



# HARROW SCHOOL

## ENGLISH SCHOLARSHIP EXAMINATION 2018

**1½ hours**

*Instructions:*

- *This paper is in two sections worth equal marks; you are advised to divide your time evenly between the two.*
- *In both responses you will be marked for the quality of your writing (spelling, grammar and punctuation).*
- *Please begin your response to Section B on a new piece of paper.*



## **SECTION A: WRITING**

Imagine that your school has announced a plan to stop serving chips, pizza, burgers, cakes and other 'unhealthy' food and, additionally, to have two completely meat-free days each week. There are some in your school who are not very happy about this plan.

**Write a speech, to be delivered to your classmates, arguing for or against this plan.**

**[25 marks]**



## SECTION B: READING

***Remember to start this response on a new sheet of paper!***

***Read the following excerpt from Virginia Woolf's novel Orlando (which tells the story of a young nobleman born during the reign of Queen Elizabeth I) and answer the question that follows.***

After an hour or so — the sun was rapidly sinking, the white clouds had turned red, the hills were violet, the woods purple, the valleys black — a trumpet sounded. Orlando leapt to his feet. The shrill sound came from the valley. It came from a dark spot down there; a spot compact and mapped out; a maze; a town, yet girt about with walls; it came from the heart of his own great house in the valley, which, dark before, even as he looked and the single trumpet duplicated and reduplicated itself with other shriller sounds, lost its darkness and became pierced with lights. Some were small hurrying lights, as if servants dashed along corridors to answer summonses; others were high and lustrous lights, as if they burnt in empty banqueting-halls made ready to receive guests who had not come; and others dipped and waved and sank and rose, as if held in the hands of troops of serving men, bending, kneeling, rising, receiving, guarding, and escorting with all dignity indoors a great Princess alighting from her chariot. Coaches turned and wheeled in the courtyard. Horses tossed their plumes. The Queen had come.

Orlando looked no more. He dashed downhill. He let himself in at a wicket gate. He tore up the winding staircase. He reached his room. He tossed his stockings to one side of the room, his jerkin to the other. He dipped his head. He scoured his hands. He pared his finger nails. With no more than six inches of looking-glass and a pair of old candles to help him, he had thrust on crimson breeches, lace collar, waistcoat of taffeta, and shoes with rosettes on them as big as double dahlias in less than ten minutes by the stable clock. He was ready. He was flushed. He was excited. But he was terribly late.

**How does the writer make this such a vivid scene for the reader? Be sure to use quotations from the passage in your response.**

**[25 marks]**





# HARROW SCHOOL

## MATHEMATICS PAPER 1 SCHOLARSHIP EXAMINATION 2018

**1½ hours**

*Calculators and geometrical instruments are permitted*

*Instructions:*

- *Answer in the spaces in the question paper.*
- *Show your working clearly.*



1. A freight train has 6 trucks. Three of the trucks are carrying cargo weighing 17 750kg each, while another two are carrying cargo weighing 22 500kg each. The mean weight of cargo carried by the six trucks is 20 825kg.
  - a. What is the weight of the cargo in the sixth truck?

Four more trucks join the train, carrying a mean weight of 12 300kg each.

- b. What is the new mean weight of cargo being carried by each truck?



At the freight train's first stop, two thirds of the cargo was sold at a profit of 30%. At the second stop, one fifth of the total amount cargo (i.e. not just one fifth of the remaining cargo) was sold at a profit of 5%. At the train's third and final stop, the remaining cargo was sold for £3 325, at a *loss* of 5%.

- c. What was the original cost of the cargo and how much profit was made overall?



2.

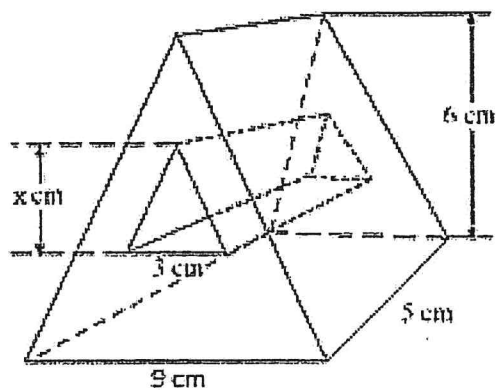


Figure 1 (not to scale)

A hole in the shape of a small triangular prism was drilled out of a larger solid triangular prism, as shown in figure 1 above. The volume of the remaining object was  $120\text{cm}^3$ .

- a. What was the height (labelled  $x$ ) of the triangular face of the small prism?



A label is placed around the body of the prism, leaving the triangular faces exposed. The label is glued together using a 1cm overlap. There is also a 0.5cm gap between the label and the exposed faces of the prism.

- b. Find the area of the label.



3. a. Simplify, where possible:

i.  $\frac{12a^5}{6a^2}$

ii.  $4a^2 + a^3$

iii.  $\frac{7a-7}{1-a}$

The operators  $!$ ,  $?$ ,  $*$  and  $\&$  are defined as follows:

$$a ! b = ab + 3$$

$$a ? b = (ab)^2$$

$$a * b = \frac{a}{b}$$

$$a \& b = a^2 - b^2$$

b. Simplify:

i.  $(a ! a) + (2 ? a)$

ii.  $(a \& b)/(a - b)$

iii.  $(a ? b) * b$



c. Solve  $(a \& 2) + (a \& 2) = 1$

d. Solve for  $a$  and  $b$

$$(a \& b) * b = a$$

$$a(a \& b) = b$$



4. This question is about exchange rates, where the following information is given:

**£1 = 3.78 ECD      British Pounds to Eastern Caribbean Dollars (ECD)**

£1 = 9.44 TTD      British Pounds to Trinidad and Tobago Dollars (TTD)

**\$1 = 6.74 TTD**      **US Dollars to Trinidad and Tobago Dollars (TTD)**

Bitcoin (BTC) is a digital currency.

- How many British Pounds would be worth 600.00 ECD?
- How many British Pounds would be worth \$550?
- My 50 000 TTD is changed into British Pounds and then changed into 0.67 Bitcoin. Work out the exchange rate of one British Pound to BTC.



- d. The following day, the value of BTC increased by 7%, so I converted my BTC back into British Pounds and then into ECD. I was charged a fee of 0.5% for each transaction. How many ECD did I end up with?



5.

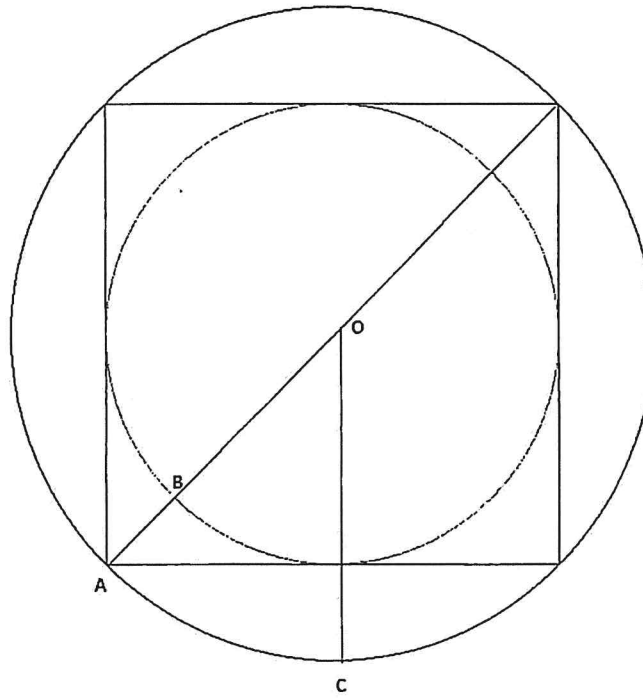


Figure 2 (not to scale)

Figure 2, which is not drawn to scale, shows a square of side 10cm inscribed inside a circle with centre  $O$ . A second circle, also with centre  $O$ , is inscribed within the square.

Find the length of  $AB$  and the length of  $AC$ .







6. a.

i. Find the  $n$ th term of the arithmetic series which starts 30, 32, 34, ...

I am trying to pay off my debt of £1272 by paying £30 in the first month, £32 in the second month, £34 in the third month and so on. I started paying my debt off in January 2018.

ii. In which month will I have to pay £48?



7. a. Solve the following equations for  $x$ :

i.  $5(3 - x) = 5 - 2(1 - x)$

ii.  $3p^2 - 5p^2x = 2p^2x$   $(p \neq 0)$

iii.  $\frac{x-5}{2x+1} = \frac{2x+2}{4x}$

iv.  $\sqrt{x} + \sqrt{x+15} - 15 = 0$



b. Solve the following sets of simultaneous equations:

i.

$$\begin{aligned}2x + y &= 13 \\5x - 2y &= 1\end{aligned}$$

ii.

$$\begin{aligned}2(3p + q) + (2p - q) - 13 &= 0 \\5(3p + q) - 2(2p - q) - 1 &= 0\end{aligned}$$



c. Solve the following inequalities:

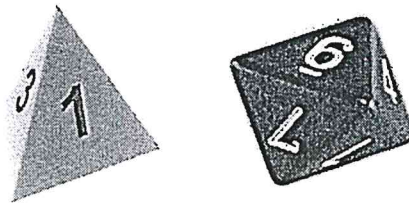
i.  $3x - 16 < 2x - 11$

ii.  $\frac{5x}{3} > \frac{x}{4} + 1$

iii. List all the even numbers for which both of the inequalities above are true.



8. A fair four-sided die and a fair eight-sided die are rolled together. The score,  $S$ , is the *difference* between the numbers on the two dice.



- a. Find the probability that  $S$  is 2.
- b. Find the probability that  $S$  is a prime number.
- c. Find the modal value of  $S$ .

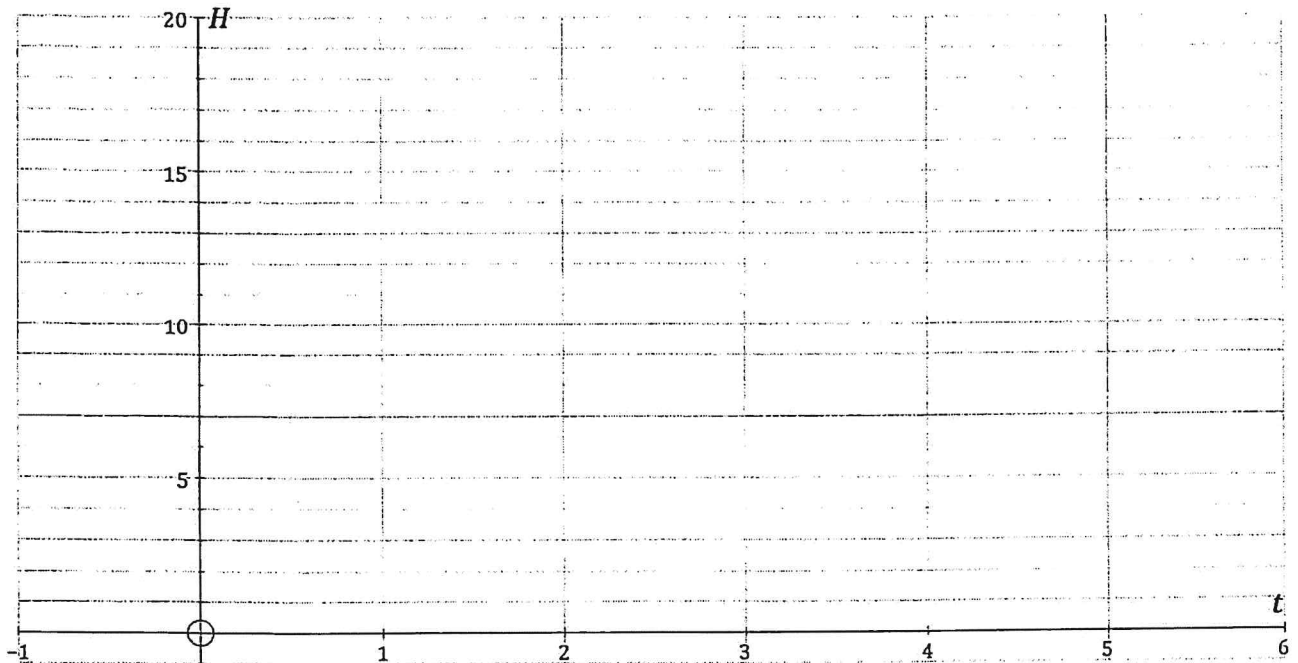


A third, six-sided die is now also rolled, and the new score,  $N$ , is the maximum difference between any two of the numbers on the three dice.

- d. Find the probability that  $N$  is 5.



9. A ball is thrown in the air. The height of the ball above the ground in metres,  $H$ , follows the equation  $H = 3t(5 - t)$ , where  $t$  is the time in seconds after the ball is released.
- a. On the axes provided below, plot a graph of  $H$  against  $t$ .



- b. At what time is the ball at its maximum height?

- c. At what times is the ball at a height of 10m?



- d. Another ball is thrown one second later. It follows the same equation of flight as the first ball. At what time (after the first ball is released) are the two balls at the same height?









# HARROW SCHOOL

## MATHEMATICS II

**90 minutes**

### GENERAL INSTRUCTIONS

*Write your solutions on lined paper.*

*This paper is designed to be very challenging. Very few (if any) candidates should expect to finish it.*

*Greater credit will be given for a smaller number of complete solutions to some of the questions rather a large number of incomplete attempts.*

*You must show all your working and explain all your reasoning.*

*Calculators, geometric instruments and squared paper may NOT be used.*



**PLEASE NOTE:** This paper is not just about getting the right answers; correct answers on their own will earn few marks. You will be marked more on the PRESENTATION of your solutions, the EXPLANATION of your working and the JUSTIFICATION of your final answers.

This paper is very difficult. You will earn more credit for complete solutions to the questions you do (even if you don't do them all), rather than incomplete attempts at solutions to all the questions.

Note: none of these questions requires a "trial and improvement" method; using this approach will score few of the available marks. All questions can be solved by other means.

---

1. You are given that  $1234 \times 5678 = 7\,006\,652$ . Using this fact, evaluate the following:

- a.  $1.234 \times 56.78$
- b.  $0.02468 \times 0.5678$
- c.  $700.6652 \div 123.4$
- d.  $1235 \times 5677$

*[NB you will earn no marks if you calculate these values directly.]*

2. You may assume that a person drinks  $2\frac{1}{2}$  litres of water every day.

Stating any further assumptions that you make, decide whether a person drinks enough water in their lifetime to fill a swimming pool.

3. The *modulus function*, written  $|x|$ , returns the number part of  $x$ , ignoring its sign.

For example,  $|6| = 6$  and  $|\frac{3}{7}| = \frac{3}{7}$ , but  $|-11| = 11$  and  $|-3.6| = 3.6$ .

a. Find *all* values of  $x$  which satisfy the following equations:

- i.  $|x| = 8$
- ii.  $12|x| = 20$
- iii.  $|x| - 3 = 3$
- iv.  $|x - 3| = 3$

b. Solve:

- i.  $7(x + 1) - \frac{3}{5}(2 - x) = 5(2x + 1)$
- ii.  $7(|x| + 1) - \frac{3}{5}(2 - |x|) = 5(2|x| + 1)$

c. How many solutions are there to the equation  $|x - 2| + 3 = 1$ ? Explain your reasoning.

4. a. Solve this pair of simultaneous equations:

$$\begin{aligned} 2x - y &= 10 \\ 5x + 2y &= 7 \end{aligned}$$

b. Using your answer from part (a), solve the following pairs of simultaneous equations:

i. 
$$\begin{aligned} 2a - b &= 1000 \\ 5a + 2b &= 700 \end{aligned}$$

ii. 
$$\begin{aligned} 2q - p &= 10pq \\ 5q + 2p &= 7pq \end{aligned}$$

c. Explain why the pair of simultaneous equations

$$\begin{aligned} 2m^2 - n^2 &= 10 \\ 5m^2 + 2n^2 &= 7 \end{aligned}$$

has no solutions.



5. In a football league, there are 20 teams. In a season, each team plays each other twice (once at home and once away). After each match, the winning team scores 3 points, and the losing team 0 points; in the event of a draw each team scores 1 point.

a. How many matches are there in total each season?

Last season, the total number of points scored by all 20 teams was exactly 1000.

b. How many matches were drawn last season?

6.  $x$ ,  $y$  and  $z$  are numbers which satisfy the following:

$$x + y + z = 12;$$

$$xy + xz + yz = -4;$$

$$xyz = \frac{3}{5}.$$

Without calculating  $x$ ,  $y$  or  $z$  individually, find the values of the following expressions:

a.  $4x + 4y + 4z$

b.  $x(2 - 3y) + y(2 - 3z) + z(2 - 3x)$

c.  $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$

d.  $(x + 1)(y + 1)(z + 1)$

7. When I run uphill, I run at half of my usual speed. When I run downhill, I run at two thirds of my usual speed.

Yesterday, I went on a hilly 10km run. The run was in a loop so I ran the same distance uphill as I did downhill. This run took me  $1\frac{1}{2}$  times as long as a completely flat 10km run takes me.

What distance of my hilly run was uphill?

8. a. Find how many factors the number 42 has.  
*[Remember that 1 is a factor of every number and that every number is a factor of itself]*
- b. Write 42 as the product of prime factors.
- c. Explain how you could use your list of prime factors from (b) to work out the number of factors of 42.
- d. Find how many factors the following numbers have:
- i. 330
- ii.  $3 \times 11 \times 13 \times 17 \times 19 \times 23 \times 47$
- e. Find how many factors the number 12 has. Why does the method above not work for 12?

9. A plant has some sticky seed pods on it, which are falling off. When each one falls off, it sometimes hits other sticky pods on the way down. If a sticky pod is hit by a falling pod, it also falls off the plant; a third of the time it remains stuck to the pod which hit it and two-thirds of the time it remains separate from the pod which hit it.

- a. A pod falls off and hits two other pods on the way down. Find the probability that:
- i. It lands on the ground on its own;
- ii. It lands on the ground as one of three pods all stuck together;
- iii. It lands on the ground stuck to exactly one other pod.

Three separate pods all fall off the plant independently of each other. Each one hits two other (different) pods on the way down.

- b. Find the probability that the first pod lands on its own, the second pod lands stuck to exactly one other pod, and the third pod lands stuck to two other pods
- c. Find the probability that one of each of the three pods lands on its own, stuck to exactly one pod, and stuck to exactly two pods in any order.

*Hint: you may want to think about the number of different ways this can happen.*





# HARROW SCHOOL

**Geography 2018**

**1 hour 30 minutes**

*Answer all the questions in the space provided.*

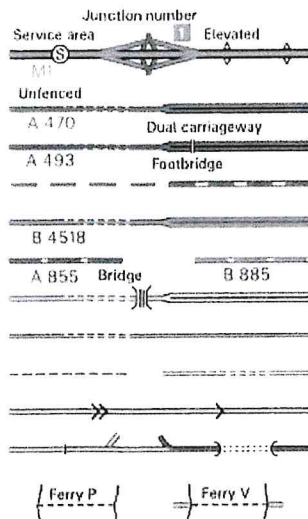
*Answer all of Questions 1 and 2.*

*Answer one essay title from a choice of four for Question 3.*

*An Ordnance Survey map extract is included with this examination.*



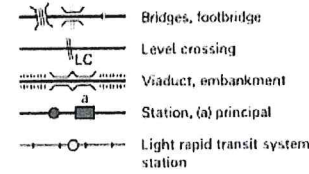
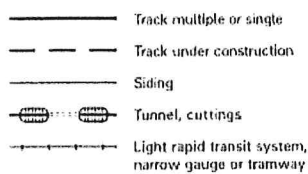
## ROADS AND PATHS



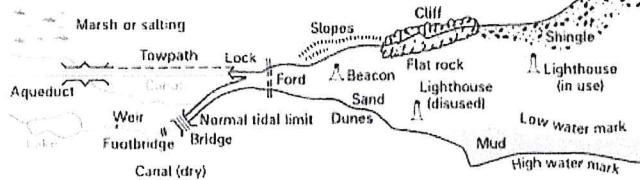
Not necessarily rights of way

Motorway (dual carriageway)  
Primary Route (recommended through route)  
Main road  
Road under construction  
Secondary road  
Narrow road with passing places  
Road generally more than 4m wide  
Road generally less than 4m wide  
Path / Other road, drive or track  
Gradient: steeper than 20% (1 in 5), 14% to 20% (1 in 7 to 1 in 5)  
Gates, Road tunnel  
Ferry (passenger), Ferry (vehicle)

## RAILWAYS



## WATER FEATURES



**HEIGHTS** 1 metre = 3.2808 feet

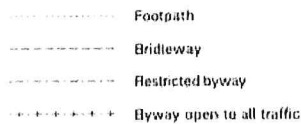
Contours are at 10 metres vertical interval

Heights are to the nearest metre above mean sea level

144

Where two heights are shown the first height is to the base of the triangulation pillar and the second (in brackets) to the highest natural point of the hill

## PUBLIC RIGHTS OF WAY

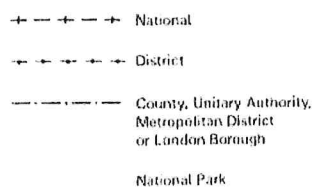


The symbols show the defined route so far as the scale of mapping will allow.

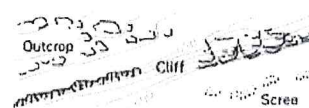
The representation on this map of any other road, track or path is no evidence of the existence of a right of way. Not shown on maps of Scotland

Danger Area  
Firing and Test Ranges in the area. 'Danger' Observe warning notices.

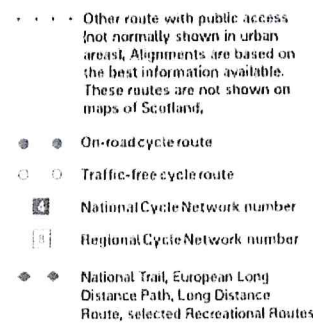
## BOUNDARIES



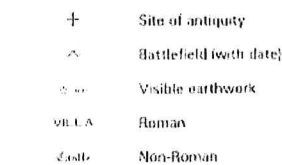
## ROCK FEATURES



## OTHER PUBLIC ACCESS



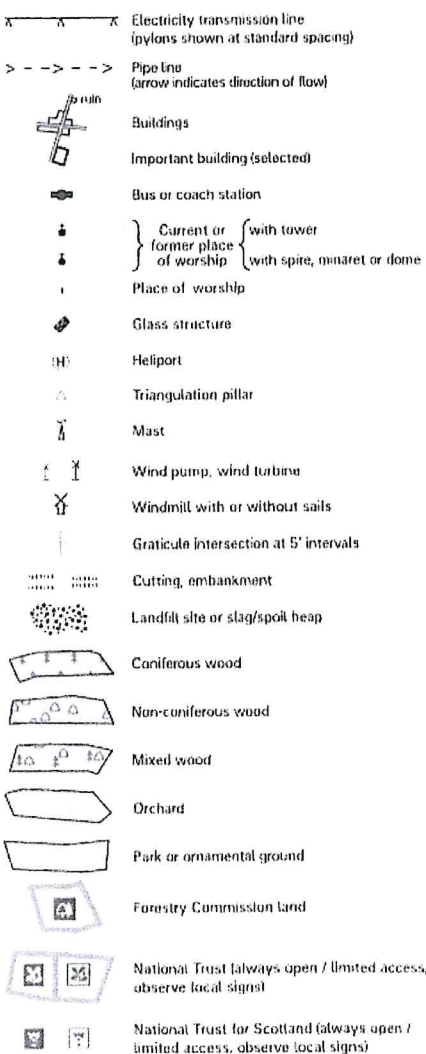
## ANTIQUITIES



## TOURIST INFORMATION



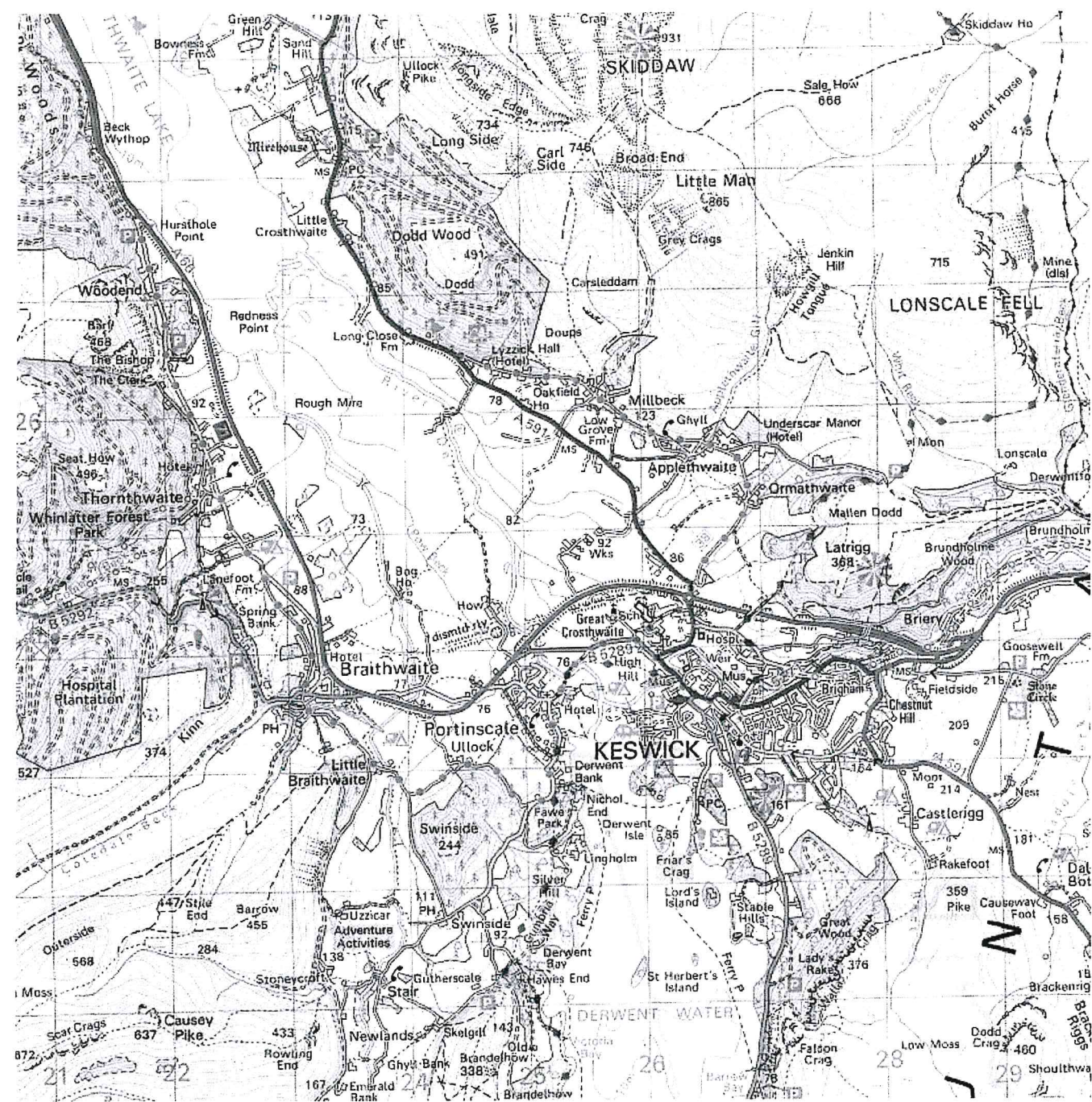
## LAND FEATURES



## ABBREVIATIONS

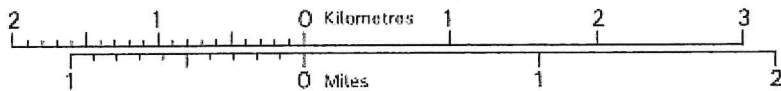
Br	Bridge	MS	Milestone
Cem	Cemetery	Mus	Museum
CG	Cattle grid	P	Post office
CH	Clubhouse	PC	Public convenience (in rural areas)
Fm	Farm	PH	Public house
Ha	House	Sch	School
MP	Milepost	TH	Town Hall, Guildhall or equivalent





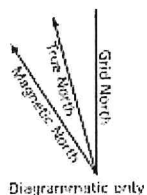
Scale 1: 50 000

2 centimetres to 1 kilometre (one grid square)



1 kilometre = 0.6214 mile

1 mile = 1.6093 kilometres



Diagrammatic only



## QUESTION 1

Answer ALL of Question 1

*[Spend 25 minutes on this section]*

Use the Ordnance Survey map extract showing the town of Keswick and the surrounding area to answer the following questions:

- a) Using your locational knowledge, what **upland area** of the British Isles is located within Cumbria, the county that Keswick is situated within, in the north west of England. [1]

- b) Complete the table by identifying the **land feature** found at each grid reference. [2]

Grid Reference	Land Feature
21 25	
263 236	

- c) Give the **6-figure** grid reference of **Lord's Island** within Derwent Water. [1]

- d) What is the **spot height** of Latrigg in grid square 27 24. [1]

- e) In which **direction** was the photographer looking when he took the picture below. [1]



- f) Name the **highest point** in the photograph. [1]



- g) To the nearest kilometre, how long is the stretch of the **River Derwent** that flows between Derwent Water and Bassenthwaite Lake. [1]

.....

- h) Describe what the **relief** is like to the **north** of Keswick. [4]

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.....  
.....

- i) Suggest why Keswick might be a popular destination for **tourists** to visit. [4]

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.....  
.....  
.....  
.....  
.....

- j) Explain **two** reasons why Keswick is prone to flooding. [4]

Reason 1: .....

.....  
.....  
.....

Reason 2: .....

.....  
.....  
.....

[Total: 20 marks]

END OF QUESTION 1



## QUESTION 2

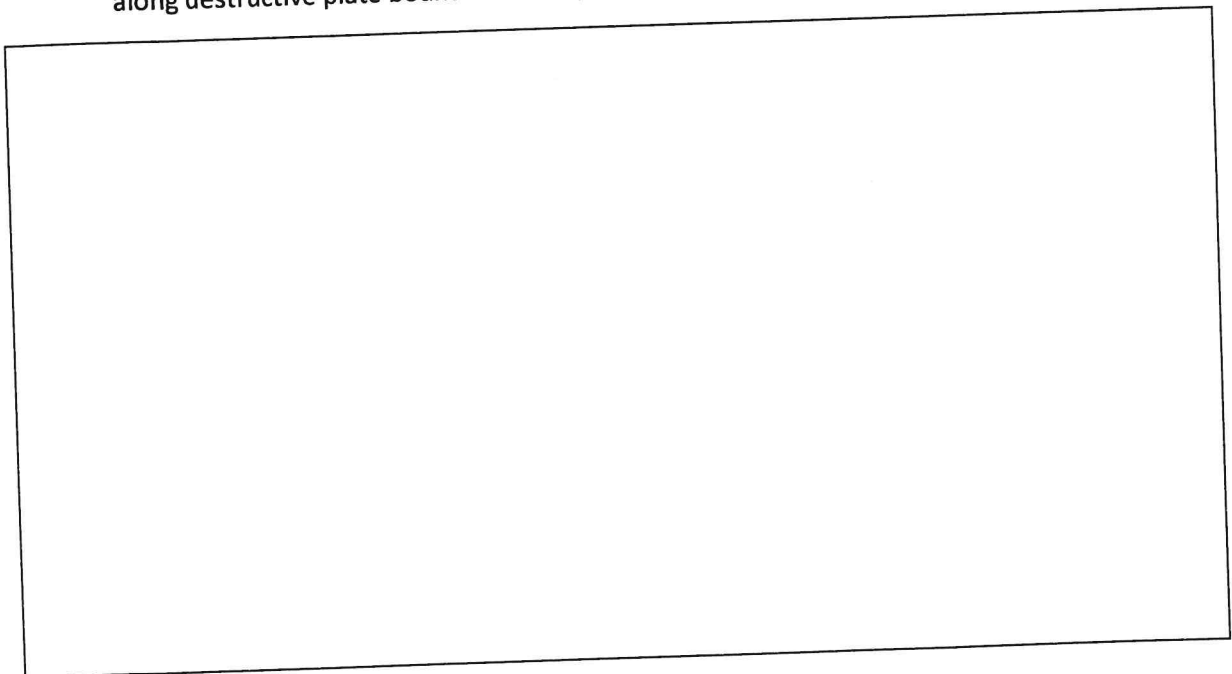
Answer ALL of Question 2

*[Spend 30 minutes on this section]*

a) Study the photograph below which shows Mount Agung, just one of 127 active volcanoes in Indonesia. It is part of the Pacific Ring of Fire, located on a destructive plate boundary.



- i. Draw an **annotated** diagram (or sequence of diagrams) to **explain** why volcanoes are found along destructive plate boundaries. [6]





ii. Explain **two** reasons why people live in areas at risk of a tectonic hazard. [4]

Reason 1: .....

.....

.....

.....

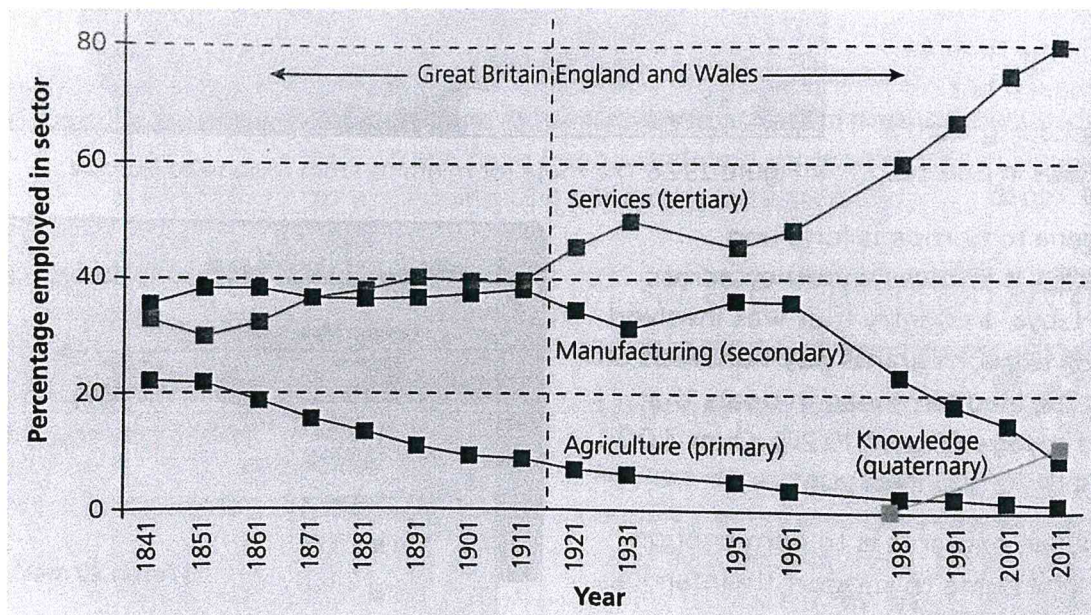
Reason 2: .....

.....

.....

.....

b) Study the graph below which shows the changing industrial structure of England and Wales.



i. Describe how the industrial structure has changed between 1921 and 2011 [4]

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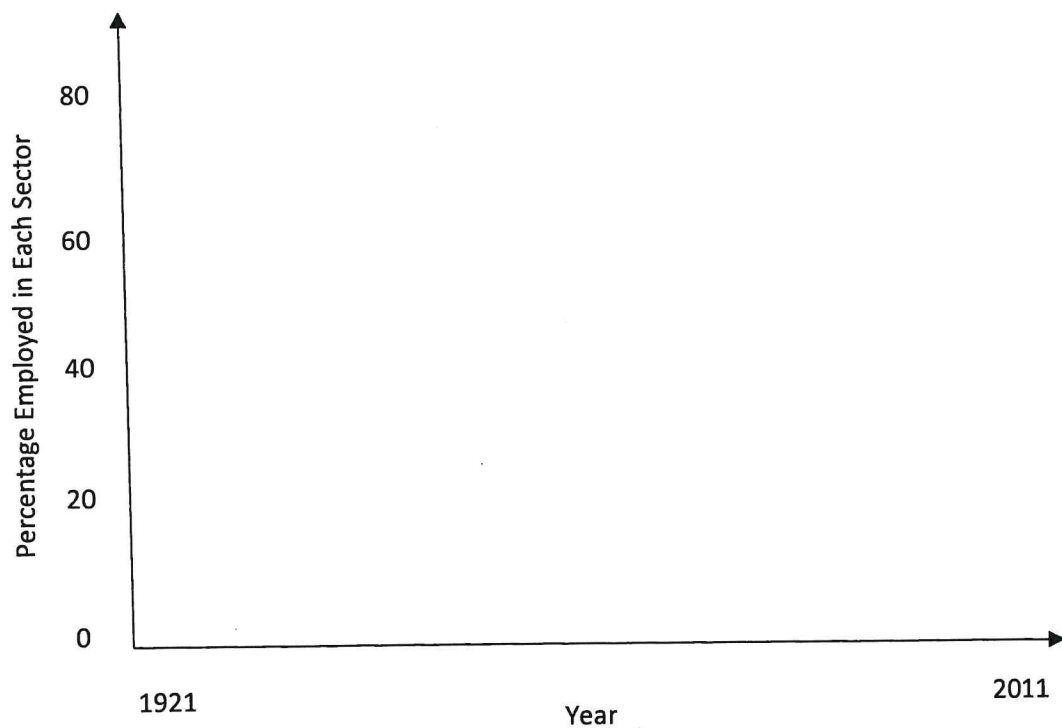
.....



- ii. Consider the **relationship** between the level of **economic development** and the percentage of people working in each sector (type) of economic activity.

On the graph below, **sketch** how the industrial structure for a country such as **China** might have changed over the same period, between 1921 and 2011. [6]

Make sure that you clearly **label** the different sectors of economic activity that you sketch.



[Total: 20 marks]

END OF QUESTION 2



### QUESTION 3

*[Spend 35 minutes on this section]*

Answer any **one** of the following essay questions and in each case refer to specific examples, places and processes.

**Credit will be given** for the use of named and located examples, and the use of well-labelled sketch maps and diagrams, where appropriate.

**EITHER**

- a) Describe and explain the possible advantages and disadvantages of a planned or completed transport project, such as HS2. [20]

**OR**

- b) What use is geography to members of the government when making national policy decisions, such as how best to leave the European Union? [20]

**OR**

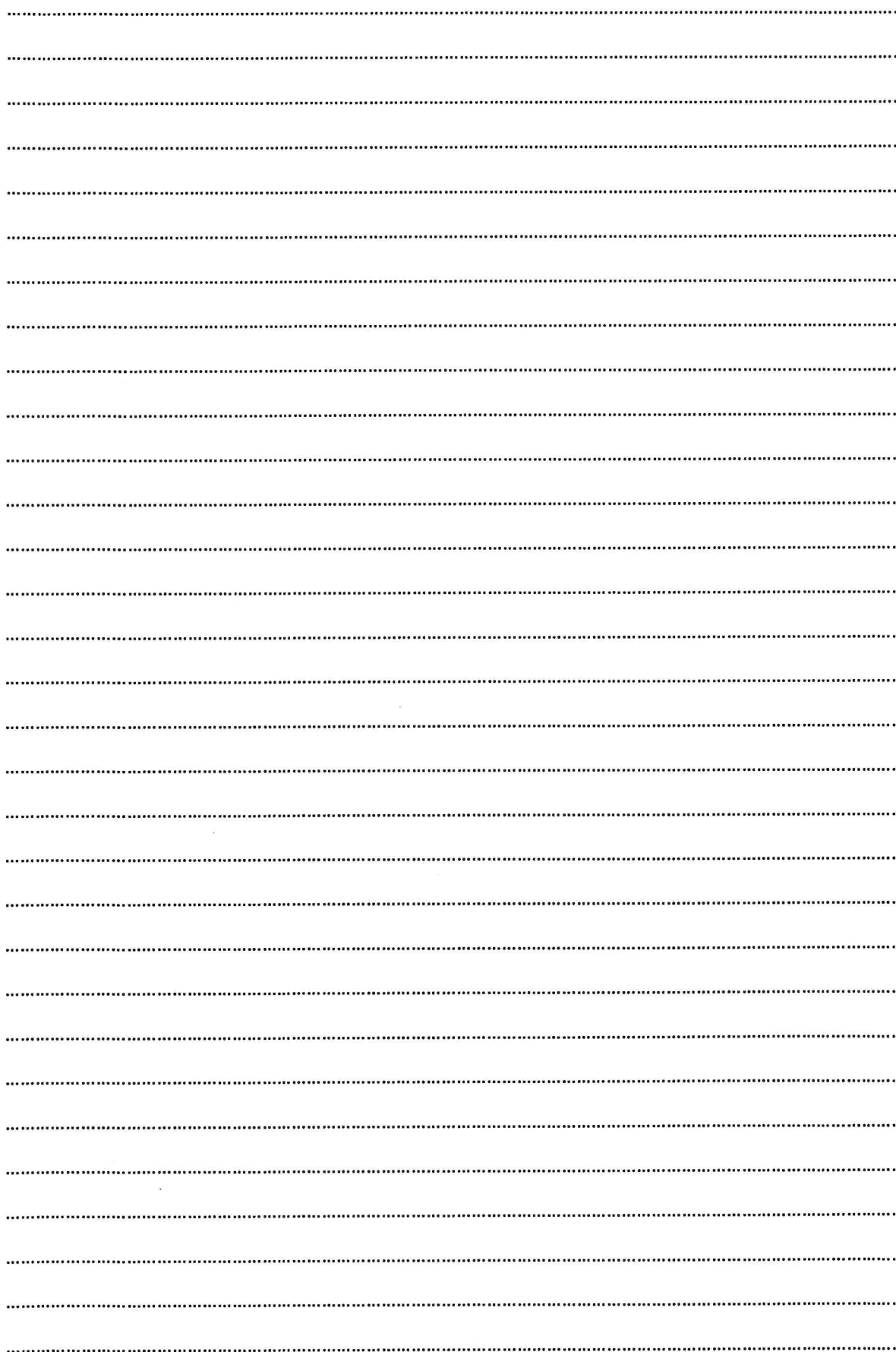
- c) Describe and explain how temperature and rainfall vary from place to place in the British Isles. [20]

**OR**

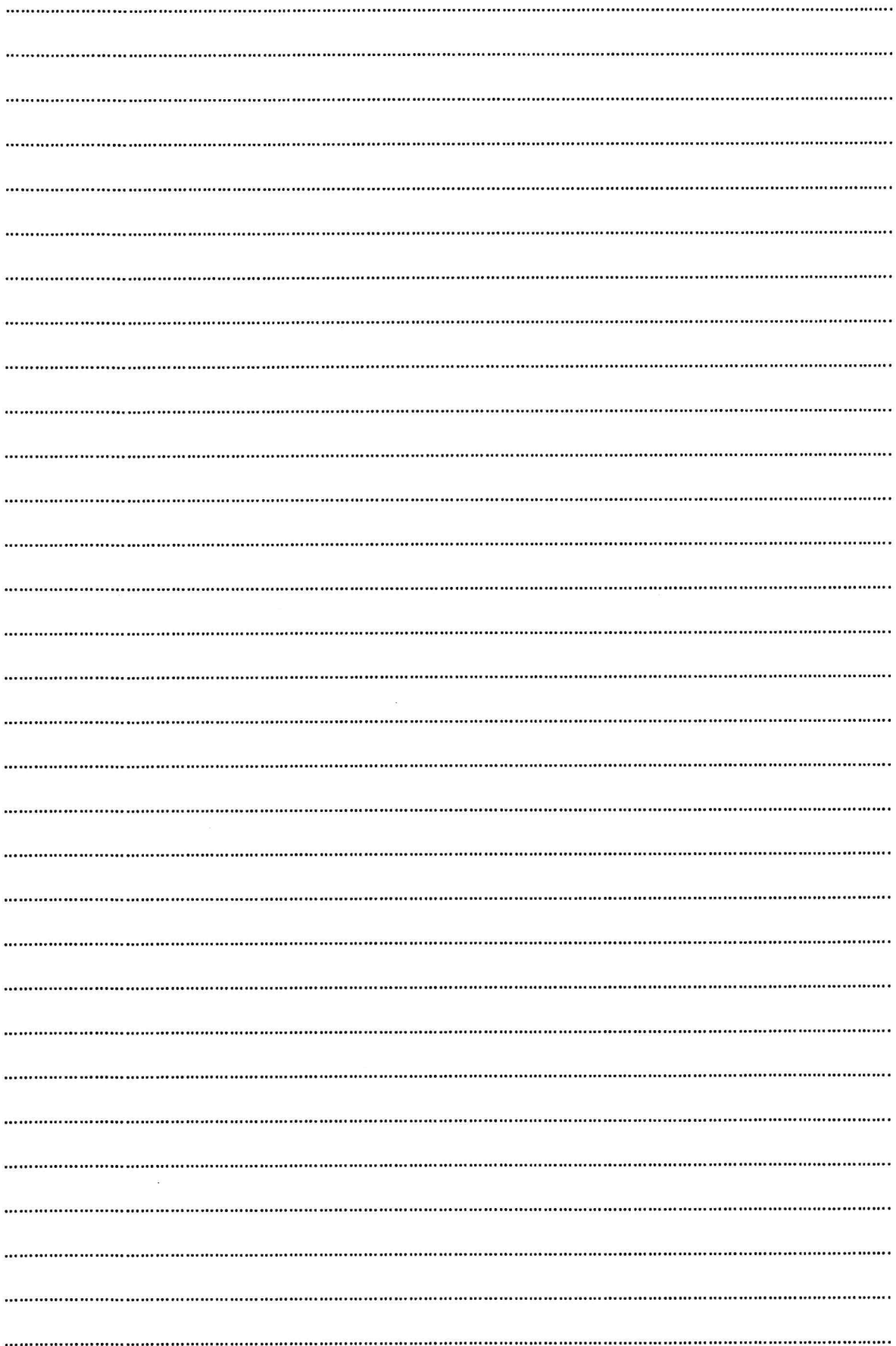
- d) Choose either earthquakes or volcanoes. Is your chosen tectonic hazard more devastating in developed or developing countries? Justify your answer. [20]

Space to plan your answer:

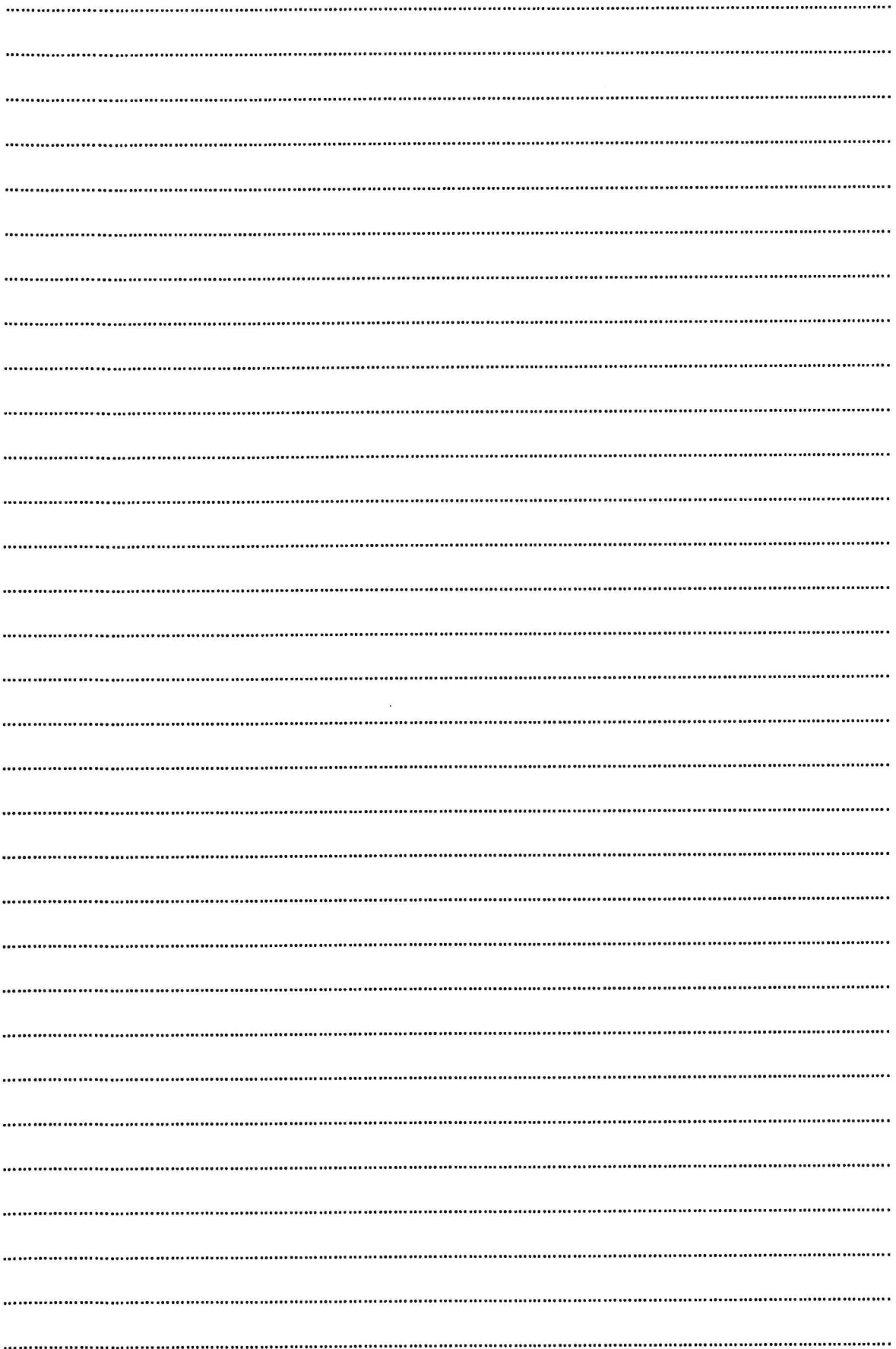




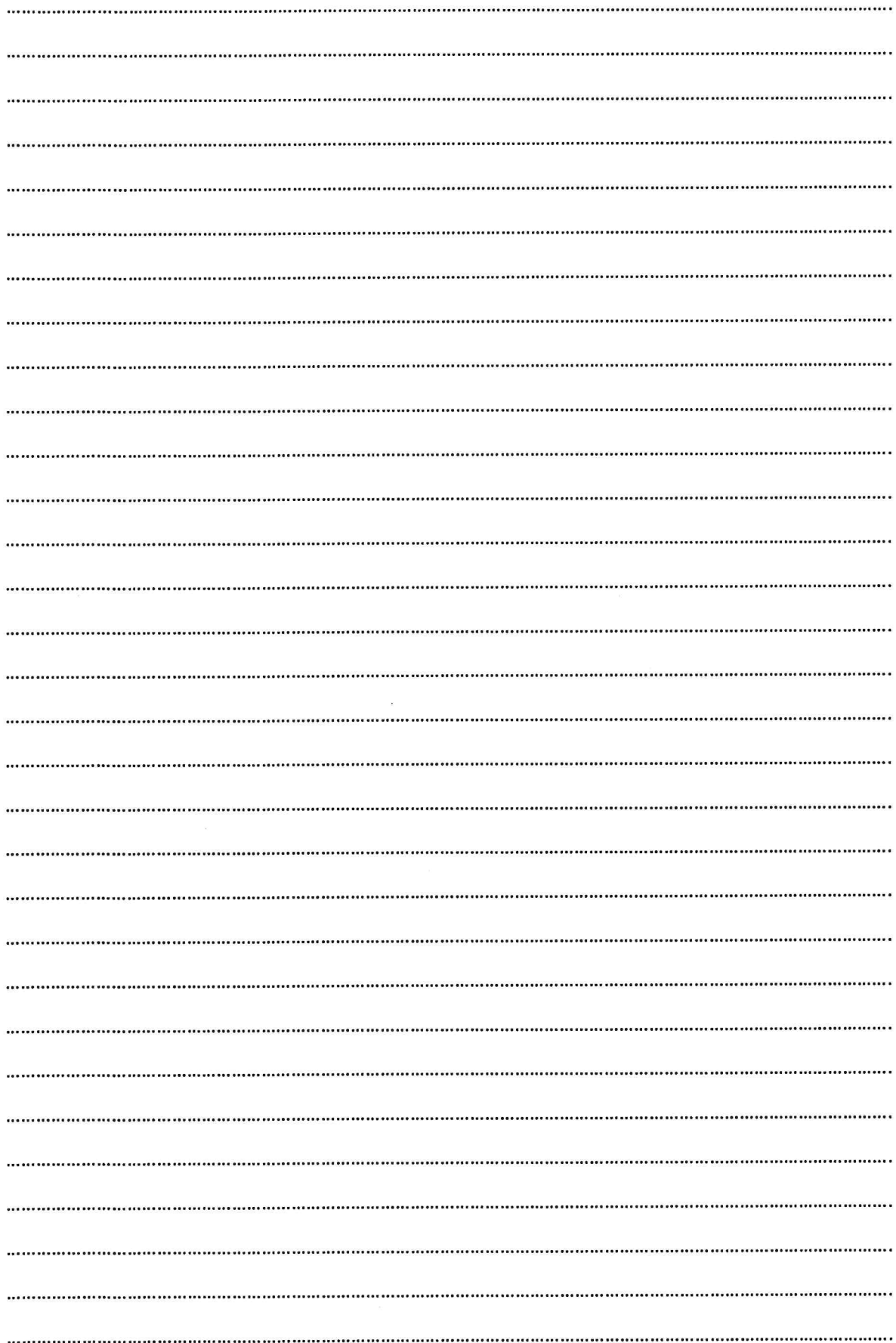














**[Total: 20 marks]**

**[Exam Total: 60 marks]**

**END OF EXAMINATION**





# HARROW SCHOOL

## **Philosophy & Applied Ethics Scholarship Examination 2018**

**1hr 15 mins**

*30 minutes to annotate article and 45 minutes to answer question*

*It is strongly recommended you use highlighters to help you annotate the articles  
and spend some of the 30 minutes planning your answer.*



SOURCE 1

**CATHOLIC HERALD**  
The Catholic Voice in the United Kingdom

Latest News

## Euthanasia is always wrong, Pope Francis tells doctors

By Emily Woodley  
published Friday, 17 May 2015



**In this article**  
addressing the issue of Euthanasia, Pope Francis says that it is always wrong.

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**FREE MAGAZINE**  
17 MAY 2015 | 16 pages | free magazine

*Pope says 'intent to end life' is completely different from withdrawing excessive or inappropriate medical treatment*

The Pope has addressed the ethics of medical intervention, telling doctors at the Vatican that those caring for the sick “without shortening their life, but also without futilely resisting their death.”

The European members of the World Medical Association met on Thursday for a discussion with the Pontifical [Papal] Academy for Life on end-of-life care. At the same time, across St. Peter's Square, the Vatican Dicastery [Department] for Promoting Integral Human Development and the International Confederation of Catholic Health Care Institutions were hosting a meeting on inequalities in health care.

“Increasingly sophisticated and costly treatments are available to ever more limited and privileged segments of the population,” the Pope said, “and this raises questions about the sustainability of health care delivery and about what might be called a systemic tendency toward growing inequality in health care.

“This tendency is clearly visible at a global level, particularly when different continents are compared,” he said.

“But it is also present within the more wealthy countries, where access to health care risks being more dependent on individuals' economic resources than on their actual need for treatment.”

A variety of factors must be taken into account when determining what medical interventions to use and for how long with a person approaching the end of his or her earthly life, Pope Francis said.



For those with resources, treatments are available that “have powerful effects on the body, yet at times do not serve the integral good of the person.”

The Pope referred to Pope Pius XII, who 60 years ago told anaesthesiologists and intensive care specialists that “there is no obligation to have recourse in all circumstances to every possible remedy and that, in some specific cases, it is permissible to refrain from their use.”

“From an ethical standpoint,” the Pope said, withholding or withdrawing excessive treatment “is completely different from euthanasia, which is always wrong, in that the intent of euthanasia is to end life and cause death.”

If the patient is competent and able, the Pope said, he or she “has the right, obviously in dialogue with medical professionals, to evaluate a proposed treatment and to judge its actual proportionality in his or her concrete case” and to refuse the treatment “if such proportionality is judged lacking.”

In either case, he said, even medical professionals must follow “the supreme commandment of responsible closeness,” remaining alongside those who are dying.

“It could be said that the categorical imperative is to never abandon the sick,” he said.

“The anguish associated with conditions that bring us to the threshold of human mortality, and the difficulty of the decision we have to make, may tempt us to step back from the patient. Yet this is where, more than anything else, we are called to show love and closeness, recognising the limit that we all share and showing our solidarity.”

“Let each of us give love in his or her own way – as a father, a mother, a son, a daughter, a brother or sister, a doctor or a nurse. But give it!” Pope Francis said.

#### **SOURCE 2: Oliver Bater – Harrow Lower Sixth Boy**

*‘What can Christian ethics contribute to the current debate about assisted dying?’*

In 2014, Laura Clark – aged 85 years old –hospitalized and bed ridden - finally no wished to eat anymore – and even more so would gain no nourishment from any food she tried to eat due to an inoperable cancer that had been growing in her stomach for three years.

What you would wish for in Laura’s situation? She was provided with two options:

1. Continuously be provided by painkillers while she slowly starved to death
2. Have pain relief, alongside artificial nutrition and hydration to prolong her life until the cancer inevitably spread to other parts of the body, which also involved the insertion of nasogastric tube.



Laura choose option 1 – and slowly starved to death over a 47 day period - both not only leading to a completely undignified death and agonizing struggle for their loved who they watched. Now I would ask in whose interest is life being prolonged under these circumstances beneficial for. Another option currently illegal by law would have been to offer Laura a “swift and painless release”.

You might be surprised to hear –that being for assisted dying - a position that seems currently incongruous with mainstream Christianity - is actually supported by a majority of Christians nationally – with polling even suggesting up to 81% of Anglicans support the legislation of assisted dying according to YouGov. Furthermore, despite the cries from many such as the Bishop of Durham – that the lobby for assisted dying is a “militant atheist and secular lobby”, the founder of the society of Voluntary Euthanasia was in fact Rev. Dr Inge, Dean of St Paul’s Cathedral who is one of many prominent Christians to have been in favour of the right for assisted dying.

I would also like to stress what the true nature of assisted dying is. Because there is often a tendency to assume assisted dying is the same as assisted suicide. Assisted dying only allows someone who is already terminally ill with less than 6 months left to live to chose the manner and timing of their death. Switzerland – where the law doesn’t restrict the law to only those who a terminally illness – is completely differently different issue to that of assisted dying. The person must also self-administer the medication, rather than a doctor or the bill proposed by Lord Joffe in the UK.

I believe the Christian case for assisted dying focuses around the three key principles of: free will and personal freedom, agape love, the principle of the resurrection and eternal life.

A key question to ask oneself when discussing euthanasia, is to what extent to we have personal autonomy and control of our actions, and to what extent is our life predetermined and predestined by God. Many groups believe that despite being free agents God still has absolute sovereignty over life and death not humans, and thus see euthanasia as infringing on the prerogatives of God – taking decisions that God alone should take.

Modern liberal Christianity deems human life and death a human responsibility not a divine one–e.g. it is deemed reasonable to help a patient with a further extension of a life that the dying person still values – and thus equally should it be not be a logical extension that if a dying person finds their condition unbearable and repeatedly ask for assistance in dying – we should respect their wishes.



Secondly, I believe Christian principle of agape love is also highly relevant in the Christian debate. Furthermore, I find it very difficult to reconcile both the ideas of selfless unconditional love, and the denial of such great suffering and pain of so many. Reverend Baroness Kathleen Richardson asks: *By what moral judgement can we justify keeping alive those people who sincerely want to die, when their life is in their own eyes not worth preserving?* Jesus himself advocated giving priority to human need over and above the letter law of the law – insisting for example the Sabbath was made for man, not man for the Sabbath, and the importance of relating each Christian teaching to the particular context. And thus, asking “what is the most loving thing to do in each situation” – in certain circumstances it would thus seem apparent that the most compassionate available choice is to accede to a patient’s wishes.

There also seems to be a widespread assumption that giving in to death is somehow a denial of faith and hope. However surely, the central Christian doctrine of the resurrection instead would promote death as simply being the start of a new life with God. Could assisted dying if done after a fulfilled positive life, not be described as “a noble death” or as truly a real act of faith in knowledge of a future with God?

I would like to end on this thought: Jesus’ Golden Rule was to treat others you wish to be treated. Six recent opinion polls show that between 81 and 87% of the population would like to have assisted suicide legalized so if they find themselves suffering in intolerable pain they can be offered the opportunity for this swift and painless release– thus if we apply Jesus’ principle and treat people as they themselves wish to be treated, Christian ethics ought to support assisted dying, as it would give people the means to treat others as they themselves might prefer in the same circumstances.

To conclude, assisted dying may not necessarily be the desired options for all or even many terminally ill patients, but for those who are suffering in such pain that they feel quality of their life is so diminished – it should not only be a Christian position, but a legal right that we provide those people with the freedom of choice to end their lives with dignity and respect – not to have our ignorant prejudgements and preconceived ideas about the reality of death remove their free will and ability to choose.

#### Question:

***‘What can Christian ethics contribute to the current debate about assisted dying?’***





# HARROW SCHOOL

## French Scholarship Examination 2018

**1 hour**

*Dictionaries are not permitted*

*GENERAL INSTRUCTIONS: You should start a new sheet of paper for each exercise. Please write all of your answers ON ALTERNATE LINES. The marks are shown at the end of each exercise. There is a total of 100 marks.  
Use your time accordingly.*



*PLEASE START ANOTHER SHEET OF PAPER AND WRITE ON  
ALTERNATE LINES*

**2. Translate the following sentences into French:**

- a) I get up early
- b) We eat crisps
- c) They have worked together
- d) He used to play golf
- e) Marie and Anne arrived late
- f) They can go to the concert
- g) My father had watched a film
- h) Marc is going take the bus
- i) I will not be sad
- j) The boy will read

*(30 marks)*



**1. Translate into English. You should write ON ALTERNATE LINES.**

Beaucoup de constructeurs d'automobiles font en ce moment des expérimentations sur des routes avec des voitures sans chauffeur. Une équipe universitaire britannique a installé un système sur une voiture électrique et l'a testé sur des chemins privés pour voir si la voiture était capable de détecter et s'adapter à des conditions changeantes, y compris des conditions météorologiques et des dangers inattendus. Les chercheurs disent que la voiture s'arrête automatiquement pour les piétons. Bref, très bientôt de vraies voitures seront capables de rouler toutes seules au milieu de la circulation.

Les voitures sans chauffeur permettraient au passager de se reposer et de voyager avec plus de sécurité car, si le système fonctionnait bien, il y aurait moins d'accidents. Ces voitures seraient plus fiables que des voitures avec conducteurs parce que les hommes, à la différence des ordinateurs, sont parfois moins attentifs quand ils sont fatigués ou distraits. Ce qui bloque la technologie aujourd'hui, ce n'est pas vraiment la technologie elle-même, mais le fait que ces voitures ne sont pas autorisées sur des routes traditionnelles à côté d'autres véhicules.

*(30 marks)*



*PLEASE START ANOTHER SHEET OF PAPER AND WRITE ON  
ALTERNATE LINES*

**3. Write an article for your school website talking about your local area.**

**You should mention:**

- **What is (and is not) to be found in your area**
- **What tourists can do in your area**
- **A recent excursion in your area**
- **How you could improve your area**
- **Where you will live in future and why**

*(40 marks)*

The account may be true or imaginary.

No credit will be given for pre-learnt but irrelevant material.

You should write using any tenses you consider appropriate. When you have finished, you should **CHECK YOUR WORK VERY CAREFULLY**, looking especially at verb forms, genders, adjectives and spelling.

**Please do not write more than 150 words.**

Keep each section of a roughly even length (ie. approximately 30 words each)

You should concentrate on **accuracy** (quality rather than quantity).





# HARROW SCHOOL

## ENTRANCE SCHOLARSHIPS EXAMINATION 2018

### LATIN

**1 ½ hours**

#### GENERAL INSTRUCTIONS:

*You must attempt all questions on the paper.*

**You are not permitted to write anything down for the first 10 minutes of the examination. This time should be spent reading the examination paper.**

*It will help if you study the Latin passages and the English introduction to each passage during the first 10 minutes.*

*You should make an intelligent guess at words you do not know, using your knowledge of English vocabulary and the English introduction to each passage.*

*Try to base any guesses on elements in the sentence that you definitely DO know and make sure that they make sense in context.*

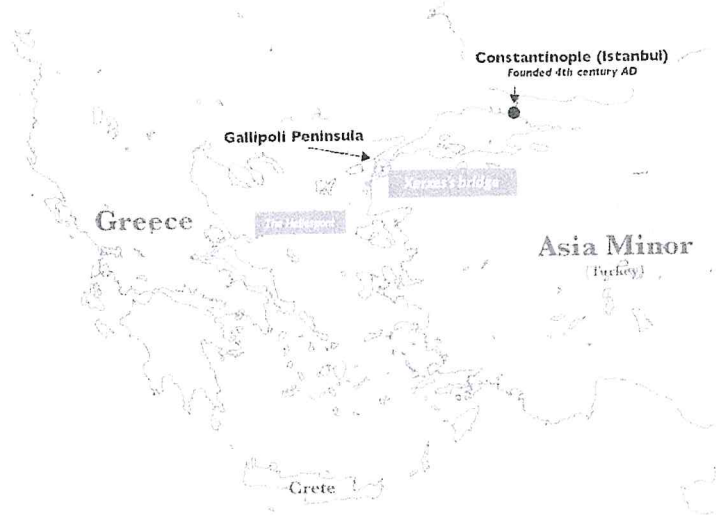


## Section 1: Comprehension

*Xerxes the Great, was the fourth king of kings of the Achaemenid dynasty of Persia.*

*He is also notable in Greek history for his failed invasion of Greece in 480 BC.*

*During his invasion, Xerxes attempted to bring his enormous army from Asia Minor into Europe by bridging over the Hellespont river. He tethered many ships together using cables to create pontoons; however, a large storm arose and destroyed the bridge.*



*Herodotus records the following story of Xerxes' madness in his reaction to the loss of his bridge.*

ubi Xerxes quid accidisset cognovit, gravissime ferens, iussit suos milites trecenta verbera flagellis infligere Hellesponto, et iacere vincula in illud flumen. alii etiam narrant, praeter haec, Xerxem homines misisse, qui incenderent Hellespontum igne. Xerxes imperavit ut, dum flagellis flumen caedunt, pronuntiarent barbara haec et insana verba: "O mala aqua, dominus tibi hanc poenam infligit, quod illum iniuria affecisti, quamquam nihil mali ab ipso passa es. transibit te nostra rex, si vis, si non vis. nemo hominum tibi sacra facit, quod es miserum salsumque flumen." simul vero mari has poenas infligi Xerxes iussit, simulque capita amputari eorum, qui pontem aedificaverant.

### Vocabulary

verber, -eris (n)	a beating, a blow
flagellum, -i (f)	a lash, a whip
infligo, infligere, inflixī, inflictus	to strike, to inflict
vinculum, -i (n)	a chain, shackles
patior, pati, passus sum	to be hurt, to suffer
sacra, -orum (pl. neut.)	sacrifices
salsus, salsa, salsum	bitter, salty
amputo, amputare, amputavi	to cut off, to amputate
pons, pontis (f)	bridge

1. *gravissime ferens* (line 1): how did Xerxes first react to the news? [1]
2. *iussit suos...illud flumen* (lines 1-2): what two things did Xerxes order his men to do? [6]
3. *alii etiam... igne* (line 2-3): besides these things, what else do other people say he did? [4]
4. *pronuntiarent...verba* (lines 4): what did Xerxes command his men to say? [2]



5. *quod illum ... passa es* (lines 5-6): what reasons do Xerxes men give why the king is punishing the river? [4]
6. *transibit te nostra rex* (lines 6): what will Xerxes do regardless? [2]
7. *nemo... flumen* (lines 6-7): why do no men offer sacrifices to the Hellespont? [2]
8. *simul vero... aedificaverant* (lines 7-8): explain who else suffered from Xerxes' anger at the broken bridge. [4]

Total = 25 marks

## Section 2: Grammar

*Xerxes eventually makes it across to Europe, but finds himself blocked by a small band of Spartans who are making a stand at Thermopylae.*

dum haec geruntur, Graeci Persas expectabant ad Thermopylas. erant Spartani trecenti, et socii ad quadringentos. his militibus praeerat Leonidas rex Spartanorum. interim Xerxes speculatorem misit, qui et numerum eorum et quid facerent exploraret. ubi ad murum accessit, nonnullos e Graecis vidit: quorum alii exercitationibus se delectabant, alii comam pectebant. speculator reversus est, et Xerxi omnia, quae viderat, nuntiavit.

### Names

Graecus, -i (m)	Greek
Persa, -ae (m)	Persian
Leonidas, -ae (m)	Leonidas, famous king of Sparta

### Vocabulary

speculator, -oris (m)	a spy
exercitatio, -onis (f)	exercise
delecto, delectare	to enjoy, to please
coma, ae (f)	hair
pecto, pectere	to comb

1. Identify an example of the **nominative** case in line 1 [1]
2. *erant*: (line 1): identify the **tense** of this verb [1]
3. *ad quadringentos* (line 2-3): explain the use of the preposition *ad* with the number [1]
4. *misit* (line 3): identify the **tense** of this verb [1]
5. *speculatorem* (line 3): identify the **case** of this word and explain why it is that case [2]
6. *eorum* (line 4): identify the **case** of this word and who it refers to [2]



7. *quid facerent?* (line 4-5): explain why the **subjunctive** is used here [1]
8. *quorum* (line 6): identify the **case** of this word and explain why this **case** is used here [2]
9. *exercitationibus* (line 4): identify the **case** of this word [1]
10. *viderat* (line 7): identify the **tense** of this verb [1]
11. *reversus est* (line 5): how should this verb be **translated** here (hint: "he reversed" will not do...) [2]

**Total = 15 marks**

### Section 3: Translation

Translate the following passage into English. Please write your translation on alternate lines. You should make an intelligent guess at words you do not know, using your knowledge of English vocabulary and the English introduction to each passage.

*Later on, when Xerxes was approaching with his army, the Athenians witness a strange omen and abandon their city with greater haste; when finally Xerxes arrives, he finds only a few Athenians remaining, who barricaded themselves on top of the Acropolis.*

cum nuntii Athenas rediissent, clamaverunt "quo loco quisque currere posset, eo cum liberis et familiam fugeret!" itaque festinabant omnes fugere ex urbe. erat dirum miraculum: alii dicunt ingentem serpentem habitare in templo Athenae, quae arcis custos esset. hic serpens consumebat cibum quem Graeci ei sacra dederunt. tamen, hic cibus, cum superioribus temporibus semper consumptus fuisset, nunc intactus erat. ubi sacerdos explicavit quid hoc omen significaret, cives magis timebant, quod credebant deam ipsam fugisse urbem. interim advenit Xerxes cum exercitu, et vacuam deprehendit urbem. erant autem Athenienses nonnulli qui in arcem se contulerant, et aditus muris ligneis muniverant, quod credebant se esse tutos. diu vero hi muri Persis resistebant. tandem in arcem intraverunt Persae omnesque, qui ibi erant, interfecerunt, templumque spoliaverunt.

#### Names

Athena, -ae (sg. f.)	Athena, the goddess
Athenae, -as (pl. f.)	Athens, the city
Athenienses (pl. m.)	Athenians

#### Vocabulary

quo loco... eo...	"to which place.... there...."
miraculum, -i (n)	miracle, omen
serpens, -ntem (m)	serpent, snake
arx, arcis (f)	citadel, <i>here</i> , i.e., the Acropolis



consumptus fuisset	"had been eaten"
intactus, -a, -um	untouched
sacerdos, -dotis (m)	priest
significo, -are, -avi	to signify, to mean
aditus, -us	entrance, approach
ligneus, -a, -um	made of wood
tutus, -a, -um	safe
spolio, spoliare	to spoil, to rob, to plunder

**Total = 35 marks**

**Paper total = 70 marks**

**[PTO for Extension Work**



#### Section 4 (Optional): Composition

Translate the following sentences into Latin (make sure that you think very carefully about the role of each word *in English first* before you attempt to translate into Latin):

1. The young men, when they were walking to the forum, saw the girls. [3]
2. The leader will lead his soliders out of the city. [3]
3. Who are the citizens who are afraid of the gods? [4]

Total = 10 marks

#### Section 5 (Optional): Comprehension

*The battle of Salamis – the Greeks fight against the Persian fleet, a last stand. Another sign from the gods appear which encourages the Greeks.*

itaque Persae Graecas naves tanto impetu oppugnaverunt, ut ceteri Graeci onmes in puppim remigarent, et ad terram admoverent naves. quidam Aminias, vir Atheniensis, longius vectus, navem hostium rostro petiit. navis cum alteri haereret, nec liberari posset, tum ceteri Graeci, auxilio subeuntes Aminiae, pugnam commiserunt. alii narrant miraculum: apparuisse Graecis feminam, quae illos ad fortiter pugnandum hortata sit; eamque dixisse his verbis: "miseri, quousque in puppim remigabitis?" diu pugnatum est. maior pars navium Persarum in hac pugna periit.

#### Vocabulary

in puppim remigarent	"to row to stern", i.e, to retreat
longius vectus	"carried rather far out to sea"
rostrum, -i (n)	the rostrum, beak of the ship, the ship's ram
haereo, haerere	to stick to, to get stuck on
auxilio subeuntes	coming to the aid of + <i>dat</i>
quousque	"how long?"



1. Identify an example of a **result clause**. [1]
2. Identify an example of an **imperfect subjunctive**. [1]
3. Identify an example of a **preposition with an ablative noun**. [1]
4. Identify an example of an **active present participle**. [1]
5. Identify an example of an **comparative adjective** [1]
6. Identify an example of a **noun in the vocative**. [1]
7. Identify an example of an **adverb**. [1]
8. Identify an example of an **direct object in the accusative case**. [1]
9. Identify an example of a **verb in the perfect tense**. [1]
10. Identify an example of an **infinitive**. [1]

**Total = 10 marks**





# HARROW SCHOOL

## Science

**90 Minutes**

*Section 1 consists of 24 multiple choice questions.  
You must select the best answer, A-D, for each question and mark your answers on  
the separate Multiple Choice Answer grid provided.*

*Sections 2, 3 and 4 are to be answered on the examination paper in the spaces  
provided.*

*Use blue or black ink for text.*

*You may use a pencil for diagrams.*

*You may use a calculator*



Harrow School 13+ Scholarship  
Science Examination  
*Section 1: Multiple Choice Answer Grid*

For each question fill in the circle A, B, C or D which  
you feel is the best answer. USE AN HB PENCIL.

Name

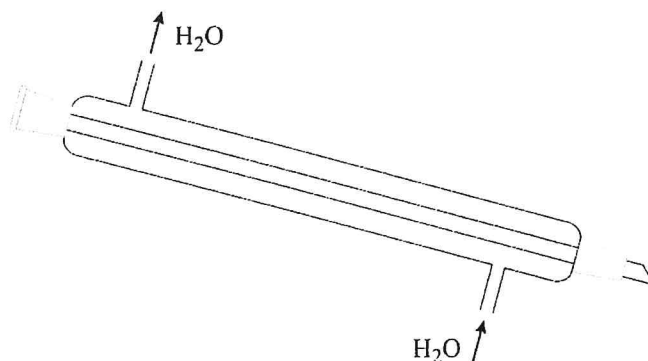
- |    |     |     |     |     |    |     |     |     |     |
|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| 1  | (A) | (B) | (C) | (D) | 14 | (A) | (B) | (C) | (D) |
| 2  | (A) | (B) | (C) | (D) | 15 | (A) | (B) | (C) | (D) |
| 3  | (A) | (B) | (C) | (D) | 16 | (A) | (B) | (C) | (D) |
| 4  | (A) | (B) | (C) | (D) | 17 | (A) | (B) | (C) | (D) |
| 5  | (A) | (B) | (C) | (D) | 18 | (A) | (B) | (C) | (D) |
| 6  | (A) | (B) | (C) | (D) | 19 | (A) | (B) | (C) | (D) |
| 7  | (A) | (B) | (C) | (D) | 20 | (A) | (B) | (C) | (D) |
| 8  | (A) | (B) | (C) | (D) | 21 | (A) | (B) | (C) | (D) |
| 9  | (A) | (B) | (C) | (D) | 22 | (A) | (B) | (C) | (D) |
| 10 | (A) | (B) | (C) | (D) | 23 | (A) | (B) | (C) | (D) |
| 11 | (A) | (B) | (C) | (D) | 24 | (A) | (B) | (C) | (D) |
| 12 | (A) | (B) | (C) | (D) |    |     |     |     |     |
| 13 | (A) | (B) | (C) | (D) |    |     |     |     |     |



## SECTION 1: Multiple Choice Science Questions

For each of the questions in this section, identify which one of the answers A, B, C or D is correct and then indicate your answer on the separate *Multiple Choice Answer Sheet*.

1. For which process is the following apparatus used?



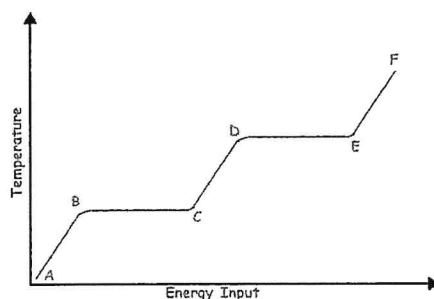
- A) Chromatography
- B) Filtration
- C) Combustion
- D) Distillation

2. Only one of these processes does not involve particles spreading out. Which one?

- A) Diffusion
- B) Evaporation
- C) Osmosis
- D) Filtration

**QUESTIONS 3-6** all relate to the diagram below.

The diagram below plots how the temperature of a substance changes as it is heated. Plateaued sections represent a change of state. You may wish to label the diagram to help answering these questions.



3. The temperature remains constant between B & C because:

- A) the Bunsen is not being heated evenly across the substance
- B) the substance was allowed to cool at intervals so it was not dangerous
- C) The container did not absorb the heat effectively.
- D) The particles use the energy to break attraction between each other rather than changing the speed they move



4. Condensation occurs between:

- A) E & D
- B) D & C
- C) C & B
- D) B & A

5. The energy input could be most practically achieved by:

- A) stirring
- B) heating
- C) using a purer sample
- D) adding a catalyst

6. The state in which the particles are touching yet free to move over each other occurs between:

- A) E & D
- B) D & C
- C) C & B
- D) B & A

7. In the presence of water, anhydrous copper sulphate will turn:

- A) blue to white
- B) white to blue
- C) blue to pink
- D) pink to blue

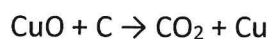
8. When hydrated, the formula of the compound is  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .

*{Relative masses: Cu = 64, S = 32, O = 16, H = 1}*

It is correct to say that the compound has:

- A) Twenty-one different elements and a blue colour
- B) The properties of both a metal and a non-metal.
- C) Four atoms and a relative formula mass of 160
- D) Four different elements and a relative formula mass of 160

9. Look at the reaction below and then select which of the statements beneath is correct.



- A) Of the four chemicals in this reaction, only one is not a solid at room temperature.
- B) The copper has been oxidised in this reaction.
- C) Carbon is less reactive than copper.
- D) None of the above.



10. Approximately, how many times does a human heart beat over the course of a normal life span?

- A) 30 000 000
- B) 300 000 000
- C) 3 000 000 000
- D) 30 000 000 000

11. At what point in time did dinosaurs exist?

- A) 100 000 years ago
- B) 1 million years ago
- C) 10 million years ago
- D) 100 million years ago

12. Who discovered the structure of DNA in 1953?

- A) James Watson & Francis Crick
- B) Charles Darwin
- C) Gregor Mendel
- D) David Attenborough

13. If a bacterium divides into two new bacteria every 20 minutes, how many bacteria would there be after 12 hours?

- A) 72
- B) 240
- C) 4096
- D)  $6.9 \times 10^{10}$

14. Which structures are found in both plant and animal cells?

- A) nucleus, cell wall, vacuole, chloroplast
- B) cell wall, nucleus, cytoplasm, mitochondria
- C) cell surface membrane, nucleus, mitochondria, cytoplasm
- D) mitochondria, cytoplasm, cell surface membrane, cell wall

15. What is the maximum magnification that can be achieved using a standard light microscope when the magnification of the eyepiece lens is x10 and the magnification of the high power objective lens is x40?

- A) x4
- B) x40
- C) x50
- D) x400



16. On average, how many eggs do a woman's ovaries release in her lifetime?

- A) 2
- B) 400
- C) 780
- D) 960

17. Which foods are all rich in protein?

- A) spinach, cheese, egg, beef
- B) lentil, lamb, turkey, milk
- C) tuna, chicken, apple, peanut
- D) butter, potato, bacon, banana

18. Which of the following diseases affects the liver?

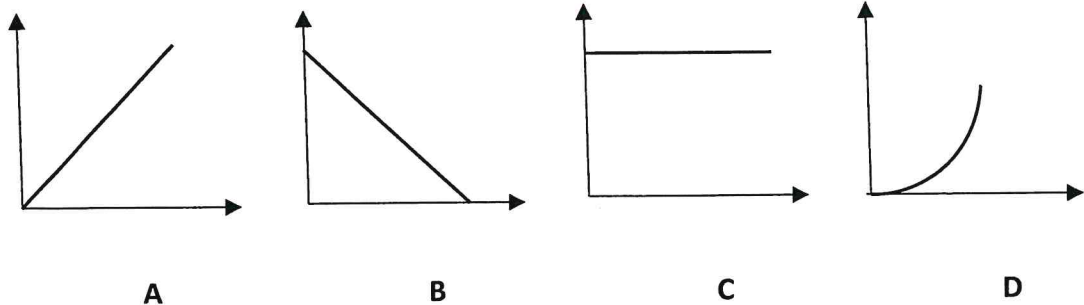
- A) diabetes
- B) Alzheimer's
- C) bronchitis
- D) hepatitis

19. Which is the largest of the following biological structures?

- A) glucose molecule
- B) flu virus
- C) sperm cell
- D) bacterium

**QUESTIONS 20 - 24** all relate to the 4 graphs below.

For each of the questions 20-24, select which of the graphs best represents the physical relationship described. In each question the first variable mentioned is on the y-axis (vertical axis).



20. Distance travelled against time by a man cycling along a lane at a constant speed.

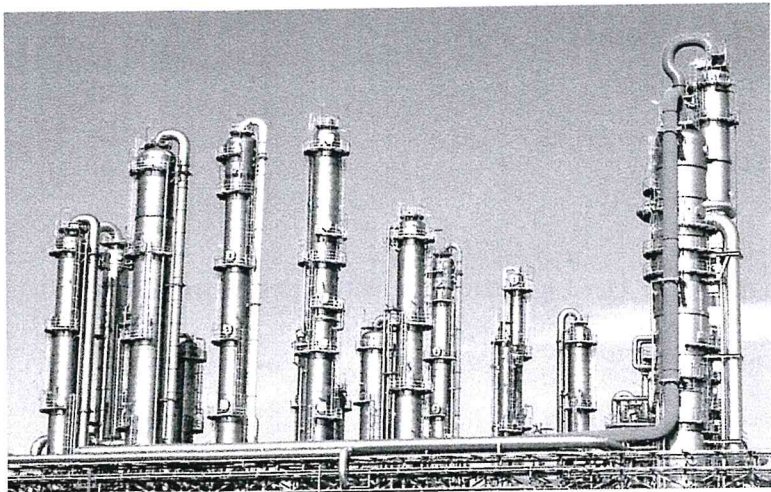


21. Distance travelled against time by a rock dropped from the top of a cliff onto the beach below (assuming air resistance is small enough to be ignored).
22. Speed against time for the cyclist in question 20.
23. Acceleration against time for the rock in question 21.
24. Speed against time for a ball that has been dropped onto a hard floor from the moment it just leaves the ground until it reaches the top of its bounce.

**Section 1: TOTAL =  / 24**



## SECTION 2: Chemistry Short Answer Questions



This photograph shows the fractionating columns at a crude oil refining plant. These are employed as a separation technique to industrially separate crude oil into hydrocarbons of varying sizes. The larger the molecule, the stronger the attractive forces between them.

1. Fractional distillation uses which physical property to separate the hydrocarbon molecules?

---

[1]

2. The key difference between 'simple' and 'fractional' distillation is the use of a 'fractionating column'. Why is this needed?

---

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[1]

3. Explain why the largest hydrocarbons are found at the bottom of the column.

---

---

[1]

The smallest hydrocarbon that can be separated out by fractional distillation is methane,  $\text{CH}_4$ . The carbon forms four bonds so that the molecule has a particular 3-dimensional shape in which the atoms of hydrogen which surround the carbon are as far away from each other as possible.

4. Sketch this shape below, showing the 3D arrangement of the atoms.



When used as a fuel (eg in a Bunsen burner), methane reacts with oxygen to release energy.

5. What is the name given to reactions that release energy?

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

6. The burning of methane forms two products. Complete the word equation to give the name of the other product.

methane + oxygen  $\rightarrow$  carbon dioxide + \_\_\_\_\_ [1]

7. This reaction involves oxidation and reduction.

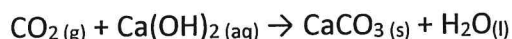
- a. Complete the two statements below:

The substance that has been oxidised is \_\_\_\_\_

The substance that has been reduced is \_\_\_\_\_

[1]

- b. Carbon dioxide is one of products of burning fuels such as methane. The simple chemical test to identify carbon dioxide gas represented by the balanced equation shown here:



- i. What is the common name of calcium hydroxide ( $\text{Ca}(\text{OH})_2 (\text{aq})$ )?

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

- ii. Suggest from the equation why a positive result is to note a murky/cloudy appearance.

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

- c. When carbon dioxide molecules diffuse into the atmosphere they can dissolve in, then react with water in an addition reaction. Complete the equation to suggest the formula of the product of this addition reaction.

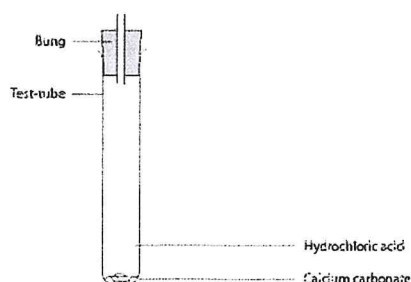




- d. The product of this reaction between water and carbon dioxide is a weakly acidic solution – the basis of acid rain. Suggest the colour of universal indicator if added to a solution of acid rain.

[1]

Acid rain reacts with limestone (calcium carbonate), a material used to construct many old buildings and structures such as the pyramids of Giza and York Minster. The reaction of limestone, with acid rain is another example of a reaction that produces carbon dioxide.



- e. What effect does acid rain have on limestone structures?

[1]

f.

- i. Describe one observation, if this reaction was to be carried out in a test tube.

[1]

- ii. Why should the tube not be sealed?

[1]

Nanomaterials have been developed to minimise the effects of acid rain on these structures.

- g. What do you think the word 'nano' means?



[1]

limestone treated with hydrophobic layer      untreated limestone

- h. This protection creates a thin *hydrophobic* layer on the surface of the limestone structure. Suggest how the hydrophobic layer on limestone helps to preserve the structure.

[2]

Section 2: TOTAL =   / 17



### SECTION 3: Physics Problem Solving

#### 1. DENSITY

Recall the equation:

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

- a. Each side of a cube of steel is found to be 2.0 cm when measured with a ruler and its mass is measured as 64 g. Calculate a value for the density of steel and give your value in  $\text{g/cm}^3$  and  $\text{kg/m}^3$ .

$$\begin{aligned}\text{Density of steel} &= \underline{\hspace{2cm}} \text{ g/cm}^3 \\ &= \underline{\hspace{2cm}} \text{ kg/m}^3\end{aligned}$$

(4)

- b. A measuring cylinder has a maximum capacity of 200  $\text{cm}^3$ . Some water is poured into it and it is then placed upright in a freezer until the water has completely frozen.  
If liquid water has a density of 1.0  $\text{g/cm}^3$  and ice a density of 0.92  $\text{g/cm}^3$ , what is the maximum volume of water that should be poured into the cylinder if the ice is not to rise above the top of the cylinder when frozen?

**Show your working / reasoning clearly.**

(3)

(TOTAL 7)



## 2. ASTRONOMY

Look at the images below, taken from Harrow School's *Rayleigh Observatory*, of various celestial objects.

PLATE A

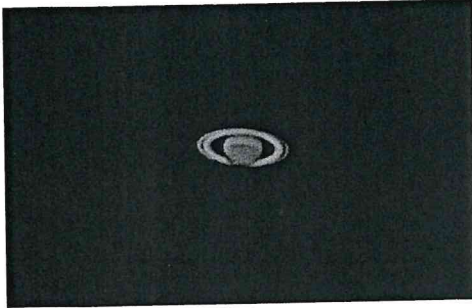


PLATE B



PLATE C



PLATE D



- a. What is the name of the planet in **Plate B**? What is the coloured oval feature on its surface towards the bottom right? What might be the small black dot to the right of centre and between the two horizontal bands?

Planet name: \_\_\_\_\_

Oval feature: \_\_\_\_\_

Small black dot: \_\_\_\_\_

- b. What is the name of the object in **Plate A** and what is the name of the space probe that we very recently deliberately crashed into it by NASA?

\_\_\_\_\_

\_\_\_\_\_

(5)



The white arrow in **Plate C** points to a supernova (an exploding star) in the galaxy *M82* which lies at a distance of about 11 million light-years from Earth. A light-year is the distance travelled by light in one year.

- c. If light travels at a speed of 300 000 *km/s*, how far away is the supernova in *km*?

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---

(3)

**Plate D** shows the Moon in gibbous phase.

- d. A lunar cycle (that is, the time between one new moon to the next new moon) lasts just over 4 weeks.

- i. How long is it between new moon and the next full moon?

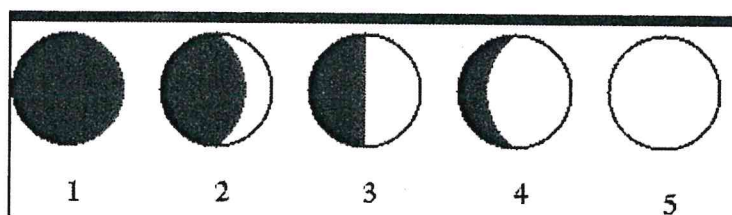
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- ii. Approximately how long must have passed between the previous new moon and the photograph in Plate D being taken?

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(2)

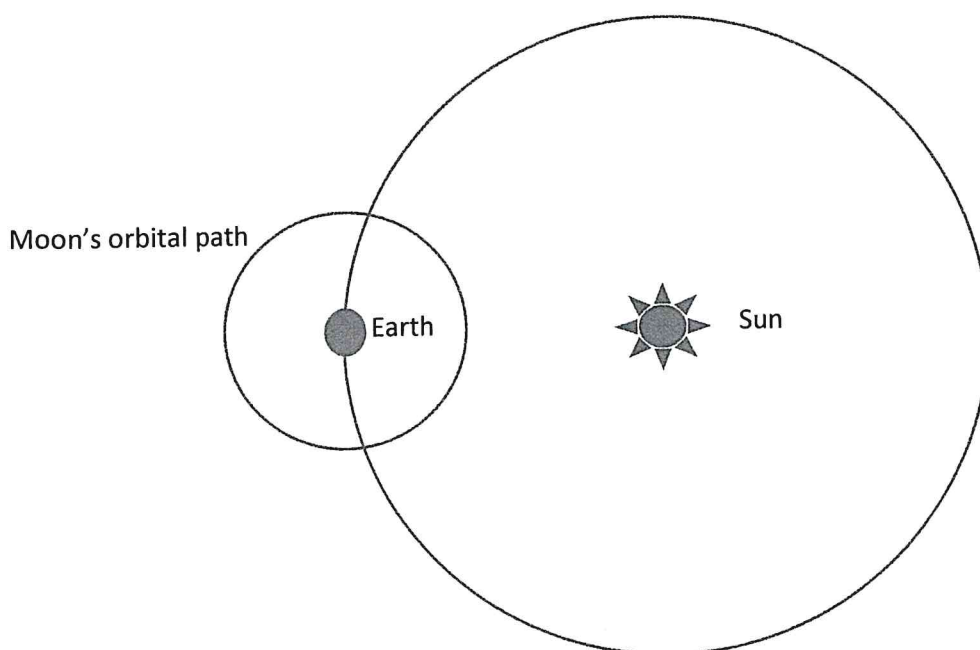
- e. If an astronaut had been standing on the surface of the Moon when the photograph was being taken, he would have seen the Earth in the lunar sky. Which of the following phases best represents how the Earth would have looked to him? Indicate your preference by circling one of the numbers 1-5 (note that diagram 1 represents the Earth being completely dark and diagram 5 represents the Earth being completely illuminated from the astronaut's point of view).



(2)



- f. The diagram below (NOT to scale!) shows the paths of the Earth's and the Moon's orbits about the Sun and Earth respectively.



Label with an 'X' on the diagram above the approximate position of the Moon on its orbital path when the photograph **PLATE D** was taken.

Label on the diagram with an 'L' and an 'S' the position of the Moon when on Earth we are experiencing a lunar and solar eclipse respectively.

- g. On January 31<sup>st</sup> 2018, there was a so-called 'blue Moon'. This is the name given to a second full Moon in the same calendar month (the first full moon of that month was on January 2<sup>nd</sup>). Such occurrences are quite unusual (hence the expression "once in a blue moon"! ) but they are slightly rarer during the first sixth months of the year than they are in the last six. Why might this be?

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- h. The average distance of the Earth from the Sun is called an astronomical unit, or 1 *AU*. Mars's average distance from the Sun is close to 1.5 *AU*. Assuming the orbits of both Earth and Mars can be considered to be circular, state, in *AU*:

the closest Mars can ever be from Earth \_\_\_\_\_ *AU*

the furthest Mars can ever be from Earth \_\_\_\_\_ *AU*

(TOTAL = :

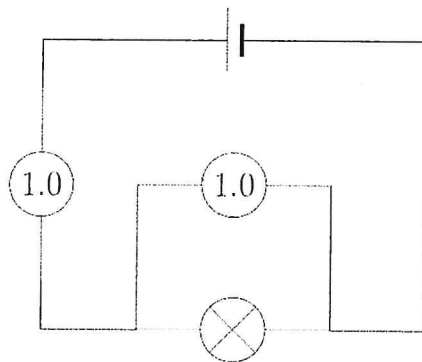


### 3. ELECTRIC CIRCUITS

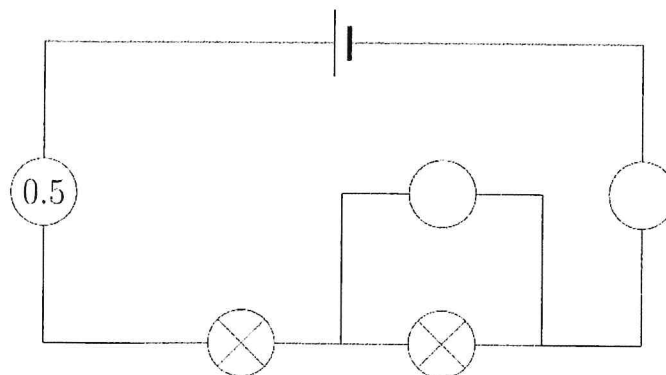
Some useful information and assumptions you can make in the following questions *a - d*:

- ammeters measure electric current (in amps), have zero resistance and are connected in series;
  - voltmeters measure voltage (in volts), have infinite resistance and are connected in parallel;
  - assume that, in all the circuits below, **all bulbs are identical** (that is, have the same resistance);
  - assume all meters are connected correctly and that each cell has a voltage of 1.0V
- 
- in a series circuit, supply voltage = sum of the voltages dropped across components;
  - voltages are equal for any two components in parallel with each other;
  - voltages are shared between components in series in the ratio of the components' resistances;
  - sum of currents approaching a junction in a circuit = sum of currents leaving the junction

For each circuit diagram, complete the numerical value of its reading inside the empty circles. **The first circuit has been done for you** (use the values in this first circuit to help you figure out the others, remembering the bulbs are all the same in all 5 circuits!). Note that no units are required!



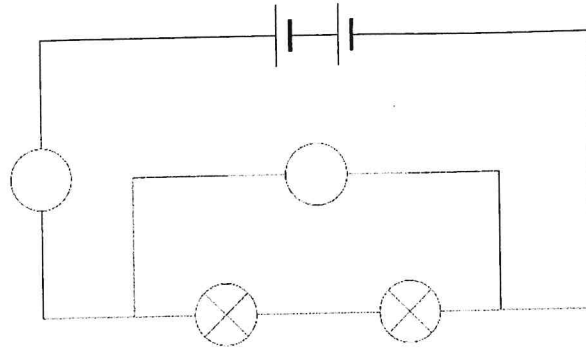
a.



[2]

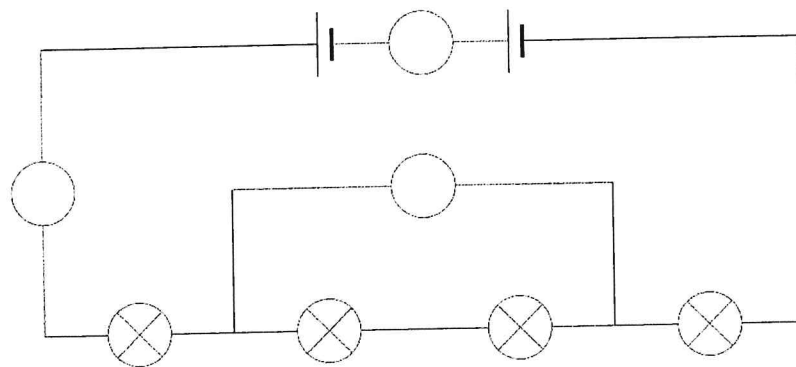


b.



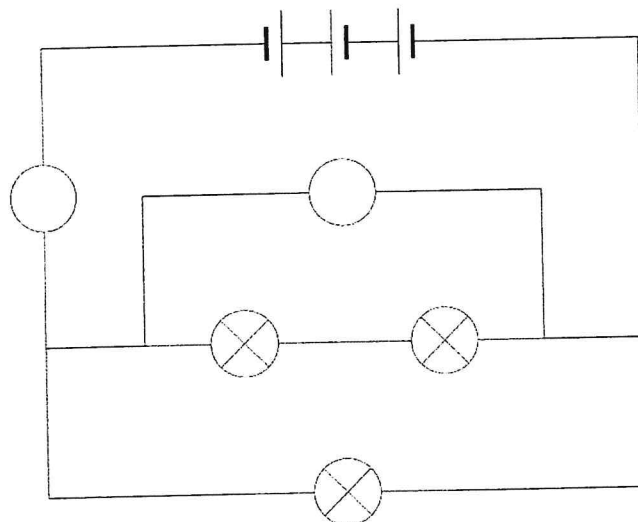
[2]

c.



[3]

d.



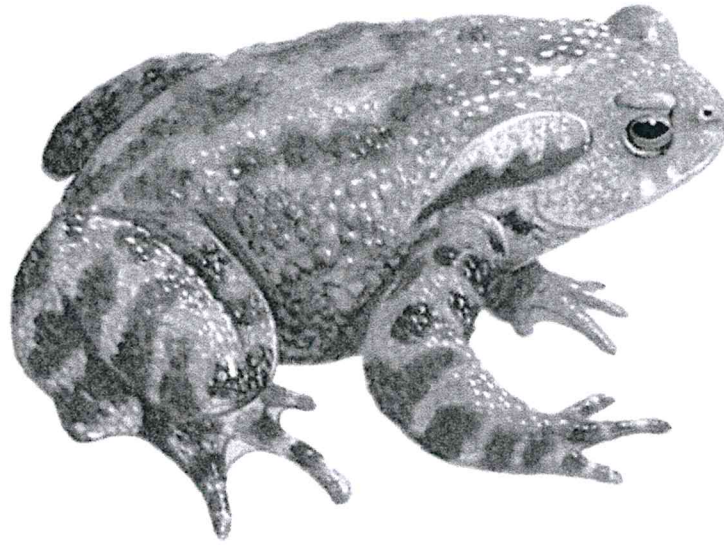
[2]

[TOTAL = 9]

Section 3: TOTAL =  / 34



#### SECTION 4: *Biology Comprehension*



In the UK, common toads (*Bufo bufo*) spend the winter underground. They use their back legs to 'knead' their bodies into the soil, submerging themselves completely when the days get shorter and nights turn colder. There is increasing concern that this could pose problems for the animals in milder conditions. Toads are cold-blooded, and in warmer winters their metabolism increases causing them to burn up fuel that would otherwise be used to prepare for spring-time mating. Indeed, there is some evidence that warmer winters are already having an impact. In one long-term study involving a large population of toads in the south of England, higher temperatures correlated with a reduction in body size in females, resulting in fewer eggs being laid. How the UK's frogs and newts might be affected is as yet unclear.

1. To which group of vertebrates (animals with a backbone) do toads belong?

---

(1)

2. Describe two features that toads share with other animals in this group.

---

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(2)

3. Suggest one reason why toads spend the winter underground.

---

---

(1)



4. An organism's metabolism is determined largely by its rate of aerobic respiration. Describe how you could measure the rate of aerobic respiration of a toad.

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(2)

5. On the axes below, draw a line/curve to show the relationship between the temperature of the environment (ambient temperature) and the rate of respiration of a cold-blooded animal like a toad. Label the axes.



(2)

6. On the axes below, draw a line/curve to show the relationship between the temperature of the environment (ambient temperature) and the rate of respiration of a warm-blooded animal such as a human. Label the axes.



(2)



7. Suggest how toads might adapt to warmer winters over time.

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(2)

8. Human activities such as burning fossil fuels have been blamed for the warmer winters experienced by the UK in recent years. Explain the link between the burning of fossil fuels and a warmer climate.

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(3)

**Section 4: TOTAL =**  **/ 15**





# HARROW SCHOOL

## HISTORY SCHOLARSHIP EXAMINATION 2018

**1½ hours**

*There are three sections.*

*You are advised to spend approximately 30 minutes on each.*

*The quality of your answers is more important than the quantity, so spend 5-10 minutes thinking and 20-25 minutes writing for each section.*

*Each section is worth 30 marks in total.*



## SECTION A

*Read the background information, and study both sources. Then answer both questions.*

### **Background information**

The Battle of Gettysburg was fought between 1 and 3 July 1863, in and around the town of Gettysburg, Pennsylvania, between Union and Confederate forces during the American Civil War. General George Meade's Unionist army defeated attacks by Confederate General Robert E. Lee's army, halting Lee's invasion of the North. Many historians see this as the turning point of the war. Elements of the two armies initially collided at Gettysburg on 1 July 1863, as Lee attempted to engage the Union army and destroy it. Two large Confederate corps assaulted the Unionist forces from the northwest and north, collapsing the hastily developed Union lines, sending the defenders retreating through the streets of the town to the hills just to the south. On the second day, most of both armies had assembled. All across the battlefield, despite significant losses, the Union defenders held their lines. On the third day of battle, the main event was a dramatic infantry assault by 12,500 Confederates against the centre of the Union line, known as Pickett's Charge. It was repulsed by Union rifle and artillery fire, at great loss to the Confederate army. Lee and his army retreated back to Virginia. Around 50,000 soldiers from both armies were casualties in the three-day battle, the most costly in US history. On 19 November 1863 President Abraham Lincoln used the dedication ceremony for the Gettysburg National Cemetery to honour the fallen Union soldiers and redefine the purpose of the war in his historic Gettysburg Address.

### **SOURCE A:**

**The Gettysburg Address. A speech delivered by President Lincoln on 19 November 1863, on the occasion of the opening of the Soldiers' National Cemetery in Gettysburg.**

Four score and seven years ago our fathers brought forth on this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this. But, in a larger sense, we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here. It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us - that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion, that we here highly resolve that these dead shall not have died in vain, that this nation, under God, shall have a new birth of freedom, and that government of the people, by the people, for the people, shall not perish from the earth.

### **SOURCE B:**

**From a letter written by President Lincoln to General Meade on 14 July 1863.**

You fought and beat the enemy at Gettysburg; and, of course, to say the least, his loss was as great as yours. He retreated; and you did not pressingly pursue him; but a flood in the river detained him, till, by slow degrees, you were again upon him. You had at least 20,000 veteran troops with you, and as many more raw ones within supporting distance, all in addition to those who fought with you at Gettysburg; while it was not possible that he had received a single recruit; and yet you stood and let the flood run down, bridges be built, and the enemy move away at his leisure, without attacking him. My dear general, I do not believe you appreciate the magnitude of the misfortune involved in Lee's escape. He was within your easy grasp, and to have closed upon him would, in connection with our other late successes, have ended the war. As it is, the war will be prolonged indefinitely. Your golden opportunity is gone, and I am distressed immeasurably because of it.



1. Study Source A. In your own words, explain the main points that President Lincoln was making in the Gettysburg Address.
2. Study Sources A and B. How and why do they differ in their interpretation of the significance of the Battle of Gettysburg?

## SECTION B

Answer **ONE** of these questions.

***Either***

3. The Ethiopian emperor Haile Selassie said that 'History teaches us that unity is strength.' Do your historical studies show this to be true? Use any historical period or periods you have studied to answer this question. [30 marks]

***or***

4. US President Harry S. Truman said: 'In periods where there is no leadership, society stands still. Progress occurs only when courageous, skilful leaders seize the opportunity to change things for the better.' Do your historical studies show this to be true? Use any historical period or periods you have studied to answer this question. [30 marks]

**TURN OVER FOR SECTION C**

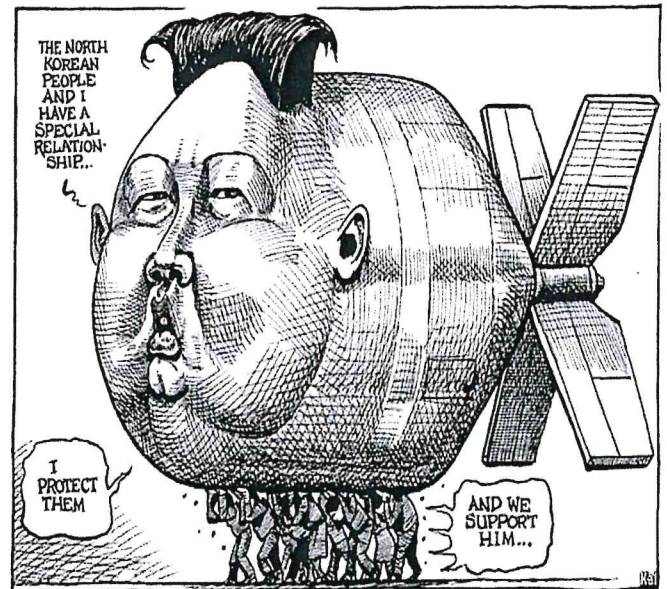
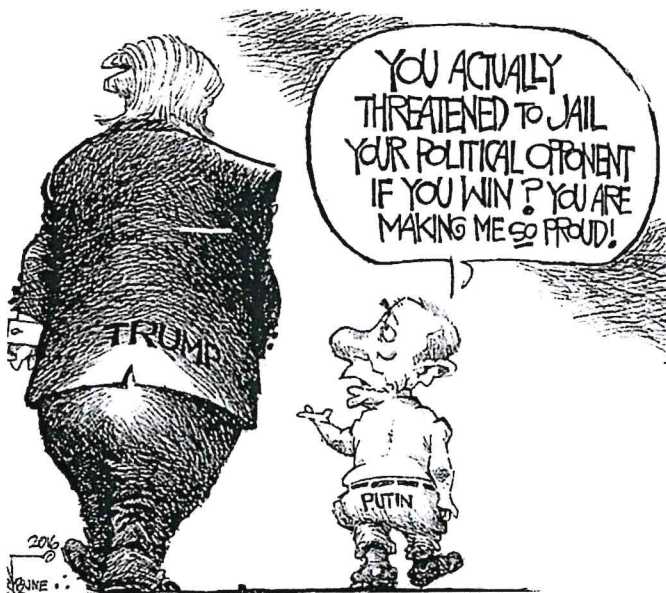


## SECTION C

5. Study these satirical cartoons about current world leaders. Choose ONE of them, and explain why you think it is funny and/or effective.

(If you don't think any of them are funny or effective, then you may either (a) choose ONE of them and explain why it is neither funny nor effective; or (b) choose ONE of them and explain why some people might find it funny and/or effective.)

[30 marks]







# HARROW SCHOOL

## ENTRANCE SCHOLARSHIPS EXAMINATION 2018

### CLASSICAL GREEK

1 hour

#### *GENERAL INSTRUCTIONS:*

**Before you begin, state at the top of your answer sheet how long you have been studying Greek and for how many lessons per week.**

**Answer as many questions as you can. Use the whole paper for help with vocabulary.**

**Write your answers on A4 paper**

*You should make an intelligent guess at words you do not know.*



**SECTION A: Reading and Grammar (40 marks)**

**1 Identify the following Greek proper names.**

- (a) Λεωνίδης
- (b) Όμηρος
- (c) Πυθαγόρας
- (d) Άριστοτέλης
- (e) Άλέξανδρος ό Μέγας

[5]

**2 Transliterate the following (i.e. write them in Greek letters). Long vowels are indicated with a macron (e.g. 'ē' or 'ō'). Remember to add breathings where appropriate. [5]**

- (a) necropoleis
- (b) neolithos
- (c) freneticos
- (d) episcopos
- (e) cathedra

[5]

**3 Imagine that each letter of the Greek alphabet is represented by a number ( $\alpha = 1$ ,  $\beta = 2$ , etc.). Write down in Greek and translate the words represented by the following number sequences. Remember to add breathings where appropriate. [4]**

- (a) 1-13-8-17-24-16-15-18
- (b) 11-9-8-15-18
- (c) 11-1-12-2-1-13-24
- (d) 15-9-13-15-18

[4]

**4 Change the following nouns from plural to singular, keeping the same case. Write out the Greek singular form and give the basic meaning of each word.**

**Example:** τους δολους = τον δουλων (slave)

- (a) τα έργα
- (b) των ίππων
- (c) τας κορας

[6]



5 Change the following nouns from singular to plural, keeping the same case. Write out the Greek plural form and give the basic meaning of each word.

- (a) της οίκιας
- (b) τῷ ἀγγέλῳ
- (c) ὁ πόλεμος

[6]

6 The following English words are derived from Greek words. What do they mean? If you recognise the Greek word(s) they come from, write it/them down (you may be credited for this, even if you cannot define the English word).

- (a) zoology
- (b) euphemism
- (c) autobiography
- (d) theosophy
- (e) trigonometry
- (f) cyclone

[6]

7 Write out any TWO of the following:

- (a) The full imperfect active of λυω.
- (b) 3<sup>rd</sup> declension noun παις in all its cases (singular & plural).
- (c) The full weak aorist of παυω.
- (d) The definite article in all genders and cases (singular & plural).

[8]

### SECTION B: Sentences and Composition (25 marks)

1 Translate into English:

- (a) ὁ νεὸς δούλος ἔλυσε τοὺς ἵππους. [3]
- (b) ὁ στρατηγὸς τὸν τε στρατὸν καὶ τὰ πλοία ἐτάσσειν. [3]
- (c) ὁ διδασκαλὸς σοφὸς ἐστὶ καὶ σοφῶς λέγει. [3]
- (d) ἄρα ἐθέλετε μῦθον τίνα ἀκούειν; [3]
- (e) οἱ ἄνδραιοι φυλακὰς εἰς τὸν ποταμὸν προσετρεχόν. [3]

2 Translate into Greek:

- (a) Have you learned all the words? [3]
- (b) The stranger ordered the messengers to flee. [3]
- (c) The slaves will be sending the gifts to the island. [4]



## SECTION C: Translation (35 marks)

Translate the passage into good English. Write your translation on alternate lines. Vocabulary is given at the foot of the page. You are strongly advised to write a translation in rough, and not to write out your neat copy translation until you have considered the whole story.

### Darius and Democedes

*Darius, King of Persia, suffers an injury. He consults with the leading doctors of the age, but they are unable to cure him. Finally, he finds relief from someone unexpected: a Greek slave.*

ὁ βασιλεὺς Δάρειος ἐπεσέν ἀπὸ τοῦ ἵππου καὶ ἔστρεψε τὸν ποδᾶ. πρῶτον μὲν οὖν Αἰγυπτίους ἐχρῆτο ἰατροῖς. οἱ δὲ ἰατροὶ τὸν ποδᾶ στρεβλοῦσι καὶ βιάζουσι, καὶ κάκον ἐποίησαν. βασιλεὺς οὖν ἑπτα ἡμέρας καὶ ἑπτα νυκτὰς οὐχ οἷός τ' ἦν καθεύδειν. τῇ δὲ ὀγδόῃ τις ἡγγεῖλα αὐτῷ ὅτι δοῦλός τις Δημοκίδης ὀνόματι ἄριστός ἐστι περὶ τῆς ἰατρικῆς.

ὁ δὲ Δάρειος εὐθύς ἐκέλευσε τοῦτον ἀγειν Δημοκίδην πρὸς τὰ βασιλεια. καὶ Δάρειος ῥώτησεν αὐτόν· εἰ ἐμπειρός ἐστι περὶ τῆς ἰατρικῆς, ὁ δὲ Δημοκίδης πρῶτον μὲν διὰ φόβον οὐδὲν εἶπεν. ἐπεὶ ὁ βασιλεὺς αὐτίς ῥώτησεν, ὁ δοῦλος “εἰ, ὦ βασιλεῦ,” ἔφη, “σεαυτὸν μοι ἐπιτρέψεις, ὀλίγων ἡμερῶν, πάντα εὖ γενήσεται.” μετὰ δὲ ταῦτα, Ἑλληνικοῖς ἰάμασι Δημοκίδης ἐχρῆτο, καὶ τὸν βασιλέα ἐθεράπευσεν. ὁ δὲ τῷ Δημοκίδει πολὺν τε χρυσὸν καὶ ἄλλα δῶρα παρέσχεν.

### Vocabulary

Δάρειος -ου ὁ	Darius
στρέφω ἔστρεψα	I twist
χραομαι +dat.	I use
ἰατρος ὁ	doctor
Αἰγύπτιος -α -ον	Egyptian
στρεβλόω	I wrench (i.e. <i>in order to put back in place</i> )
βιάζω	I force, use force on
οἷός τ' ἦν	He was able
Δημοκίδης-ους ὁ	Democedes (Δημοκίδην, acc.)
ἰατρική -ῆς ἡ	(art of) medicine
βασιλεια -ων τά	palace
ἐμπειρος -ον	experienced
ἐρώταω, ῥώτησα	I ask
ἐπιτρέπω ἐπέτρεψα	I entrust
γενήσεται	<i>fut.</i> “will be”
Ἑλληνικός -ή -όν	Greek
ἶμα -ατος τό	remedy
θεράπευω	I cure

Total: 100 marks