories 3100 (poor)

2p.m. Oh God, why am I so unattractive? Cannot believe that I convinced myself I was keeping the entire weekend free to work when in fact I was on permanent date-with-Daniel standby. Hideous, wasted two days glaring psychopathically at the phone, and eating things. Why hasn't he rung? Why? What's wrong with me? Why ask for my phone number if he wasn't going to ring, and if he was going to ring surely he would do it over the weekend? Must centre myself more. Will ask Jude about appropriate self-help book, possibly Eastern-religion-based.

8. Consider each of the following phrases in the context in which it appears and write an explanation of what you think it means.

- a) Extract A: 'people thereby constrained to borrow daylight for that service'.
- b) Extract B: 'an ambient stage environment'.
- c) Extract C: 'For years he's been looking for something to put his madness into'.
- d) Extract D: 'Must centre myself more'.

[8]

9. What objectives do you think the *diarists* in **Extract A** and **Extract C** set out to achieve? Give clear reasons for your comments. [10]

10. What do **Extracts B and D** reveal about the kinds of audience for which the *authors* are writing? Explain your reasoning. [10]

11. Which of the four extracts do you find to be *most* interesting/appealing as a piece of writing **and** which do you find to be *least* interesting/appealing? Give thorough explanations for your comments. [12]

**Part III (40 marks)**

12. Approximating to the style, tone and content of your choice, choose **one** of the Extracts A, B, C or D and continue the entry. You may or may not wish to use consecutive or non-consecutive dates for stylistic effect in your writing. [40]

[End of Paper]

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## Eton College King's Scholarship Examination 2004

LATIN

(One and a half hours)

Answer Question 1 and ONE other question.

1. *Pyrrhus, king of Epirus in Greece, was trying to rival his cousin Alexander the Great in establishing a huge empire. After some success, followed by dismal failure in Greece itself, he turned his attention to the land of Italy instead, where the phrase 'Pyrrhic Victory' was coined.*

- Pyrrhus mox ad Italiam venit, et tum primum Romani cum transmarino hoste pugnauerunt. consul P. Valerius Laevinus contra eum missus est. cum ille exploratores Pyrrhi cepisset, iussit eos per castra duci, videre omnem exercitum, tumque dimitti, ut nuntiarent Pyrrho omnia quae a Romanis faciebantur. commissa mox pugna, quamquam iam Pyrrhus fugiebat, vicit tamen elephantorum auxilio, quos Romani timuerunt quod eis incogniti erant. sed nox proelio finem fecit: Laevinus per noctem fugit, sed Pyrrhus Romanos mille octingentos cepit et omnes optime tractans, etiam interfectos sepelivit. cum illos adverso vulnere mortuos iacere vidisset, dicitur tulisse ad caelum manus cum his verbis: "utinam tales milites in exercitu meo fuissent! nam sic totius orbis dominus essem." idem proximo anno iterum contra Romanos pugnabat, et hostibus iterum superatis exclamavit se vicisse sed simul militum suorum numerum maximum delevisse.

EUTROPIUS (adapted)

<i>P.</i>	Publius	<i>adversus-a-um</i>	in the front
<i>explorator-oris (m)</i>	spy	<i>iaceo-ere-ui</i>	I lie
<i>committo-ere-misi-missum</i>	I join, start	<i>utinam + subjunctive</i>	if only
<i>finis-is (m)</i>	end, finish	<i>talis-is-e</i>	such
<i>octingenti-ae-a</i>	-genti means x100	<i>orbis-is (m)</i>	world
<i>tracto-are-avi-atum</i>	I treat	<i>essem</i>	'I would be'
<i>sepelio-ire-ivi, sepultum</i>	I bury	<i>proximus-a-um</i>	next

- (a) Translate the whole passage into English, writing your translation **on alternate lines**. [40]
- (b) *missus est* (line 2): change this into the present passive, keeping the same person. [1]
- (c) *cepisset* (line 2): in which tense of the subjunctive is this verb? [1]
- (d) *duci* (line 3): what part of the verb is this? [2]
- (e) *videre* (line 3): why is this verb in the infinitive? [1]
- (f) *nuntiarent* (line 3): why is this verb in the subjunctive? [1]
- (g) Put *omnia quae* (line 3) into the singular, keeping the same case. [2]
- (h) *proelio* (line 5): give the case of this noun. [1]
- (i) *tulisse* (line 8): say what part of the verb this is, and give the equivalent part of the verb in the present. [2]
- (j) *manus* (line 8): give the case and number of this noun. [1]
- (k) *totius orbis* (line 9): change this into the ablative singular. [2]

- (l) *proximo anno* (line 9): what case is this in, and why? [1]  
 (m) *hostibus...superatis* (line 10): what construction is this? [1]  
 (n) Give the positive and comparative of *maximum* (line 10), keeping them in the same case and number. [2]  
 (o) Of what construction is *delevisse* (line 11) a part? [1]  
 (p) Find and write down a present participle from the passage. [1]
- [20]

[Total for Question 1: 60]

ANSWER EITHER QUESTION 2 OR QUESTION 3

2. Read the following passage, then answer the questions below. DO NOT TRANSLATE unless you are specifically asked to do so. You should pay careful attention to the number of marks for each question.

*Caesar had been chasing the Helvetii, a Gallic tribe, for some time now, and was at last presented with a realistic chance of inflicting a serious defeat on them. However, problems that he had not anticipated succeeded in thwarting his plans.*

- Caesar igitur, cum Labieno fidelissimo comite locutus, ei imperavit ut media nocte cum duabus legionibus proficisceretur, et ad summum montem ascenderet. eum certiorem fecit se ante diem eadem via ad imum montem secuturum esse. prima luce, cum Labienus iam summum montem teneret, Caesar ipse ab hostium castris mille et quingentis passibus aberat. ut postea ex captivis comperit, neque ipsius adventus neque Labieni cognitus erat. interea P.Considius, exploratoribus praefectus, equo progressus ad eum accurrit et dicit montem, quem a Labieno occupari iussisset, ab hostibus teneri: se id propter Gallica arma atque insignia cognovisse. Caesar, suis copiis in locum altiorem subductis, manebat. Labienus tamen exspectare iussus erat dum copias Caesaris prope hostium castra conspiceret, ut utrimque uno tempore hostes oppugnarent. itaque copiae eius frustra exspectantes totum diem paratae erant oppugnare. deinde sub noctem per exploratores Caesar cognovit et montem a suis non a Gallis teneri, et Helvetios iam profectos esse, et Considium terrore superatum falsa dixisse.

CAESAR (adapted)

<i>fidelis-is-e</i>	loyal, faithful	<i>Gallicus-a-um</i>	Gallic
<i>certiorem facio</i>	I inform	<i>insignia-ium (n)</i>	insignia
<i>imus-a-um</i>	bottom (of)	<i>dum + subjunctive</i>	until
<i>mille passus (m,pl)</i>	a thousand paces, a mile	<i>utrimque</i>	from both sides
<i>ut + indicative</i>	as	<i>tempus-oris (n)</i>	time
<i>comperio-ire-peri-pertum</i>	I discover	<i>sub + acc. (here)</i>	towards
<i>adventus-us (m)</i>	arrival	<i>Gallus-i (m)</i>	a Gaul
<i>cognosco-ere-novi-nitum</i>	I find out	<i>Helvetii-orum (m)</i>	Helvetii
<i>praeficio-ere-feci-fectum</i>	I put in charge of (+ dat.)		

- (a) How is Labienus described in line 1? [2]
- (b) What two things did Caesar order Labienus to do? (lines 1-2) Give full details. [4]
- (c) Change the words *ei imperavit ut proficisceretur* (lines 1-2) into a command clause using the verb *iubeo* instead of *impero*. [2]
- (d) What did Caesar inform Labienus he would do? (lines 2-3) [3]
- (e) Did Labienus follow his orders? Explain how you know, with reference to the Latin. [1+1]
- (f) How far away from the enemy camp was Caesar at dawn? [1]
- (g) What did Caesar find out later from prisoners? (lines 4-5) [2]
- (h) How did Publius Considius come to Caesar? (line 6) Give **two** pieces of information. [2]
- (i) What information did Considius bring to Caesar? (*dicit...teneri*) (lines 6-7) [3]
- (j) To what does *id* (line 7) refer? [1]
- (k) What had Labienus been ordered to do? (*Labienus...conspiceret*) (lines 8-9) [3]
- (l) What was the aim of this order? (*ut...oppugnarent*) (lines 9-10) [2]
- (m) Translate into good English the whole sentence *itaque... oppugnare* (line 10). [4]
- (n) Using the information in the final sentence, say what Caesar's feelings towards Considius would have been at this moment? Explain your reasoning clearly. [4]
- (o) Find and write down **two** different uses of *ut* + *subjunctive* in this passage. Identify the type of clause in each. [2]
- (p) Find and write down an example from this passage of a perfect participle that has an active translation. [1]
- (q) How long a period of time do the events of this passage take? Show how you have come to your answer. [2]

[Total for Question 2: 40]

3. Translate this passage into Latin. You should write your translation on alternate lines.

Nero was emperor of the Romans for fourteen years. With the help of his mother, who was a very bad woman, he had killed both his father and his brother. Since he often punished his enemies by death, few men dared to speak against him; for they believed that no-one was safe. Although he had been unable to murder his mother as she set out across the sea in a ship, afterwards he sent a soldier to kill her with a sword. When many temples had been destroyed by fire, the citizens immediately asked, "The emperor himself didn't persuade his slaves to do this, did he, in order to build a beautiful house in the same place for himself?" Eventually Galba attacked him with a huge army, and Nero was discovered alone near the city. Listen to this, cruel emperors, and beware!

Nero	<i>Nero-onis</i>
emperor	<i>princeps-ipsis (m)</i>
I dare	<i>audeo-ere, ausus sum</i> (deponent from the perfect tense onwards)
no-one	<i>nemo-inis (m)</i>
fire	<i>incendium-ii (n)</i>
Galba	<i>Galba-ae (m)</i>
I beware	<i>caveo-ere, cavi, cautum</i>

[Total for Question 3: 40]



# Eton College King's Scholarship Examination 2004

**FRENCH**

**(One and a half hours)**

WRITE YOUR CANDIDATE NUMBER HERE: **CAND**

*This paper consists of five questions. You must answer ALL the questions, and complete the first four in an hour. The time taken to read the passage for Question 5 is in addition to the one and a half hours given for the paper. Your answers to Questions 1 and 4 should be written ON THE QUESTION PAPER in the spaces provided. Your answers to Questions 2, 3 and 5 should be written on the examination stationery.*

1. *USE OF FRENCH (10 marks). You are advised to spend no more than ten minutes on this question. Write your answers in the spaces provided.*

a) *Translate the following verb forms into French, using the verb that is given in brackets:*

*(dormir) I sleep :*

*(devenir) We become :*

*(se lever) Get up! (2<sup>nd</sup> person singular) :*

*(rire) We were laughing :*

*(plonger) She used to dive :*

*(être) We will be :*

*(avoir) They will have :*

*(devoir) You ought to (2<sup>nd</sup> person plural) :*

*(pouvoir) He has been able :*

*(se réveiller) She has woken up :*



2. READING COMPREHENSION (25 marks) :

To be written on examination stationery.

Read the following passage carefully and then answer questions (a) – (q) **IN ENGLISH**. Your answers must be based on the information contained in the text.

### DES PROFESSEURS AGRESSÉS

Depuis jeudi matin, les élèves du lycée Robert Schuman au Havre sont privés de cours. Les professeurs se sont mis en grève après deux agressions perpétrées sur deux de leurs collègues en début de semaine. Rappel des faits.

Mardi après-midi, un élève a violemment lancé une pierre en direction d'un professeur d'arts plastiques sans l'atteindre. L'agresseur n'a pas pu être identifié, sa victime lui tournait le dos. Une plainte contre X a été déposée auprès des services de police.

Le lendemain matin, deux élèves se présentant avec une demi-heure de retard au cours ont pris à parti un autre professeur qui leur réclamait leur carnet de correspondance. «Ils ont adopté une attitude menaçante et tenaient des propos grossiers,» explique Ghislaine Levieux, proviseur. Pour Stéphane Caron, professeur en grève, **les faits sont beaucoup plus graves (m)**. «L'un des élèves incriminé a voulu à deux reprises donner un coup de tête à notre collègue qui était ceinturé. Deux professeurs se sont portés à son secours.»

Depuis ces derniers mois, le climat n'a cessé de **se dégrader (n)** dans ce lycée qui compte 1.000 élèves. Les événements se sont surtout aggravés en décembre. «Nous avons connu des tensions avant les vacances de Noël. Pour tous les établissements, cette période est toujours très difficile. Les deux incidents ont réveillé un malaise chez les professeurs qui ont voulu réagir,» confie encore le proviseur. L'avis est partagé par l'ensemble du corps enseignant qui liste les actes les plus inquiétants: tentatives d'incendie d'une classe en plein cours, agressions d'élèves, jets de couteaux, menaces de mort. La coupe est pleine. D'autant plus que, d'après Stéphane Caron, **rien n'a été fait (o)** pour éviter cette spirale. «Nous imputons cette dégradation à des sanctions trop légères. Une journée d'exclusion **ne suffit pas (p)**.» Et la convocation en conseil de discipline des deux garçons n'a visiblement pas suffi à apaiser les esprits.

Depuis, les assemblées générales et les réunions se succèdent. «Hier a été une journée de concertation et de **travail en équipe (q)** dans le but de prendre des dispositions pour éviter que les faits ne se reproduisent,» ajoute Mme. Levieux. Mais les exigences des professeurs vont au-delà en demandant notamment le classement de l'établissement en Zone d'Education Prioritaire et des moyens de surveillance appropriés. Les personnels ont repris le travail.

- (a) What situation have the pupils of the Lycée Robert Schuman found themselves in since Thursday morning? [1]
- (b) What have the teachers done and why? [2]
- (c) What did a pupil do to a teacher on Tuesday, and with what consequences to the teacher? [2]
- (d) Why couldn't the pupil be identified? [1]
- (e) Why were two pupils censured by a teacher? [1]
- (f) What have the two pupils done to be reproached by Ghislaine Levieux? [2]
- (g) What did one of them try to do, according to Stéphane Caron? [1]
- (h) How was the situation resolved? [1]
- (i) What is always a difficult period for schools? [1]
- (j) What are the worst kinds of incident that can happen? [5]
- (k) What is the reason for this deterioration in behaviour, according to Stéphan Caron? [1]
- (l) What are the teachers now demanding? [2]
- (m-q) What do you think the words or phrases in **bold italics** mean? You may translate them or explain them. [5]

3. TRANSLATION (25 marks)

*To be written on examination stationery.*

*Translate into English, paying attention to the style as well as the accuracy of your translation.*

### **ACCIDENT D'HÉLICOPTÈRE À CHAMONIX: DEUX MORTS ET UN BLESSÉ**

L'accident d'un hélicoptère chargé de sécuriser les pistes de ski qui s'est produit mercredi matin à Chamonix pour une raison indéterminée, a fait deux morts et un blessé.

«Les personnes décédées sont le pilote de l'engin, un père de famille âgé d'une cinquantaine d'années, et un secouriste de 38 ans, père de deux fillettes,» a précisé la compagnie de Mont-Blanc, qui gère les remontées mécaniques à Chamonix.

Un autre secouriste de 56 ans, bloqué une partie de la matinée dans la carcasse de l'hélicoptère, a pu être dégagé et a été conduit à l'hôpital. Ses jours ne sont plus en danger. L'homme a été blessé au dos, à la cuisse et à la tête.

L'hélicoptère était en train de sécuriser les pistes en déclenchant des avalanches à l'aide d'explosifs lorsqu'il a heurté les câbles du téléphérique à 2.600 mètres d'altitude.

Un plongeur dans un restaurant d'altitude, situé au-dessus du lieu du drame, a déclaré que «le temps était clair, qu'il n'y avait pas de vent et pas de soleil susceptible d'éblouir le pilote, lorsque l'accident s'est produit. Les câbles se sont tendus comme un élastique et l'hélicoptère a été projeté sur le sol quinze mètres plus bas.»

Cet accident a provoqué une vive émotion dans la vallée de Chamonix où les victimes étaient toutes connues du milieu montagnard.

4. TRANSLATION INTO FRENCH (10 marks)

*Write your answer in the space provided.*

*(Remember that the Reading Comprehension and the Translation provide almost all the words and structures that you will need.)*

a) The pilot has been in hospital for a fortnight.

---

b) "The strike began at the beginning of the week," the head teacher said.

---

c) The rescue workers arrived half an hour late on Monday morning.

---

d) It is all the more difficult because the victims are well known in the village.

---

c) The girls have been to his help on two occasions since Friday morning.

---

5. REPRODUCTION STORY (30 marks)

*To be written on examination stationery.*

*The story will be read to you twice. You may not take notes during the reading. You should aim to reproduce the story in about 120-130 words of French, and you will be marked for the style as well as the accuracy of your version.*

**A VISIT TO A STATELY HOME**

Monsieur et Madame Dupont – louer un gîte rural – mieux connaître la région – déjeuner bien – un joli petit château – architecte – les châteaux de la Loire – attrayant – la cour – une allée – en bras de chemise – tondre la pelouse – se tromper de chemin – panneaux – voir le château de plus près – pourboire – une domestique – encore deux couverts – Monsieur le Duc.

# Eton College King's Scholarship Examination 2004

**FRENCH** (Supervisor's Copy)

5. *REPRODUCTION STORY. The time taken to read the passage twice is in addition to the one and a half hours given for the paper.*

## A VISIT TO A STATELY HOME

Pendant les vacances d'été, l'année dernière, nos voisins Monsieur et Madame Dupont traversaient en voiture une région de la France qu'ils ne connaissaient pas. Depuis des années ils passaient les vacances en France, et normalement ils louaient un gîte rural, mais cette fois-ci ils avaient élu d'aller d'hôtel en hôtel pour mieux connaître la totalité de la région. Ce matin-là ils avaient fait la grasse matinée et à dix heures du matin ils avaient pris un petit déjeuner assez léger. Une heure plus tard ils s'étaient mis en route et ils avaient parcouru bien des kilomètres quand ils ont remarqué un joli petit château non loin de la route. Ils se sont arrêtés pour l'admirer.

- Allons voir si on peut visiter, a dit Madame Dupont.

Monsieur Dupont était architecte et il s'intéressait aux vieux châteaux en France; sa femme s'intéressait surtout aux jardins. L'année précédente ils avaient passé, tous les deux, une agréable quinzaine à visiter tous les châteaux de la Loire, et de l'extérieur et de l'intérieur. Pourtant, ils n'avaient jamais vu un château aussi attrayant que celui-ci et ils ont décidé d'en faire la visite.

En arrivant d'abord dans la cour, ils l'ont trouvée déserte. Personne! .... Si! Là, au bout d'une allée, ils ont aperçu un vieil homme en bras de chemise qui tondait la pelouse. Il faisait son travail avec soin et il était évident qu'il aimait bien son métier.

- Bonjour Monsieur, Madame, a dit le vieux. Vous vous êtes trompés de chemin peut-être? Ce n'est pas étonnant car les routes sont petites et il y a très peu de panneaux.

Ils lui ont expliqué qu'ils avaient trouvé le château si beau qu'ils avaient voulu le voir de plus près.

Le vieux leur a raconté l'histoire du château et leur en a fait voir et l'intérieur et les jardins. A la fin de la visite, comme Monsieur Dupont se demandait justement combien d'argent il devait donner au vieux comme pourboire, une domestique est venue vers eux.

- Mettez encore deux couverts à la table, Marie, lui a dit le vieux. Il me semble que mes amis ont très faim et qu'ils voudront bien déjeuner avec moi, j'espère.

- Très bien, Monsieur le Duc, a répondu la domestique.

Imaginez la surprise de nos amis les Dupont!

[30 marks]



# Eton College King's Scholarship Examination 2004

**GREEK**

(One and a half hours)

*Candidates should attempt ALL the questions on this paper.*

1.

(a) Give the appropriate forms of the following articles and nouns:

- i. ὁ δοῦλος accusative singular
- ii. τὸ δένδρον genitive singular
- iii. ἡ οἰκία dative singular
- iv. ἡ τιμή accusative plural
- v. ὁ νεανίας genitive plural [5]

(b) Convert these articles and nouns into their opposite number, keeping them in the same case (i.e. if they are singular, make them plural; if they are plural, make them singular):

- i. τῷ λόγῳ
- ii. τῶν οἰκιῶν
- iii. τοὺς παῖδας [3]

(c) Translate into English:

- i. λύεις
- ii. ἔλυον
- iii. ἐλύσαμεν
- iv. λύσουσιν
- v. λύσαντες
- vi. λύεται [6]

(d) Translate into Greek:

- from λύω: i. loose! (sing.)
- ii. he was loosing
- iii. I am loosed
- from φιλέω: iv. we love
- v. they loved (aorist)
- from εἶμι: vi. to be [6]

[Total for Question 1: 20]

2. Translate the following passage into English: **write your translation on alternate lines.**

*Teleutias leads a disastrous Spartan (Lacedaimonian) attack on the Olynthians*

ὁ δὲ Τελευτίας, ἐπεὶ ὄρα ὅτι οἱ ἄνδρες ἀποθνήσκουσιν, ὀργίζεται καὶ τὰ ὄπλα λαμβάνει. ἔπειτα δὲ ἄγει μὲν ταχέως τοὺς ὀπλίτας, κελεύει δὲ τοὺς πελταστὰς καὶ τοὺς ἰππέας διώκειν τοὺς Ὀλυνθίους. οἱ δὲ ἰππεῖς, ἐγγυτέρω τοῦ τείχους αὐτοὺς διώκοντες, κακὰ πάσχουσι καὶ ἀποχωροῦσιν. οἱ γὰρ Ὀλύνθιοι προσβάλλουσιν αὐτοῖς ἀπὸ τῶν πύργων καὶ ἀναγκάζουσιν αὐτοὺς εὐθὺς ἀναχωρεῖν. ἐν δὲ τούτῳ οἱ Ὀλύνθιοι ἐκπέμπουσι τοὺς ἐαυτῶν ἰππέας, καὶ οἱ πεζοὶ αὐτοῖς ἀνδρείως βοηθοῦσιν. τέλος δὲ οἱ τῶν Ὀλυνθίων στρατιῶται ταράσσωσι τοὺς φεύγοντας Λακεδαιμονίους. καὶ ὁ Τελευτίας ἐνταῦθα μαχόμενος ἀποθνήσκει. μετὰ δὲ ταῦτα, πάντες οἱ ἀμφὶ αὐτόν, μάλιστα φοβούμενοι, ταχέως φεύγουσιν ἐκ τῆς μάχης.

XENOPHON (adapted)

ὁ πελταστής—οῦ	peltast ( <i>a lightly armed infantryman</i> )
ἐγγυτέρω (+ genitive)	nearer
ὁ πύργος—ου	tower
ἀναχωρῶ	I retreat
ἐαυτῶν	their own
ταράσσω	I throw into confusion
ἀμφὶ (+ accusative)	around, with

[Total for Question 2: 20]

3. Answer the questions on the following passage. **Do not translate unless specifically asked to do so.**

*The circumstances surrounding the death of the emperor Tiberius*

ὁ δὲ Τιβέριος, ἄρξας πολλὰ ἔτη, ἀπέθανεν ἐν Μισηνῶ. ἐνόσει γὰρ πολὺν χρόνον, ἤλπιζε δὲ ἀσφαλῆς ἔσσεσθαι, ἐπεὶ ἐπίστευεν ἱερεὶ τινι, Θρασύλλω ὀνόματι. ὁ δὲ εἶπε· “σύ, ὦ δέσποτα, ἔτι δέκα ἔτη ἄρξεις.” ὁ οὖν Τιβέριος, γέρων ὢν καὶ νοσῶν, πολλάκις ἐφαίνετο ἀποθνήσκειν, ἀλλὰ αἰεὶ ὑγιῆς ἐγίγνετο. καὶ διὰ ταῦτα, ὁ Γάιος, ἐθέλων βασιλεὺς εἶναι, τότε μὲν ἔχαιρε, τότε δὲ ἐφοβεῖτο. τέλος δέ, ἐθέλων ἀποκτείνειν τὸν βασιλέα, τῷ Τιβερίῳ σῖτον αἰτοῦντι ἀπεκρίνατο οὕτως· “ὁ σῖτος βλάπτει σε· νόσον γὰρ ἔχεις· μηδὲν οὖν ἔσθιε. ἀλλὰ ἄγε δὴ, δέχου ταῦτα τὰ ἱμάτια. ἐθέλω γὰρ σε θερμὸν εἶναι.” ὁ οὖν Γάιος ἐνέβαλε πολλὰ ἱμάτια αὐτῷ καὶ οὕτως ἀπέπνιξε τὸν βασιλέα. καὶ οὕτως ἐγένετο μὲν βασιλεὺς, καίπερ νεανίας ὢν. ἤρξε δὲ ὀλίγιστον χρόνον.

DIO CASSIUS (adapted)

Μισηνόν-οῦ	Misenum (a town)
Θρασύλλος-ου	Thrasullus
ὑγιῆς-ές (adj.)	healthy
Γάιος-ου	Gaius (Tiberius' nephew)
τὸ ἱμάτιον-ου	cloak
ἀποπνίγω	I suffocate

- (a) How long had Tiberius been ruling (line 1)? [2]  
(b) Although he was ill, what hope did he have (lines 1-2)? [1]  
(c) Whom did he trust, and what had this person said to him (lines 2-3)? [1+2]  
(d) Describe Tiberius' different states of health in lines 4-5. What was the effect of these on Gaius? [2+2]  
(e) What reason does Gaius give for not giving Tiberius food when he asks for it? [1]  
(f) What reason does Gaius give for covering Tiberius with cloaks (lines 8-9)? [1]  
(g) Translate καὶ οὕτως ἐγένετο ... ὀλίγιστον χρόνον (lines 10-11). [3]

[Total for Question 3: 15]

4. Translate the following sentences into Greek. Some of the words from questions 2 and 3 may help you:

- (a) The Spartans throw the soldiers into confusion. [3]  
(b) We take up arms quickly and fight bravely. [5]  
(c) The emperor was wanting to kill the old man at once. [5]  
(d) Order them to withdraw! [3]  
(e) They were trusting the young man (who was) sending away the priest. [4]

[Total for Question 4: 20]

5. Translate the following passage into English: **write your translation on alternate lines.**

*Solon's trick helps the Athenians to recover the island of Salamis from the Megarians.*

ἐπεὶ οἱ Μεγαρήσ τὴν νῆσον Σαλαμίνα ἔλαβον, οἱ Ἀθηναῖοι – ἔκαμνον γάρ – οὐκέτι ἤθελον πολεμεῖν περὶ αὐτῆς. ὁ μέντοι Σόλων, πείσας τοὺς Ἀθηναίους αὐθις μάχεσθαι, αὐτὸς στρατηγὸς κατέστη ὑπὸ τῶν πολιτῶν. πλεύσας οὖν ὁ Σόλων ἐπὶ ἄκραν τῆς Ἀττικῆς εὗρεν ἐκεῖ γυναῖκας τινὰς θυούσας. καὶ ἐπεὶ ταύτας εἶδεν, ἔπεμψεν ἄγγελον εἰς Σαλαμίνα προσποιούμενον αὐτόμολον παρὰ τῶν Ἀθηναίων εἶναι. ὁ δὲ ἐκέλευσε τοὺς Μεγαρέας πλεῦσαι εἰς τὴν ἄκραν καὶ λαμβάνειν τὰς τῶν Ἀθηναίων γυναῖκας. οἱ δὲ ναῦν ἔπεμψαν καὶ στρατιώτας. καὶ ὁ Σόλων ἰδὼν τὴν ναῦν προσιοῦσαν, τὰς μὲν γυναῖκας ἀπέπεμψε, νεανίας δὲ τινὰς γυναικεῖα στολῇ σκευάσας ἐκέλευσε, κρύψαντας τὰ ξίφη, παίξειν ἐγγὺς τῆς θαλάσσης. οἱ οὖν πολέμιοι, νομίζοντες αὐτοὺς γυναῖκας εἶναι, ἐξεπήδων ἐκ τῆς νεῶς ἐθέλοντες ἀρπάζειν αὐτάς. οἱ δὲ νεανῖαι σπάσαντες τὰ ξίφη πάντας ἀπέκτειναν. οἱ οὖν Ἀθηναῖοι εὐθύς ἐπιπλεύσαντες εἶλον τὴν νῆσον.

PLUTARCH (adapted)

κατέστη	'(he) was appointed'	ὁ αὐτόμολος – ου	deserter
ἡ ἄκρα – ας	headland	ἡ στολή – ἦς	clothing
ἡ Ἀττικὴ – ἦς	Attica (the region around Athens)	σκευάζω	I dress
προσποιῶμαι	I pretend	ἐκπηδάω	I leap out
		σπάω	I draw, unsheath

[Total for Question 5: 25]

# Eton College King's Scholarship Examination 2004

SCIENCE (SECTION 1)

(60 minutes)

*Candidate Number:* \_\_\_\_\_

## INSTRUCTIONS

*Write your candidate number, not your name, in the space provided above.*

*You should attempt ALL the questions. Write your answers in the spaces provided: continue on a separate sheet of paper if you need more space to complete your answer to any question.*

*Allow yourself about 12 minutes for each question.*

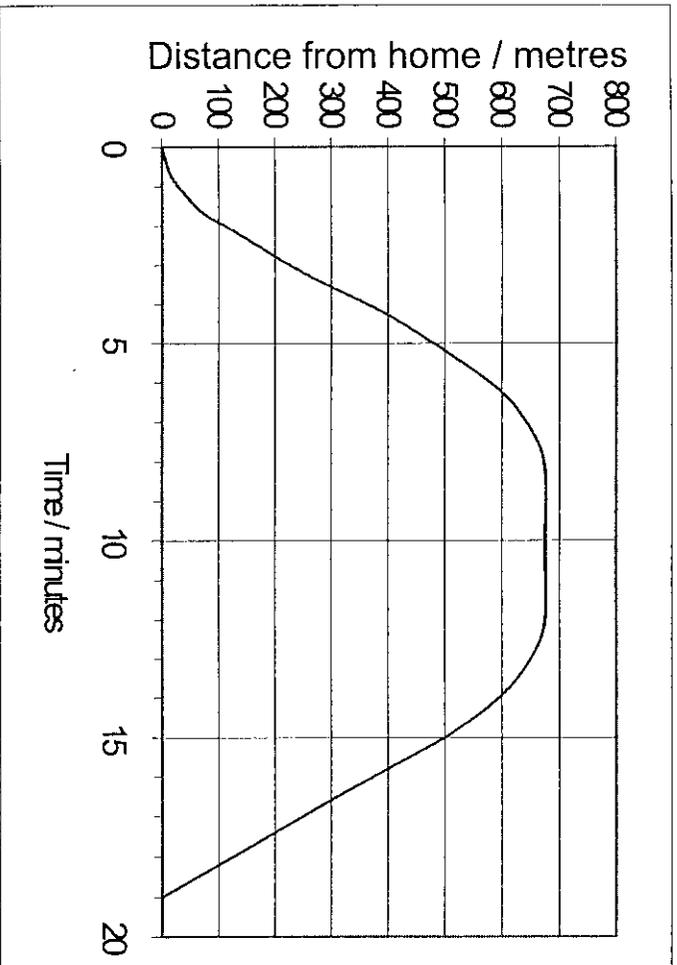
*The maximum mark for each question or part of a question is shown in square brackets.*

*In questions involving calculations, all your working must be shown.*

For examiners' use only.

1	2	3	4	5	TOTAL

1. A distance-time graph for a bicycle journey is shown below.



- (a) Describe this journey.

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[5]

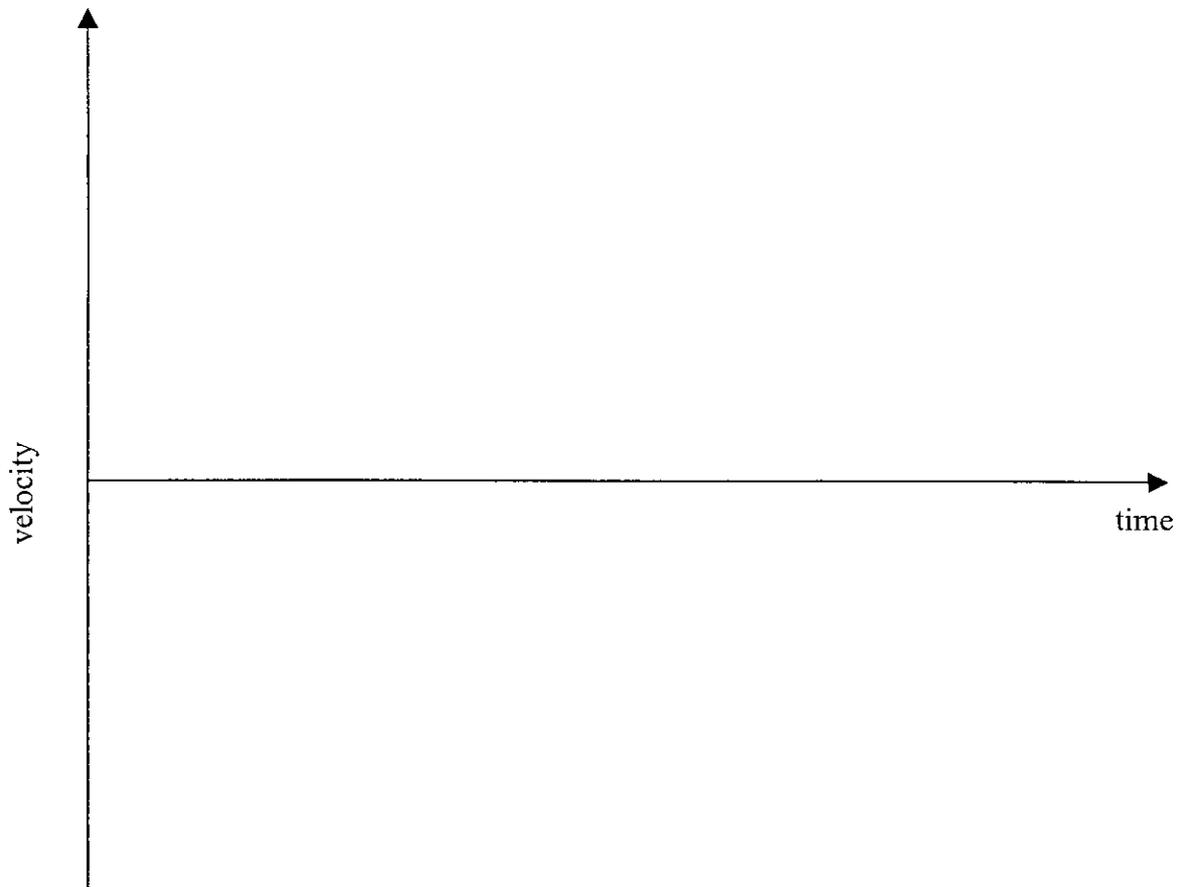
- (b) Estimate the speed of the cyclist (in m/s) during the last 4 minutes of the journey.  
Show your working.

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[2]

- (c) *Velocity* is defined as a statement of speed plus direction. Positive velocity is speed moving away from home, negative velocity is speed towards home. Using the axes below, sketch a graph of velocity against time for the journey. Give as much detail as you can.



[5]

[End of question 1. Question 2 begins on the next page]

2. (a) What is meant by the term “electric current”?

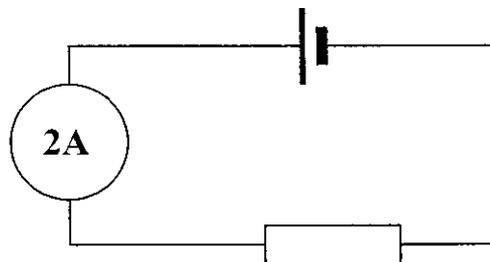
[1]

(b) In an electrical circuit what is the difference between the current leaving the cells and the current returning to the cells?

[1]

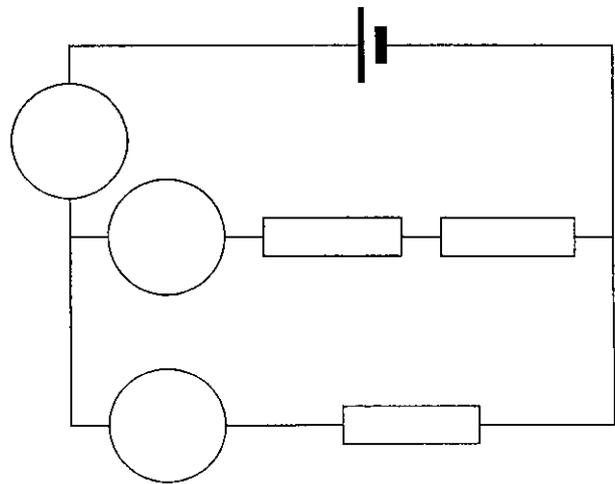
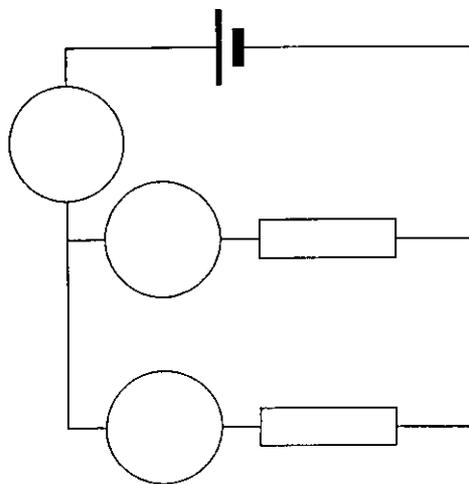
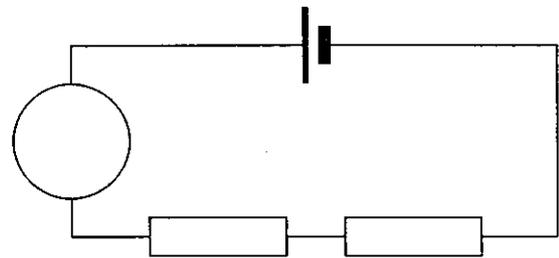
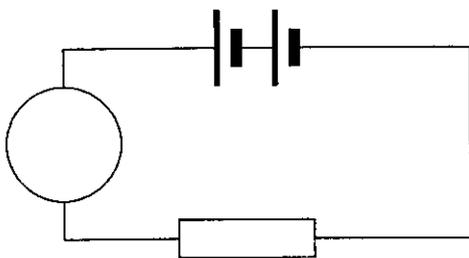
(c) Describe the energy changes which take place in the circuit below.

[2]

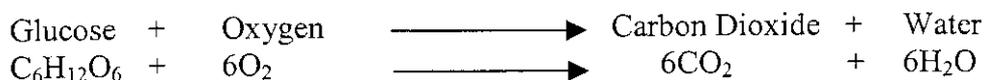


(d) All the resistors and cells shown below are identical to those in the circuit above. In the circuits below, circles represent ammeters. Deduce the size of the current in each of the ammeters below. Write your answers in the circles.

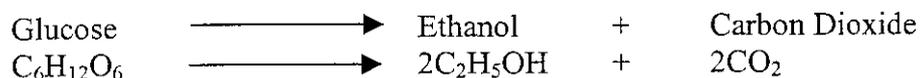
[8]



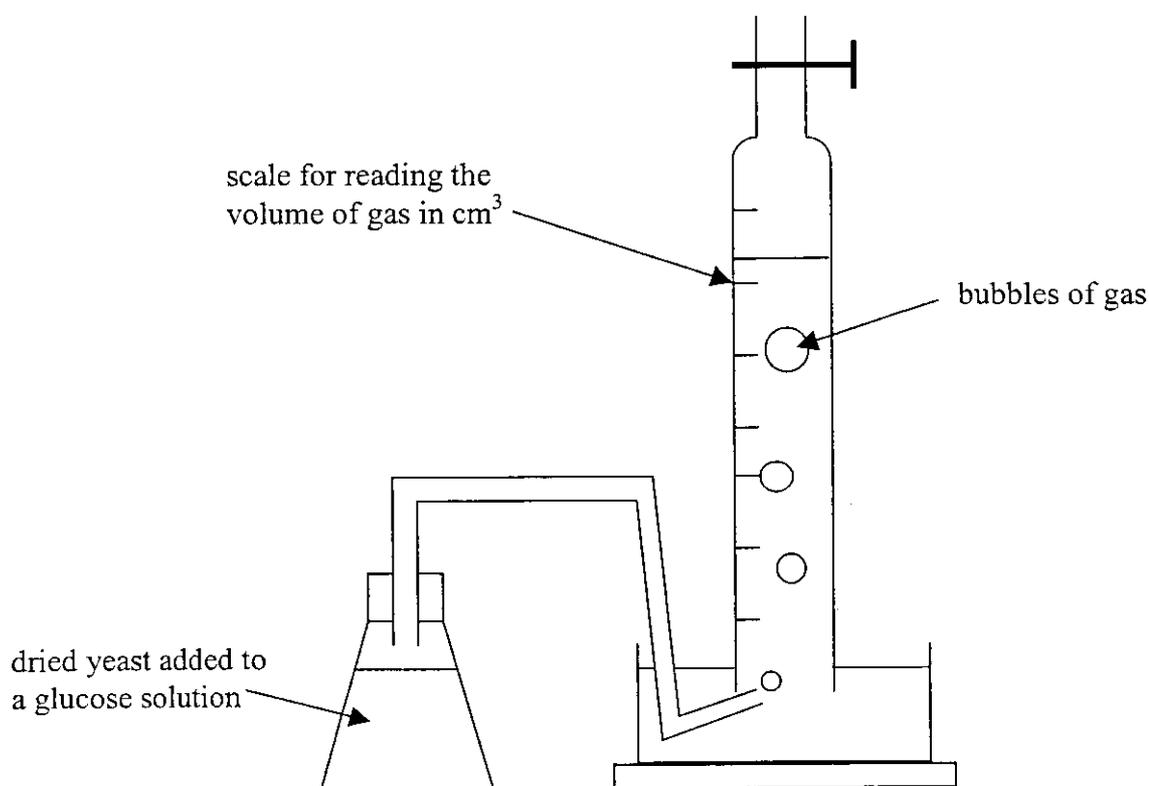
3. Many organisms carry out **aerobic respiration** using oxygen. This can be summarised by the equation below:



Yeast is a single-celled fungus. It is a facultative anaerobe. This means that as well as using the process outlined above, yeast cells can respire in the absence of oxygen. This is called **anaerobic respiration** and can be summarised by the equation below:



A class decided to investigate how the concentration of glucose affected the rate of respiration. They were provided with six solutions of differing glucose concentrations (0%, 1%, 2%, 4%, 6%, 10%) and six sets of the apparatus shown below:



The yeast that was added to the glucose solutions was in the form of dried pellets.

The pupils were divided into groups and each group investigated just one of the glucose solutions. They recorded the volumes of gas collected over a time period of 25 minutes.

- (a) What is the name of the gas that is being collected in the tube?

[1]

The pupils quickly realised that there were several factors other than glucose concentration that might affect the rate of respiration in yeast and which needed to be kept constant in the experiment.

- (b) Name **two** of these other factors and describe how you would ensure they are the same in all the experiments.

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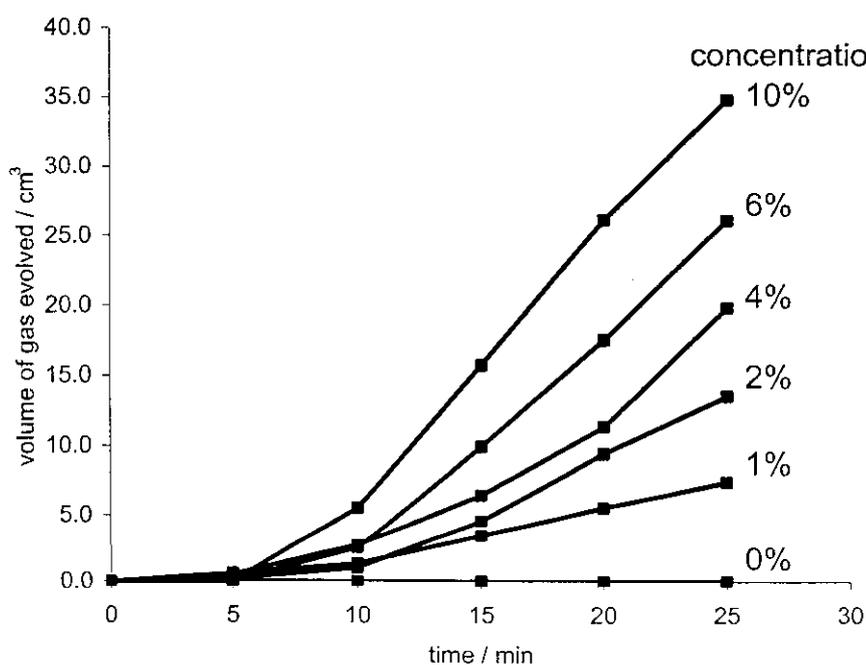


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[2]

Here are the results the different groups collected and a graph of their results.

concentration of glucose in solution (%)	total volume of gas evolved (cm <sup>3</sup> )					
	after 0 min	after 5 min	after 10 min	after 15 min	after 20 min	after 25 min
0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.0	0.6	1.3	3.4	5.5	7.4
2	0.0	0.2	1.0	4.5	9.4	13.5
4	0.0	0.5	2.7	6.4	11.3	19.8
6	0.0	0.0	2.5	9.9	17.5	26.1
10	0.0	0.0	5.5	15.7	26.1	34.8



- (c) Explain why you think glucose concentration might affect the rates of respiration in the yeast.

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[2]

- (d) Do you think the yeast cells in this experiment are respiring aerobically or anaerobically? Explain your answer.

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[2]

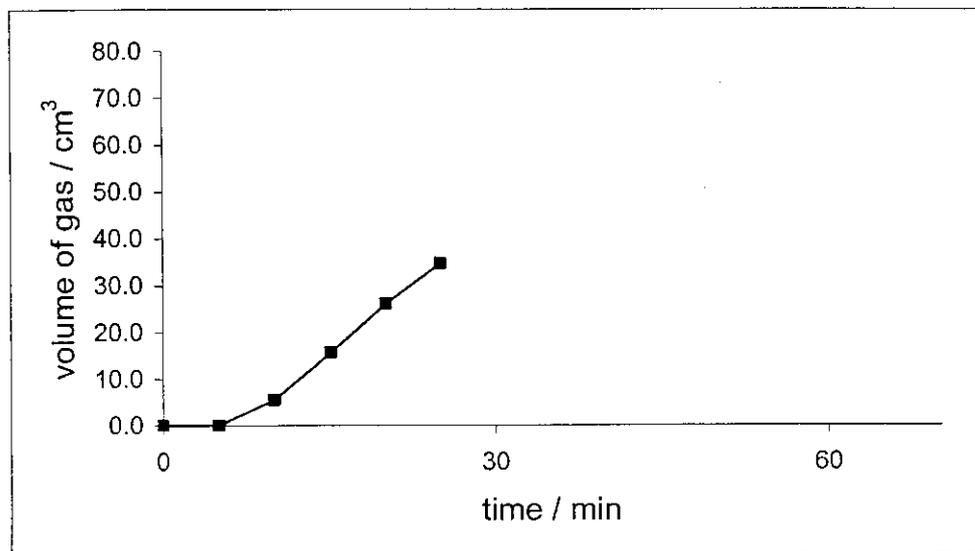
- (e) One particularly observant pupil noticed that the yeast cells in the most concentrated glucose solutions took a longer time to start producing gas than the other set-ups. Suggest why this might be.

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[2]

- (f) i) The group investigating the 10% glucose solution carried on taking readings from their apparatus for 70 minutes. The sketch graph below shows their results for the first 25 minutes. Continue the line to show what their finished graph might look like. [1]



- ii) Why do you think the graph might show the behaviour you have described?

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[2]

4. Biologists were interested in the number of bird species living on five islands of very similar size located at different distances off the coast of the mainland country of Etonia. They gathered the following data:

<b>Distance of island from the mainland (km)</b>	50	100	140	220	300
<b>Number of bird species on the island</b>	35	27	22	15	6

- (a) Describe the relationship between the distance of an island from the mainland and the number of bird species found upon it.

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[1]

- (b) Suggest a likely explanation for this relationship.

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[2]

The same scientists studied a group of islands all 140 km from the coast of Etonia.

<b>Area of island (km<sup>2</sup>)</b>	4	40	60	120	200
<b>Number of bird species on the island</b>	9	17	22	25	28

- (c) Explain why larger islands are likely to sustain greater numbers of bird species.

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[3]

[question 4 continues on the next page]

- (d) Name two other factors (apart from how close an island is to the mainland and its area) that are likely to affect the numbers of species found on a given island off the coast of Etonia.

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[2]

- (e) Woodland nature reserves can be thought of as islands within an agricultural landscape which provide certain species with the habitats they need to survive. A conservation organisation wishes to set up a number of such reserves. Using the information given above and your own knowledge, provide them with advice on the location and features of nature reserves which would be likely to sustain a large number of species.

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[4]

**[End of question 4. Question 5 begins on the next page]**

5. Bauxite is the name of the ore containing aluminium oxide from which aluminium metal is extracted. Before the aluminium can be obtained, the bauxite has to be purified.

The first stage of purification is to react the aluminium oxide with concentrated sodium hydroxide solution.

- (a) Does this suggest that aluminium oxide is acting as an acid or a base?

\_\_\_\_\_ [1]

Many impurities in the bauxite will not react with the sodium hydroxide and are insoluble.

- (b) Suggest what the next stage of purification should be.

\_\_\_\_\_ [1]

The solution containing the dissolved aluminium compound is then treated to cause the aluminium oxide to crystallise out. The crystals are first dried, and then roasted at 1000°C.

- (c) What do you think might be removed during the roasting?

\_\_\_\_\_ [1]

The aluminium produced is a typical metal and has a variety of uses, one of which is to make saucepans.

Aluminium appears to have low reactivity. This is due to a thin coating of aluminium oxide, which appears on the surface of aluminium and prevents further aluminium from reacting with the oxygen in the atmosphere. Aluminium actually lies between magnesium and zinc in the reactivity series

Aluminium saucepans can be used safely to boil water, but should not be used to heat acidic fruits or fruit juices.

- (d) i) What does the information above tell you about the solubility of aluminium oxide in water?

\_\_\_\_\_ [1]

- ii) Give two reasons (apart from its apparent low reactivity) why aluminium is a good choice for making saucepans.

\_\_\_\_\_  
\_\_\_\_\_ [2]

- (e) Does the information above suggest that aluminium oxide is acting as an acid or a base? Explain your reasoning.

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[3]

- (f) What **three** products would be formed if sulphuric acid was heated in the pan for some time?

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[2]

In general, metal oxides are usually basic and non-metal oxides are usually acidic.

- (g) What is odd about aluminium oxide?

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[1]

[End of Paper]



# Eton College King's Scholarship Examination 2004

SCIENCE (SECTION 2 - DATA ANALYSIS)

(30 minutes)

*Candidate Number:* \_\_\_\_\_

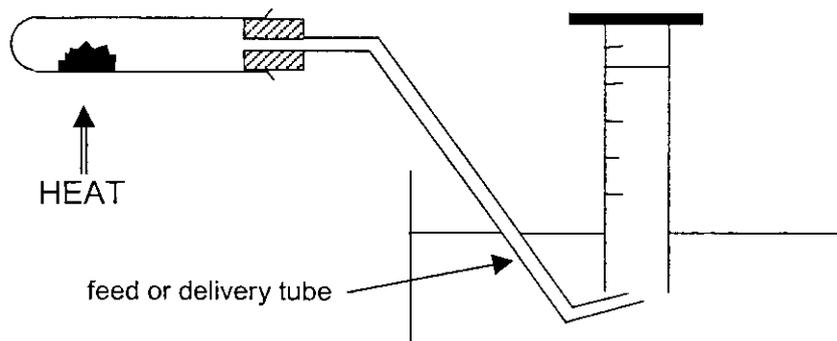
*This paper consists of two questions, each is worth the same number of marks. You are advised to spend roughly equal amounts of time on each question*

*Additional materials required: Graph Paper.*

For examiners' use only.

<b>Total</b>	
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1. The following practical equipment was set up to examine the chemical reaction when copper carbonate is heated:



The copper carbonate was placed in the test tube and heated. Gas was collected in the upturned measuring cylinder, which was initially filled with water. Volume readings were taken from the side of the measuring cylinder at known times and recorded in the table below:

Time / seconds	Volume of gas / cm <sup>3</sup>
5	2
11	5
19	10
35	20
46	30
58	40
72	50
93	60
110	65
137	70
165	72
180	72

- (a) Plot a graph of the results on a sheet of graph paper. Place time on the horizontal axis and draw a smooth curve through the points. [4]

- (b) At what time was the reaction complete?

\_\_\_\_\_ [1]

- (c) When was the reaction producing gas the fastest? Explain how you arrived at your answer.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

At the end of the experiment the test tube and the delivery tube were raised so the delivery tube was clear of the water and universal indicator solution was added to the water.

- (d) What colour would be expected from the universal indicator and what pH would this indicate?

\_\_\_\_\_ [2]

- (e) Why was it necessary to raise the delivery tube out of the water?

\_\_\_\_\_  
\_\_\_\_\_ [2]

The student noticed that the total amount of gas collected was less than he expected from the amount of solid used. He did the experiment again, keeping everything the same except changing the reacted solid for a fresh sample of solid of exactly the same mass as the original. He knew that the universal indicator wouldn't have an effect on the results, so he didn't bother to refill the trough with fresh water. This time the amount of gas collected was greater, but still a little less than expected.

- (f) Give **two** reasons why he collected less gas than expected.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

- (g) Explain why more gas was collected in the second experiment.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

- (h) Suggest how you could alter the experiment to check that your explanation in part (g) was correct.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

Both of the heating experiments were carried out on a large balance and the mass recorded throughout.

- (i) How would you expect the mass readings over the course of the two experiments to compare? Explain your answer.

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[2]

**[End of question 1. Question 2 starts on the next page]**

2. A student performed a number of experiments using various samples of metals and solutions of metal nitrates. For each experiment he placed 5cm<sup>3</sup> of the solution in a test tube and then added a thin strip of the metal under test. He recorded his observations in a table to consider later.

	<b>Metal and solution</b>	<b>Observations</b>
A	Copper metal and silver nitrate solution	Colourless solution to start. Silvery coloured solid formed.
B	Zinc metal and copper nitrate solution	Blue solution to start. Bubbles appear and zinc quickly gets covered with dark pink coloured solid.
C	Magnesium metal and copper nitrate solution	Bubbles and the magnesium quickly gets covered with dark pink coloured solid which then falls to the bottom of the tube.
D	Silver metal and zinc nitrate solution	Colourless solution to start. I couldn't see anything happening.
E	Silver metal and copper nitrate solution	I couldn't see anything happening.

- (a) What type of reaction is going on in the test tubes?

\_\_\_\_\_ [1]

- (b) From the evidence in the table, what can you say about the reactivity of the metals?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

- (c) What further reaction would you like to perform to improve your answer to part (b)? Explain what information this would give you.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

While looking at the results, the student realised he could have left out at least one experiment and yet still have got the same information about the reactivity of the metals.

- (d) Suggest an experiment he could have left out and explain your answer.

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[1]

The student was in a hurry, so he did not clear away his apparatus, but left it overnight. On returning the following day he was able to make more observations for tubes A, B & C.

- (e) What new observations might you expect for these three tubes?

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[2]

- (f) What other reaction do you know of where magnesium placed in a solution forms bubbles?

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[1]

- (g) How might you test to see if the reaction you have described in (f) is similar to the reaction forming bubbles in tube C?

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[3]

[Question continues on the next page]

The class was going on from looking at metals with solutions to the reactions of metals with metal oxides. The teacher performed a demonstration in which a mixture of powdered zinc metal and copper oxide was heated in a crucible. A very vigorous reaction took place and at the end a pink solid was seen in the crucible.

- (h) Which of the test tube reactions is most similar to this reaction? Describe the similarities.

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[3]

- (i) What type of reaction is the copper oxide undergoing, and what type of reaction is the zinc undergoing?

Copper oxide \_\_\_\_\_

Zinc \_\_\_\_\_ [2]

- (j) Using your answers to (h) and (i), how could you now classify the changes going on in test tube A of the original experiment?

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[2]

**[End of Paper]**



# Eton College King's Scholarship Examination 2004

## HISTORY AND GEOGRAPHY

(One and a half hours)

*Answer THREE questions, AT LEAST ONE to be chosen from each section.*

### SECTION 1: HISTORY

1. Why might the Norman Conquest be viewed as a national disaster for England?
2. 'The English Justinian' or a 'ruthless oppressor'. Which best describes Edward I? Justinian was Roman Emperor 427-465AD. He is remembered particularly for his law-making.
3. Why was England torn by dynastic conflict in the Wars of the Roses?
4. How far can the financial troubles of the Crown explain the troubled relationship between the early Stuart Kings and their Parliaments, 1603-1629?
5. Why did the Royalists lose the Civil War?
6. Why did the Jacobite rebellions fail?
7. What was 'Great' about the Great Reform Act of 1832?
8. Who benefited from the British Empire?
9. The historian AJP Taylor argued that the First World War was caused by 'railway timetables'. Is this a sufficient explanation for the outbreak of war in 1914?
10. What qualities have characterised successful English [or British] monarchs? You should use specific examples from your own knowledge in answering this question.
11. To what extent can individuals change the course of history? You should use specific examples from your own knowledge in answering this question.

## **SECTION 2: GEOGRAPHY**

1. Using examples that you have studied, consider to what extent the magnitude of an earthquake in a populated area determines the human scale of the disaster.
2. How far is it possible to balance the needs of conservation and recreation in areas of great natural and scenic value?
3. To what extent do geographical factors determine the world's human population distribution?
4. Using examples, discuss how people have attempted to control river floods.
5. 'In my view, climate change is the most severe problem that we are facing today, more serious even than the threat of terrorism...' Do you agree with this statement by Sir David King, the UK government's Chief Scientific Advisor?
6. 'The current pattern of world trade makes it difficult for less economically developed countries to catch up with those that are more economically developed.' Do you agree?
7. Why is satellite technology so important for weather forecasting?
8. In what ways has the theory of plate tectonics revolutionised our understanding of volcanic activity?
9. What is meant by 'sustainable development', and how relevant is this concept in relation to natural resources?
10. Why do different coastlines erode at different rates?



# Eton College King's Scholarship Examination 2004

## Mathematics A

(One and a half hours)

Answer *Question 1* and as many of the other six questions as you can.  
*Question 1* is worth 40 marks. All other questions are worth 10 marks each.  
**Show all of your working.**

### 1. Compulsory Question

- (a) The value of a car was £16,000 at the beginning of the year 2002.
- (i) If it loses 10% of its value over the course of the year, what will it be worth at the beginning of the year 2003?
- (ii) The car now loses 15% of its new value during the following year. What is the total percentage that it has lost from the beginning of 2002 until the beginning of 2004?
- (b) Solve the following pair of simultaneous equations:

$$\frac{x}{2} + y - 4 = 0, \quad \frac{y}{4} + \frac{5}{2} = \frac{x}{6}$$

- (c) In a garage, there are 10 *more* cars than motorbikes. When 5 cars are removed and 2 motorbikes added, the ratio of cars to motorbikes is 3:2  
Calculate how many cars and motorbikes there were initially.
- (d) When a stone of mass 750g is dropped into a cylindrical tank of water of radius 10cm, the water level rose by 1cm, with the rock totally submerged. If none of the water spilled out of the tank, find the density of the stone in  $\text{g/cm}^3$ , giving your answer correct to 3 significant figures.  
[Volume of a cylinder =  $\pi r^2 h$ , Density = Mass / Volume]
- (e) Simplify the following as far as possible  $(2(x + y + 2) - x)(y + x) + (y - x)(y + x)$ .
- (f) Make  $d$  the subject of the following formula  $t = \frac{5T(p - d)}{p - 2d}$
- (g) A right angled isosceles triangle has *longest* side of length 10cm. Find the lengths of the other two sides (to 3 significant figures).
- (h) A bag contains marbles of 2 different colours. There are 5 white and 3 black marbles. I pick out one marble, *do not replace it*, and then pick out another.  
Find the probability of:
- (i) Both marbles being white.
- (ii) Exactly one white and one black marble.

(i) Factorise the following as much as possible  $x^2 + 6xy + 9y^2$

(j) [The *product* of two numbers is the result of multiplying them together]

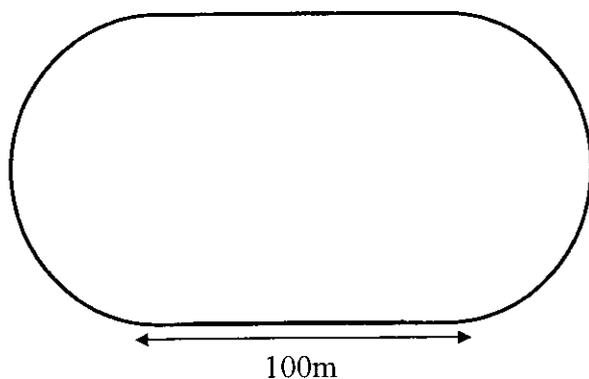
Four consecutive whole numbers are written as  $x - 1, x, x + 1, x + 2$ .

Show that if 1 is added to the product of these numbers then the resulting number is the square of the number obtained by subtracting one from the product of the middle two numbers.

2. A standard 400m running track consists of two straights each of 100m and two bends that can be assumed to be perfect semicircles. The *inside* of the first lane is shown in the diagram below.

[Circumference of a circle =  $2\pi r$ ]

[Give all answers to this question to 1 decimal place]



(a) Show that the radius of each of the semicircles is 31.8m to 3 significant figures.

The track is marked with 8 lanes, the inside of the inner most being 400m long. Each lane is 1m wide.

(b) Using your answer to (a), calculate the *total* distance round the *inside* of the outermost lane.

(c) Show that the athlete running in this outermost lane should be allowed to start 43.8m (to three significant figures) ahead of the start line in a 400m race where all athletes must stay in lanes. [You should assume that all athletes run as close to the *inside* of their lane in order to minimise the distance that they have to run]

An error was made in measuring the distance from the inside of the first lane to the inside of the outermost lane, and it was actually marked out 2% bigger than it should have been.

(d) The runner in this incorrectly measured outermost lane actually runs on the *outside of his lane* and records a personal best of 54.0 seconds. What is the best time that he could have expected on a correctly measured track, running on the *inside* of his lane at the same speed? [Assume that he maintains a constant speed throughout the race]

3. The recipe for making single and double cream from cream powder and milk is given below:

*600g of powder makes 10 portions of double cream or  
15 portions of single cream*

*To make double cream just add  $40\text{cm}^3$  of milk to every 100g of powder.*

*To make single cream:*

- *Put  $80\text{cm}^3$  of milk in a bowl*
- *Stir in the powder*
- *Add  $50\text{cm}^3$  of milk for every 100g of powder used.*

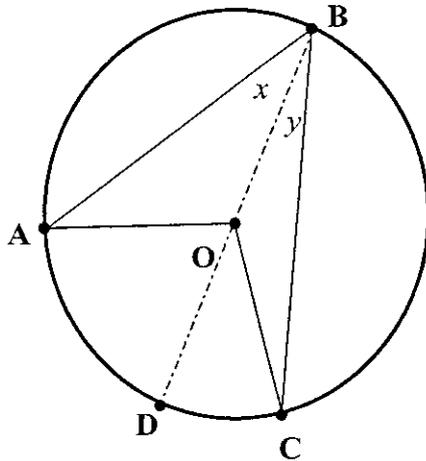
- (a) Calculate the quantities of milk and powder required to make
- (i) 8 portions of double cream
  - (ii) one bowl of single cream sufficient for 6 portions.
- (b) One bowl of  $x$  portions of double cream and one bowl of  $y$  portions of single cream are to be made.
- (i) Show the mass of powder,  $M$ , is given by the equation  $M = 60x + 40y$
  - (ii) What is the equation for the volume of milk,  $V$ , required?
- (c) 900g of powder and  $500\text{cm}^3$  of milk were used in making one bowl of each as described above. Find the number of portions of single and double cream that were made.

4. We define  $[x]$  to be the largest integer that is less than or equal to the number  $x$ .  
So that  $[2.1] = 2$  and  $[6.6] = 6$  for example.

We define  $|x|$  to be  $x$  if  $x \geq 0$  and  $-x$  if  $x < 0$ . So that  $|2| = 2$  and  $|-3| = 3$  for example.

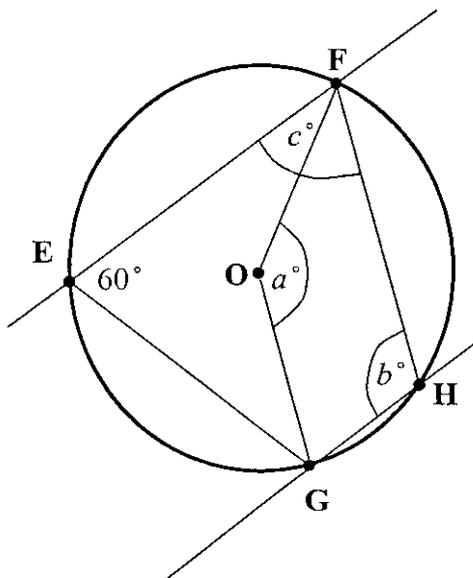
- (a) Evaluate  $[-1.2]$
- (b) Evaluate  $\left| \frac{p}{3} - 1 \right|$  to 1 decimal place.
- (c) Sketch the following graphs for  $-4 \leq x \leq 4$ :
- (i)  $y = |x|$
  - (ii)  $y = [x]$
  - (iii)  $y = |x| + 2$
  - (iv)  $y = 3[x]$

5. Consider the circle drawn below.  $O$  is the centre and points  $A, B, C$  and  $D$  all lie on the circle.  $OA, OB, OC$  and  $OD$  are all radii of the circle.



The acute angle  $OBA$  equals  $x$  degrees, and acute angle  $OBC$  equals  $y$  degrees.

- (a) Find an expression for the following angles in terms of  $x$  and  $y$ :
- Acute angle  $BAO$
  - Acute angle  $BCO$
- (b) Show that acute angle  $AOD$  equals  $2x$ .
- (c) By calculating acute angle  $COD$ , or otherwise, deduce a relationship between angles  $ABC$  and  $AOC$ .



The lines  $EF$  and  $GH$  are parallel and angle  $FEG$  equals  $60^\circ$ .

- (d) Calculate the size of angles  $a, b$  and  $c$ .

6. A special operation on any two numbers is given the symbol  $\Delta$  and works in the following way:

Consider a cake, then  $\frac{1}{3} \Delta \frac{1}{5}$  is obtained by taking  $\frac{1}{3}$  of the cake, but adding on  $\frac{1}{5}$  of the cake that *is left over* [the two thirds].

$$\text{Hence, } \frac{1}{3} \Delta \frac{1}{5} = \frac{1}{3} + \frac{1}{5} \times \frac{2}{3} = \frac{7}{15}$$

- (a) Evaluate  $\frac{1}{2} \Delta \frac{1}{3}$ .
- (b) Evaluate  $\frac{1}{2} \Delta \frac{1}{3} \Delta \frac{1}{4}$ .
- (c) Write down a formula for  $\frac{1}{x} \Delta \frac{1}{y}$ .

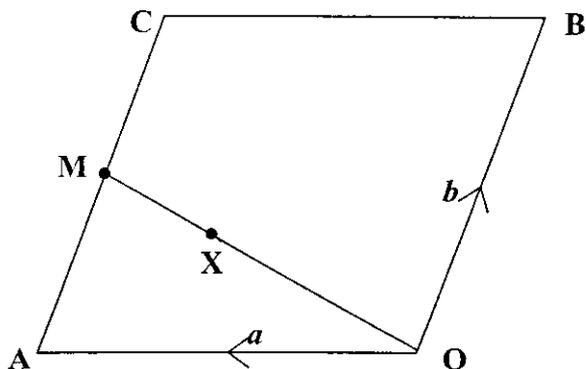
Another operation, given the symbol  $\circ$ , is defined by  $x \circ y = \frac{xy}{2}$ .

- (d) If  $x$  and  $y$  can both take values  $-2$ ,  $0$  or  $2$ , copy and complete the table below that records all possible values of  $x \circ y$ :

		y values		
		-2	0	2
x values	-2	2	0	?
	0	?	?	?
	2	?	?	?

- (e) What can you say about  $x \circ y$  and  $y \circ x$  for all these values of  $x$  and  $y$ ?
- (f) In general, what pattern would we expect to see in the table of results for an operation exhibiting this property?

7. A robot is permitted to move along the track shown in the diagram below.  $OACB$  is a rhombus and the robot begins at  $O$ .  $M$  is the midpoint of  $AC$  and  $X$  divides  $MO$  in the ratio 1:2 [That is  $MX = \frac{1}{2} XO$ ].



Unfortunately the robot has a limited understanding of instructions to move. It understands how to move in the direction equivalent to  $O$  to  $A$  and gives this journey the letter  $a$  when receiving instructions.

It also understands how to move in a direction equivalent to  $O$  to  $B$ , and labels this journey with the letter  $b$  [These journeys are shown on the diagram as arrows].

If it wants to reverse a journey it needs to be told using a minus sign, for example it labels the journey from  $A$  to  $O$  as  $-a$ . To complete one journey after another it understands addition of journeys, so that going from  $O$  to  $C$  via  $A$  will be labelled as  $a + b$  and the journey from  $B$  to  $A$  via  $O$  would be  $-b + a$ .

Finally, the robot can perform fractions of journeys, for example to go half way along  $OB$  it would require the instruction  $\frac{1}{2}b$  as  $b$  represents the distance between  $O$  and  $B$ .

- (a) Find instructions, in terms of  $a$  and  $b$ , for the following journeys:
- (i)  $A$  to  $B$
  - (ii)  $A$  to  $M$
- (b) Explain why the instructions for the journey from  $M$  to  $O$  would be  $-\frac{1}{2}b - a$
- (c) Show that the instructions for moving from  $M$  to  $X$  would be  $-\frac{1}{6}b - \frac{1}{3}a$
- (d) By finding instructions for the journey from  $A$  to  $X$  [via  $M$ ] and considering your answer to part (a), can you say anything about the points  $A$ ,  $X$  and  $B$ ?

# Eton College King's Scholarship Examination 2004

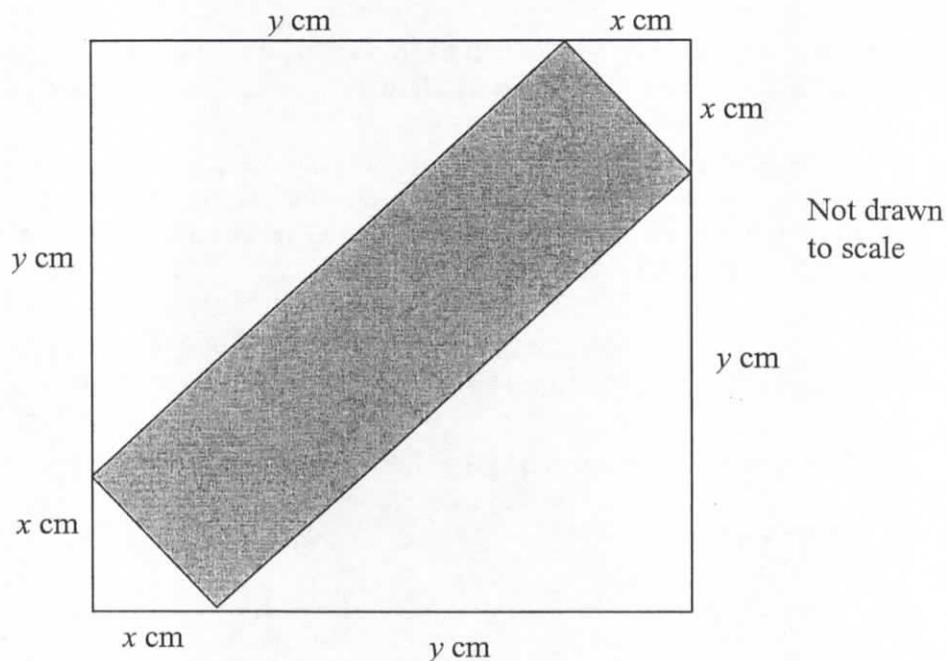
## MATHEMATICS B

(One and a half hours)

Answer as many questions as you can. Each of the ten questions carries ten marks. Show all your working. Calculators are not allowed.

- By considering powers of 2 show that the units digit of  $2^{2004}$  is 6.
  - Find the units digit of  $3^{2004}$ ,  $4^{2004}$ ,  $5^{2004}$  and  $6^{2004}$ .
  - Explain why  $1^{2004} + 2^{2004} + 3^{2004} + 4^{2004} + 5^{2004} + 6^{2004}$  is divisible by 5.

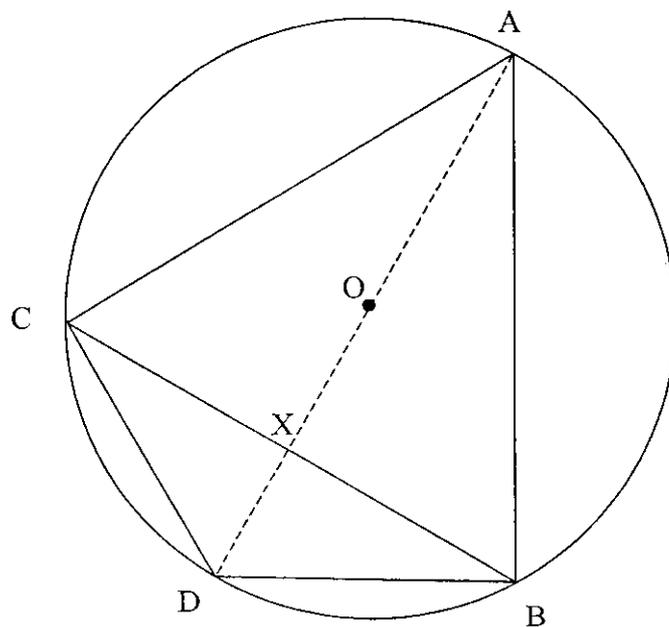
- In the diagram shown below a rectangle is drawn inside a square in such a way that the four corners of the rectangle lie on the edges of the square. Each corner of the rectangle lies  $x$  cm from one corner of the square and  $y$  cm from another corner.



- Find an expression for the length of the diagonal of the rectangle in terms of  $x$  and  $y$ .
  - Find an expression for the unshaded area in terms of  $x$  and  $y$ .
  - Given that the unshaded area is  $50 \text{ cm}^2$ , use (a) and (b) to find the length of the diagonal of the shaded rectangle.
- By considering  $(a-b)^2 + (a-c)^2 + (b-c)^2$ , prove that  $a^2 + b^2 + c^2 \geq ab + ac + bc$ .
    - Multiply both sides of the inequality in (a) by  $a + b + c$ , where  $a + b + c \geq 0$ , and hence deduce an inequality in the form  $a^3 + b^3 + c^3 \geq \dots$

[Please turn over]

4. A man spent £11.25 buying  $n$  copies of a magazine. If each copy had cost 15p less, he could have bought 3 more copies and received 45p change. If  $p$  is the price (in pence) of each magazine that he bought then it can be deduced that  $pn = 1125$ .
- Write down another equation involving  $n$  and  $p$  that can be deduced.
  - Use these two equations to show that  $p = kn$  where  $k$  is a whole number to be determined.
  - Hence find out how many magazines he bought.
5. A train leaves London at noon and arrives in Edinburgh six hours later. Another train leaves Edinburgh at noon of the same day and arrives in London nine hours later. Both trains travel the same route (in different directions) and both travel at constant speeds. Let  $d$  be the distance in miles between London and Edinburgh by the route that the trains take.
- Find the speeds of the two trains in terms of  $d$ .
  - What is the total distance travelled by the two trains at the time when the trains pass each other?
  - If the trains pass each other after  $t$  hours then use the answers to (a) and (b) to find an equation involving  $d$  and  $t$ . Solve this to find the time at which the trains pass each other.
6. A, B and C are three points on the circle drawn below whose centre is O. ABC is an equilateral triangle whose sides have length  $2\sqrt{3}$  cm. D is the point on the circle such that AD is a diameter. X is the point of intersection of the line AOD and BC.



- Write down the angle BXD and the length XB.  
Let  $r$  be the radius of the circle and  $h$  be the length OX.
- Use Pythagoras' theorem on the triangle BXA to find the value of  $r + h$ .
- Use Pythagoras' theorem on the triangle BXO to show that  $r^2 - h^2 = 3$ .
- Hence find  $r$  and  $h$ .
- Write down the ratio of the area of the triangle ABC to the area of the triangle DBC.

7. A lady bought two candles which burn at constant, though different rates. One of the candles was 4 cm longer than the other. One evening she unwrapped the candles and lit them both, lighting the longer one at 6.00pm and the shorter one at 7.30pm. She noticed that at 9.30pm the two candles were both the same length. The longer one burned out at 11.00pm and the shorter one burned out at 11.30 pm. How long was each candle originally?



Not drawn to scale

8. Figure 1 shows a small boy standing on the top of a spherical globe of radius 1.5m with centre O. His eyes are at the point E, a height of 1m above the top of the globe. All the outermost points of the globe that he can see as he turns around in a complete revolution are represented by the thick solid line drawn on the globe in Figure 1. One of the outermost points he can see is the point P. Figure 2 shows a cross section through the globe.

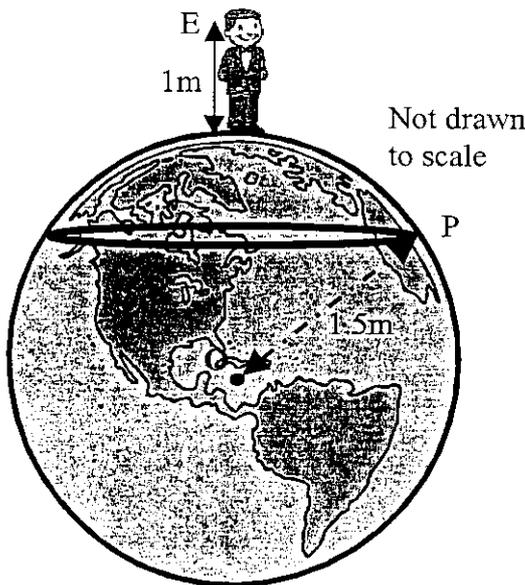


Figure 1

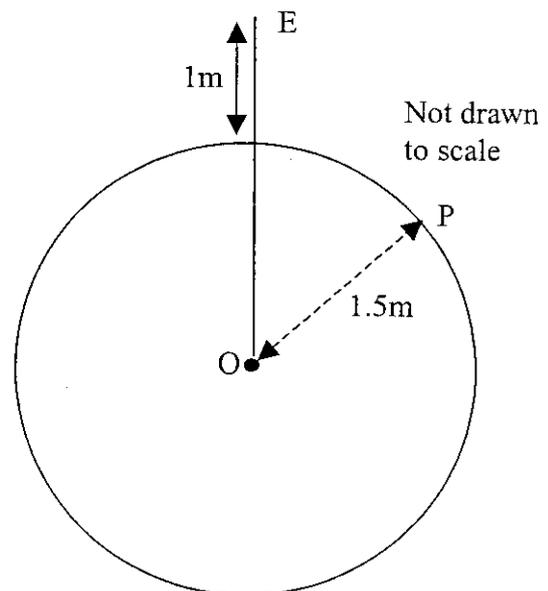


Figure 2

- What is the shape of the thick solid line that is drawn on the globe?
- Write down the angle  $EPO$ , and hence calculate  $EP$ .
- What is the exact length of the thick solid line that is drawn on the globe?

[Please turn over]

9. Five toys are on sale in a shop. The cost of each toy is a whole number of pounds and no two toys cost the same amount. A man wanted to buy two different toys for his son but he was unsure which toys to choose. He wrote down the total cost for each of the ten combinations of two different toys that he could buy from this shop.
- (a) If the costs of the five toys are  $\pounds a$ ,  $\pounds b$ ,  $\pounds c$ ,  $\pounds d$  and  $\pounds e$  then show that the sum of all ten possible total costs of two toys is  $4(a + b + c + d + e)$ .

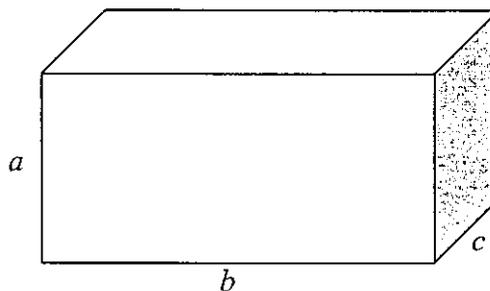
The man wrote down all the possible total costs of the two different toys as follows:

$\pounds 23$     $\pounds 34$     $\pounds 37$     $\pounds 40$     $\pounds 44$     $\pounds 47$     $\pounds 51$     $\pounds 58$     $\pounds 61$

When he got home he remembered that the reason that there were only nine totals on his list instead of ten was that two of the totals were the same.

Suppose that the toys which cost  $\pounds a$  and  $\pounds b$  have the same total cost as the toys which cost  $\pounds c$  and  $\pounds d$ .

- (b) Find the sum of these nine totals and use the fact that the sum of all ten totals is a multiple of 4 (as seen from (a)) to show that  $a + b = 37$ .
- (c) Hence find  $e$ .
- (d) Calculate the cost of the other four toys.
10. (a) If  $a$ ,  $b$  and  $c$  are three numbers then show that:  
 $(a^2b^2 + a^2c^2 + b^2c^2) = (ab + ac + bc)^2 - kabc(a + b + c)$  where  $k$  is a whole number which is to be stated.
- (b) The cuboid shown below has dimensions  $a$ ,  $b$  and  $c$ . The volume of the cuboid is  $6 \text{ cm}^3$ , the total surface of the cuboid is  $22 \text{ cm}^2$  and the total length of all the sides is 24 cm.



Not drawn to scale

- (i) Explain why  $ab + ac + bc = 11$  and write down two other equations involving  $a$ ,  $b$  and  $c$ .
- (ii) A new cuboid is made whose dimensions are  $a^2$ ,  $b^2$  and  $c^2$ . Use (a) to find the total surface area of the new cuboid.

[End of paper]

