



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Monday March 7th, 4.30 p.m. to 6.15 p.m.

ENGLISH

ONE HOUR AND FORTY-FIVE MINUTES

GENERAL INSTRUCTIONS

*You should attempt both questions.
You are advised to spend 60 minutes on Question 1 (15 minutes reading and making notes and 45 minutes writing) and 45 minutes on Question 2.*

PLEASE START EACH QUESTION ON A NEW PIECE OF PAPER

SECTION A Comprehension and Commentary: 60 minutes, 50 marks

Carefully read and enjoy W.H.Auden's description of the sea looked at from high chalk cliffs. Try particularly to hear the sounds and rhythms of the poem. Then read the extract from Shakespeare's play *King Lear*. Then answer the questions on the poem and the extract.

'Look, Stranger by W.H..Auden (1907-1973)

Look, stranger, at this island now
The leaping light for your delight discovers,
Stand stable here
And silent be,
That through the channels of the ear 5
May wander like a river
The swaying sound of the sea.

Here at the small field's ending pause
Where the chalk wall falls to the foam, and its tall ledges
Oppose the pluck 10
And knock of the tide,
And the shingle scrambles after the suck-
ing surf, and the gull lodges
A moment on its sheer side.

Far off like floating seeds the ships 15
Diverge on urgent voluntary errands;
And the full view
Indeed may enter
And move in memory as now these clouds do,
That pass the harbour mirror 20
And all summer through the water saunter.

From *King Lear* by William Shakespeare (1564-1616)

Edgar's father, the Duke of Gloucester, has been cruelly blinded by his enemies. He wants to end his life. His son, not recognised by his father, has guided him to a hill near the sea and pretends to him that he is on the cliff edge. He vividly describes the imaginary scene. Gloucester deliberately falls to end his life but lands on the soft grass in front of him.

Choughs (line 3) are small crow like birds with red legs and bills.
Samphire (line 5) is an edible plant that grows on cliffs.
A bark (line 8) is a sailing ship
A cock (line 9) is a small rowing boat towed behind the bark.

EDGAR

Come on, sir; here's the place: stand still. How fearful
And dizzy 'tis, to cast one's eyes so low!
The crows and choughs that wing the midway air
Show scarce so gross as beetles: half way down
Hangs one that gathers samphire, dreadful trade! 5
Methinks he seems no bigger than his head:
The fishermen, that walk upon the beach,
Appear like mice; and yond tall anchoring bark,
Diminish'd to her cock; her cock, a buoy
Almost too small for sight: the murmuring surge, 10
That on the unnumber'd idle pebbles chafes,
Cannot be heard so high. I'll look no more;
Lest my brain turn, and the deficient sight
Topple down headlong.

GLOUCESTER

Set me where you stand. 15

EDGAR

Give me your hand: you are now within a foot
Of the extreme verge: for all beneath the moon
Would I not leap upright.

Questions on *Look, Stranger*

1. Why do you think the poem addresses a stranger? What is the poet asking the stranger to do in the first verse? (4 marks)
2. Auden writes how, 'the gull lodges / a moment on its sheer side.' What is he describing here? (2 marks)
3. What sort of moods does Auden create in the third verse when he describes the ships 'on urgent voluntary errands' and then the clouds which, 'all summer through the water saunter'? (6 marks)
4. What effects does Auden achieve through his use of rhyme and rhythm in the poem? Quote two or three examples to illustrate your points.(6 marks)

Please turn over

Questions on *King Lear*

5. What sort of feelings do Edgar's words give you as you read them? (4 marks)
6. How does Shakespeare create the sensation of being extremely high above the sea? (6 marks)
7. Explain in your own words the meaning of, 'the murmuring surge, / That on the unnumber'd idle pebbles chafes.' (4 marks)
8. In your own words explain what Edgar means when he says, 'I'll look no more; / Lest my brain turn, and the deficient sight / Topple down headlong.' (4 marks)
9. Why do you think Edgar has tricked his father in this way? (4 marks)

A question on the poem and the extract.

10. What do you find memorable and enjoyable about the two pieces of writing? Which of the two makes the scene feel more real to you? Why is that so? (Use quotations to illustrate your answers) (10 marks)

NOW START A NEW PIECE OF PAPER

SECTION B Composition: 45 minutes; 50 marks.

Choose **one** of the following titles or themes for a composition. You may choose to write a piece of description, a story, a discussion or a poem. Spend some time planning before you start to write.

- EITHER:** *Seen From Above*
OR: *Arriving in a Strange Country*
OR: *Deception*
OR: *The Need to Slow Down*
OR: *A Sea Voyage*
OR: *The Full View*



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Tuesday, March 8th, 9.00 a.m. to 10.30 a.m.

MATHEMATICS I

GENERAL INSTRUCTIONS:

You may attempt all the questions if you have time, but greater credit will be given for complete solutions. Show all your working. Calculators may be used.

1. Simplify

a) $\frac{(3x)^2(2xy)^3}{(6y)^2}$

b) $\frac{x}{2} + \frac{x}{4} + \frac{x}{8}$

c) $3pq(12p + q) - 4p(9pq - q^2)$

d) $\frac{3x^2 - 6x}{6x}$

2. A farmer has 250 metres of fencing available to use. He uses all of his fencing to make a circular field.

a) Calculate the radius of this field and the area of this field.

He now decides that he would prefer a rectangular field. The rectangular field has length twice it's width and also the same area as the original circular field.

b) He doesn't quite have enough fencing to do this.
Calculate how many metres of fencing he is short.

3. Solve the following:

a) $\frac{5}{x-1} = \frac{4}{2x+1}$

b) $\frac{1}{10}(w+3) - \frac{1}{15}(4-w) = \frac{1}{5} - \frac{2}{3}w$

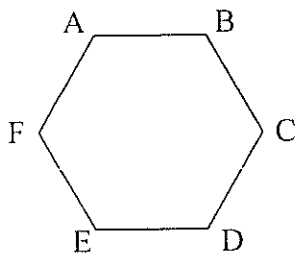
c) $(3x-4)^2 = 25$

4. The cooking time for roasting a chicken is "20 minutes plus 40 minutes per kilo".

a) If the chicken weighs 3.4 kg, calculate in hours and minutes the cooking time to roast this chicken.

b) In reality the oven has to be switched on and warmed up for 10 minutes before the chicken goes in. If I switch the oven on at 5.30pm and take the perfectly cooked chicken out of the oven at 7.52pm. What did my chicken weigh?

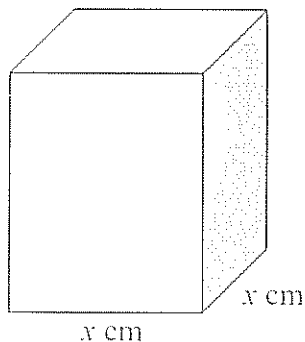
5. A regular hexagon has sides of length 10cm.



Calculate the ratio of the shortest diagonal to the longest diagonal i.e. $AC : AD$, giving your answer in the form $l : n$

6. Ernie the entrepreneur borrows £5000 which he has to pay back at the end of the year plus 5% interest. He splits the money into two amounts and invests in two different schemes (A and B) which gain him 8% and 10% respectively. When he repays the money at the end of the year, he pays back the loan and the 5% interest and still makes £221.40 profit. How much money did he invest in each scheme?
7. I have two cards, one has the letter A on it and the other has the letter T on it. I put the cards into a bag and mix them up. I pick one card at random, write down the letter written on it and replace it in the bag. I repeat this process two more times, so that I have three letters written down to form a "word" e.g. ATT .
- Write down all possible three letter words that I could obtain.
 - What is the probability my word contains a vowel.
 - What is the probability my word contains at least two A's
 - I now pick out a card for the fourth time and write it down as the fourth letter of my "word" e.g. ATTA. Making your reasoning clear and **without** writing down all possible words,
 - State how many 4 lettered words are possible
 - What is the probability that the word contains 3 T's and an A in any order?

8. A rectangular box has a square base of side x cm and a volume of 125 cm^3 .



- Find, in terms of x , the height of the box.
- Hence show that the total length of the edges of the box is $\left(8x + \frac{500}{x^2}\right)$ cm .
- Copy and complete the table below and on squared paper draw a graph of $y = 8x + \frac{500}{x^2}$ for values of x from 2 to 7.

x	2	3	4	5	6	7
$y = 8x + \frac{500}{x^2}$						

- Estimate from your graph the minimum total length of the edges and state the dimensions of the box in this case.



H A R R O W

S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Tuesday, March 8th, 11.00 a.m. to 12.30 p.m.

GEOGRAPHY

*Question one and two are compulsory and must be answered.
Answer one essay title from question three.*

An O.S. map extract is included within this examination.

QUESTION 1

Answer ALL of Question 1
[Spend 25 minutes on this section]

Use the map extract of part of the Lleyn Peninsular in Wales and key (provided with this examination) to answer the following questions.

- (a)
- (i) Describe the distribution of camp and caravan sites in the area. [2]
 - (ii) With reference to map evidence, explain the distribution of camp and caravan sites in the area. [4]
- (b) The area around Rhiw (2227) is less developed (i.e. fewer houses, economic activities, main road etc) than the stretch of coastline between Abersoch (3128) and Pwllheli (3735). With reference to evidence from the map, explain why the physical geography of the two areas may have contributed to this difference in development. [4]
- (c)
- (i) What is the 6 figure grid reference of the wind mill on this map? [1]
 - (ii) What is the 6 figure grid reference of lighthouse on St. Tudwal's Island West? [1]
 - (iii) What is the distance in kilometres along the A499 from the caravan site at 334323 to the roundabout at 363348? [2]
 - (iv) Estimate the length of the beach in Porth Neigwl or Hell's Mouth. [2]
- (d) The beaches to the south of Llanbedrog are composed of sand, while the beaches to the north are composed of shingle. Give possible reasons for this difference. [4]

[Total: 20 marks]

END OF QUESTION 1

QUESTION 2

Answer ALL of Question 2
[Spend 30 minutes on this section]

Look at Figures 1 and 2 which show an area of Port au Prince, the capital of Haiti, in the aftermath of the earthquake which struck the city in January 2010.

Figure 1 The Petionville tent city a week after the earthquake

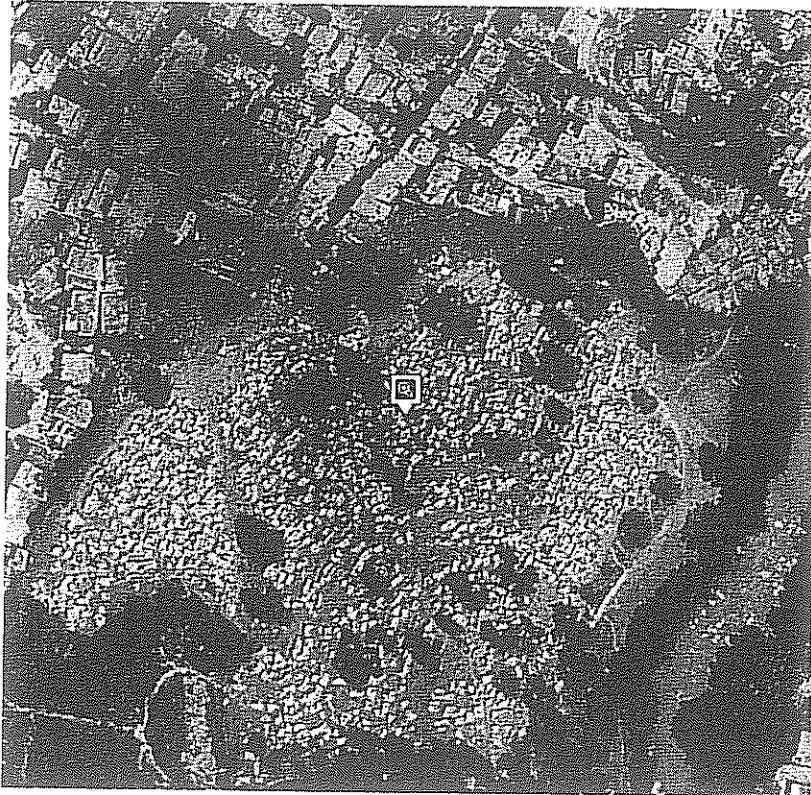


Figure 2 The Petionville tent city in January 2011



- a) Suggest reasons why so many people were made homeless by the earthquake in Haiti. [4]
- b) In the months after the earthquake there have been several outbreaks of cholera and other diseases. Why might such diseases break out in camps such as that in Petionville? [6]
- c) Aid has been slow to come to Haiti in the aftermath of the earthquake. Why might people and governments be reluctant to give aid to a country such as Haiti? [4]
- d) What are the possible disadvantages of providing aid to low income countries? [6]

[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

1. The UK's demand for energy may soon exceed the available supply. Explain the reasons for this trend and suggest and assess possible solutions [20]

OR

2. Some countries are predicted to suffer more from global warming than others. What are the **human** and **physical** factors that cause these disparities? [20]

OR

3. How important is water in creating **different** natural environments or landscapes? [20]

OR

4. Urban planners have tried to reduce traffic congestion in a number of ways, though they have not always been successful. Describe both the **benefits** and the **problems** caused by transport management schemes. [20]

OR

5. What use is Geography to decision makers in government and private companies? [20]

[Total: 20 marks]

[Exam Total: 60 marks]

END OF EXAMINATION



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Tuesday 8th March – 3.45p.m. to 4.45p.m.

FRENCH

GENERAL INSTRUCTIONS:

You should start a new sheet of paper for each exercise.

Please do all work ON ALTERNATE LINES.

The marks are shown at the end of each exercise. Use your time accordingly.

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

Daniel et Valérie sont amis. Ils ont tous les deux treize ans et ils sont voisins. Aujourd'hui, ils ont décidé de passer la journée au zoo. Ils sont émerveillés. Il y a tant d'animaux à voir: des zèbres aux belles robes rayées, des petites antilopes, et même des phoques qui, pour respirer, sortent de l'eau leur museau.

- Puis-je donner aux phoques des cacahuètes? demande Daniel.
- Non! ils ne mangent que du poisson, répond Valérie.
- Comme c'est amusant! s'exclament les enfants, en admirant le grand phoque qui joue avec un ballon.
- Attention! leur crie une petite fille. Il est interdit de monter sur les rochers et de se pencher au-dessus de l'eau.

La girafe au long cou regarde partout avec curiosité. Plus loin, il y a des lions. Ils sont seuls dans leur enclos. Pas de zèbres ou d'antilopes avec eux parce qu'ils pourraient les dévorer. L'hippopotame se nourrit de plantes, il ne mange pas des animaux. Dans leur enclos, le grand ours brun et ses oursons sont grognons. L'heure du déjeuner tarde à sonner! Du poisson, des champignons ou du bon miel – ils commencent à avoir faim et sont très impatients...

(30 marks)

NOW START ANOTHER SHEET OF PAPER

2. Translate these sentences into French ON ALTERNATE LINES :

- a) I am going to stop talking.
- b) He cannot learn.
- c) We will work next winter.
- d) Can I help you? (*tu*)
- e) What will she do tomorrow?
- f) Last week he went to Paris.
- g) Where do you live? (*vous*)
- h) I woke up very early this morning.
- i) Her mother was very tall.
- j) At the weekend, I like to go dancing.
- k) Last night I played the piano.
- l) I have a shower every morning.
- m) He was crossing the road.
- n) The birds were singing.
- o) We were very happy.

(30 marks)

**NOW START ANOTHER NEW SHEET OF PAPER.
PLEASE WRITE ON ALTERNATE LINES**

3. You recently had a really bad day at school. Write a letter to your French friend about the experience.

You should include details about:

- **Your journey to school**
- **The lessons**
- **The food**
- **An unfortunate incident**
- **Your general impressions of the day**

(40 marks)

The account may be true or imaginary.

No credit will be given for material taken from other parts of this examination paper, or irrelevant material.

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

Write about 130 words in French **ON ALTERNATE LINES**. Do not write more than 150 words. Please concentrate on accuracy and quality, rather than quantity.

NAME: _____



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Wednesday, March 9th, 9.00 a.m. to 9.30 a.m.

BIOLOGY

You have 30 minutes to answer all of the questions

You may use a calculator

The maximum mark for this paper is 35

Question 1

Answer the following multiple-choice questions. Underline the correct answer with a ruler and pencil as shown in the example below:

What, approximately, is the mass of an adult blue whale?

- i. 1.8 tonnes
- ii. 18 tonnes
- iii. 180 tonnes
- iv. 1800 tonnes

a) What is the correct order of cells from the smallest to the largest? (1)

- i. bacterium, red blood cell, white blood cell, egg cell
- ii. egg cell, bacterium, red blood cell, white blood cell
- iii. white blood cell, red blood cell, egg cell, bacterium
- iv. red blood cell, bacterium, sperm cell, egg cell

b) Approximately how big is a red blood cell? (1)

- i. 8 mm
- ii. 0.8 mm
- iii. 0.08 mm
- iv. 0.008 mm

c) Approximately how fast can the fastest human (Usain Bolt) run? (1)

- i. 9.6 km/h
- ii. 23 km/h
- iii. 38 km/h
- iv. 100 km/h

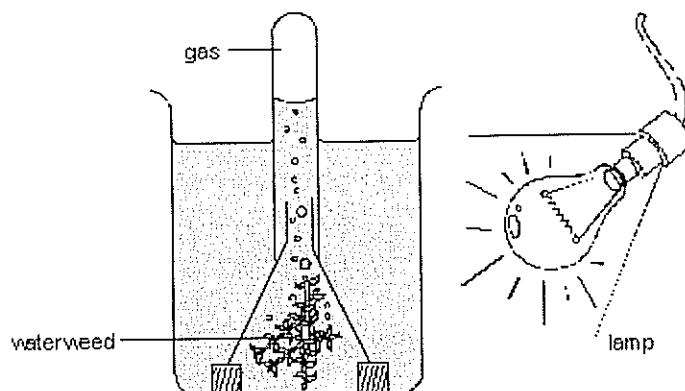
d) If a bacterium divides into two new bacteria every 20 minutes, how many bacteria would there be after 12 hours? (1)

- i. 24
- ii. 72
- iii. 4096
- iv. 7×10^{10}

- e) Which structures are all parts of the human skeleton? (1)
- appendix, skull, collarbone, vertebral column
 - spinal cord, rib cage, pelvis, shoulder blade
 - biceps, pelvis, rib cage, collarbone
 - skull, rib cage, pelvis, shoulder blade
- f) What is the volume of blood in the average adult human body? (1)
(1 litre = 1000 cm³)
- 0.5 litres
 - 5.0 litres
 - 50 litres
 - 500 litres
- g) Which of the following food chains is correct? (1)
- grass → locust → lizard → snake
 - grass → lizard → locust → snake
 - snake → locust → lizard → grass
 - grass → lizard → snake → locust
- h) Which of the following are all plant organs? (1)
- xylem, stomata, stem, leaf
 - stem, starch, fruit, root
 - waxy cuticle, starch, stomata, flower
 - flower, stem, root, leaf
- (i) How long ago are dinosaurs thought to have gone extinct? (1)
- 65 thousand years
 - 650 thousand years
 - 6.5 million years
 - 65 million years

/ 9 marks

Question 2



In an investigation, a lamp was shone on a piece of pondweed (waterweed) in a beaker of water as shown in the diagram above. The gas produced by the pondweed was collected in an upturned test tube. The volume of gas collected was recorded every minute for 8 minutes. The results are given in the table below.

Time / minutes	Volume of gas produced / cm ³
0	0.0
1	1.3
2	2.4
3	3.3
4	4.1
5	4.8
6	5.4
7	6.0
8	6.5
9	6.9
10	7.3

a) What is the name of the gas that is collected in the upturned test tube? (1)

.....

b) What is the name of the chemical reaction that produces this gas? (1)

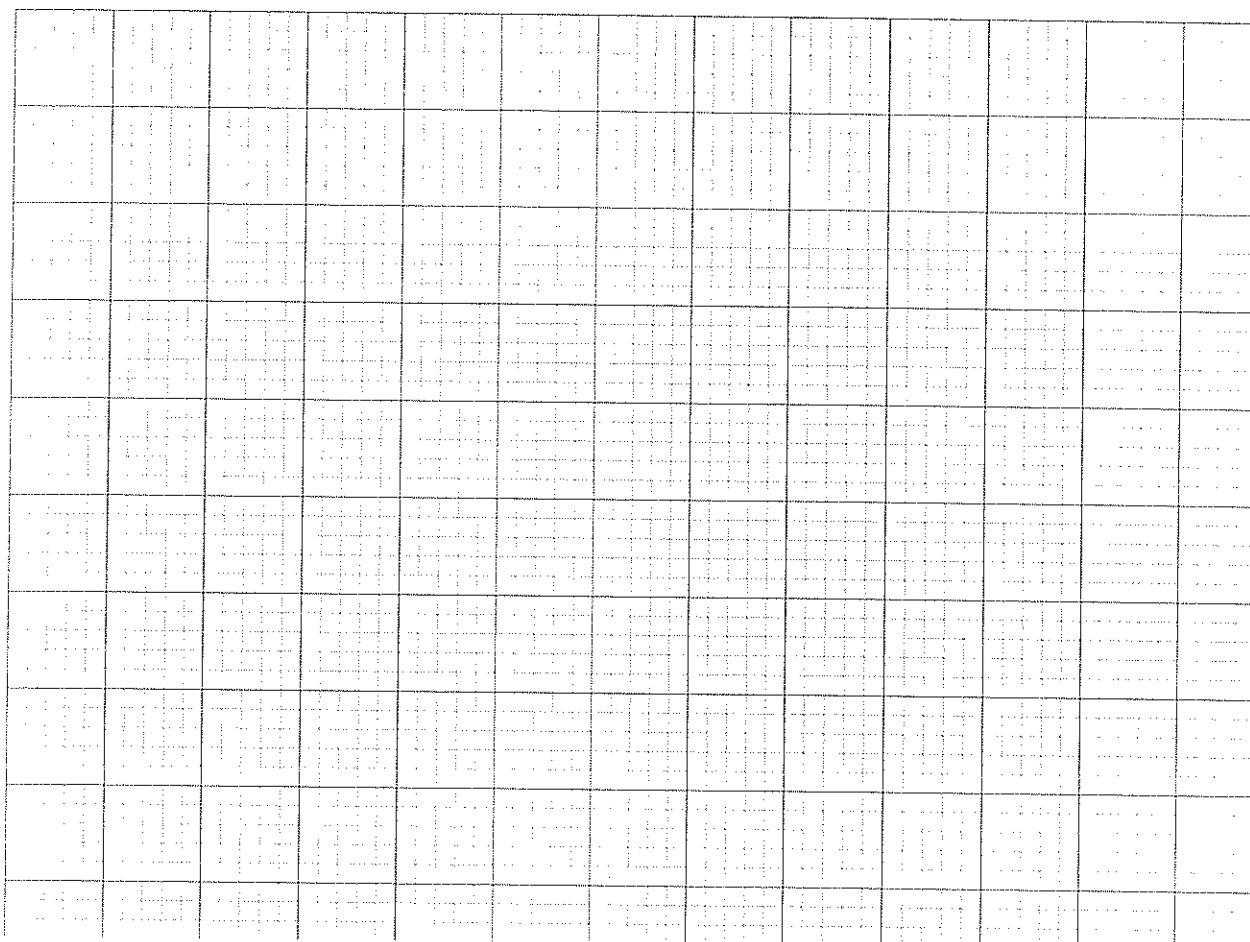
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c) Suggest why measuring the volume of gas is a more accurate method than counting the number of gas bubbles produced. (1)

.....

.....

- d) Plot a graph of the data on the graph paper below. Make sure that you label the axes and draw a best fit line through the points. (5)



- e) Calculate the initial rate of reaction from your graph. Show your working. (2)

rate of reaction = cm^3 / minute

- f) Describe how the rate of reaction changed over the 8-minute period. Suggest a reason for this change. (2)

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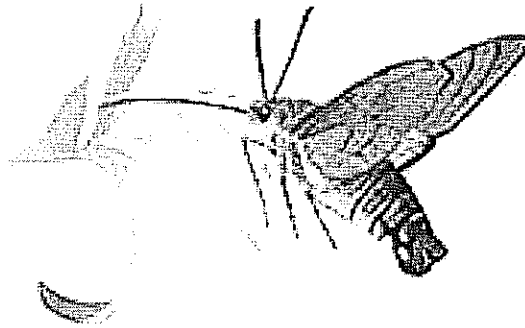
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/ 12 marks

Question 3

The hummingbird hawkmoth is a species of day-flying moth. Its name derives from the fact that its wings beat very fast, at 80 times a second, which enables it to hover just like a hummingbird. It feeds on the nectar of flowers. It can be seen in parts of lowland Britain in the summer months.



- a) Describe two features of the hummingbird hawkmoth, shown in the picture above, which it shares with all other insects. (2)

.....

- b) What is the time taken, in seconds, for one wing beat? Show your working. (2)

time for one wing beat = s

- c) How is the hummingbird hawkmoth adapted to feed on nectar? (1)

.....
.....

- d) Nectar is a sugary solution. Describe how the sugar in nectar is used by the cells of the moth to release energy. (2)

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

e) What is most of this energy needed for? (1)

.....

f) As the moth feeds on flowers it helps to pollinate them. Describe how this pollination takes place. Mention the different parts of the flower involved in pollination in your answer. (3)

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

g) Suggest two reasons why hummingbird hawkmoths migrate to southern Europe or North Africa in the winter. (2)

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

h) In recent years, hummingbird hawkmoths have become more common in Britain. Suggest a reason for this change. (1)

.....
.....

/ 14 marks

NAME: _____



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Wednesday, March 9th, 9.30 a.m. to 10.00 a.m.

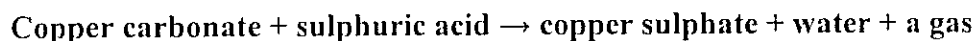
CHEMISTRY

Answer ALL questions in the spaces provided.

You may use a calculator if you wish.

The following questions are about compounds of copper: very common chemicals in school laboratories. You may not be familiar with all the experiments that are described, but by careful reading, and the application of your chemical knowledge, you should be able to work out the answers to the problems.

Copper carbonate is a green solid. It can be used to make copper sulphate by dissolving in dilute sulphuric acid contained in a beaker. The reaction can be described by the following word equation:



The gas, when bubbled through a solution of universal indicator, changes the indicator colour from green to orange.

1. Give the name of the gas formed in this reaction. [1]

2. Why does the indicator change colour? [1]

3. Approximately what pH value is indicated by the orange colour? [1]

4. As the reaction happens, the green solid dissolves and a blue solution forms. What does this tell you about the solubility of copper sulphate in water? [1]

5. If you keep adding the green solid to the acid, eventually the fizzing stops and the green solid remains at the bottom of the beaker. Explain these two observations. [2]

Any green solid that has not dissolved can be removed by filtration, leaving a clear blue solution of copper sulphate. This blue solution is then heated. The following passage that describes this experiment has some words missing. Fill in the blanks, using the words that are given. Some words in the list may not be needed, and some may be used more than once. [10]

The words that you may use are included in this list:

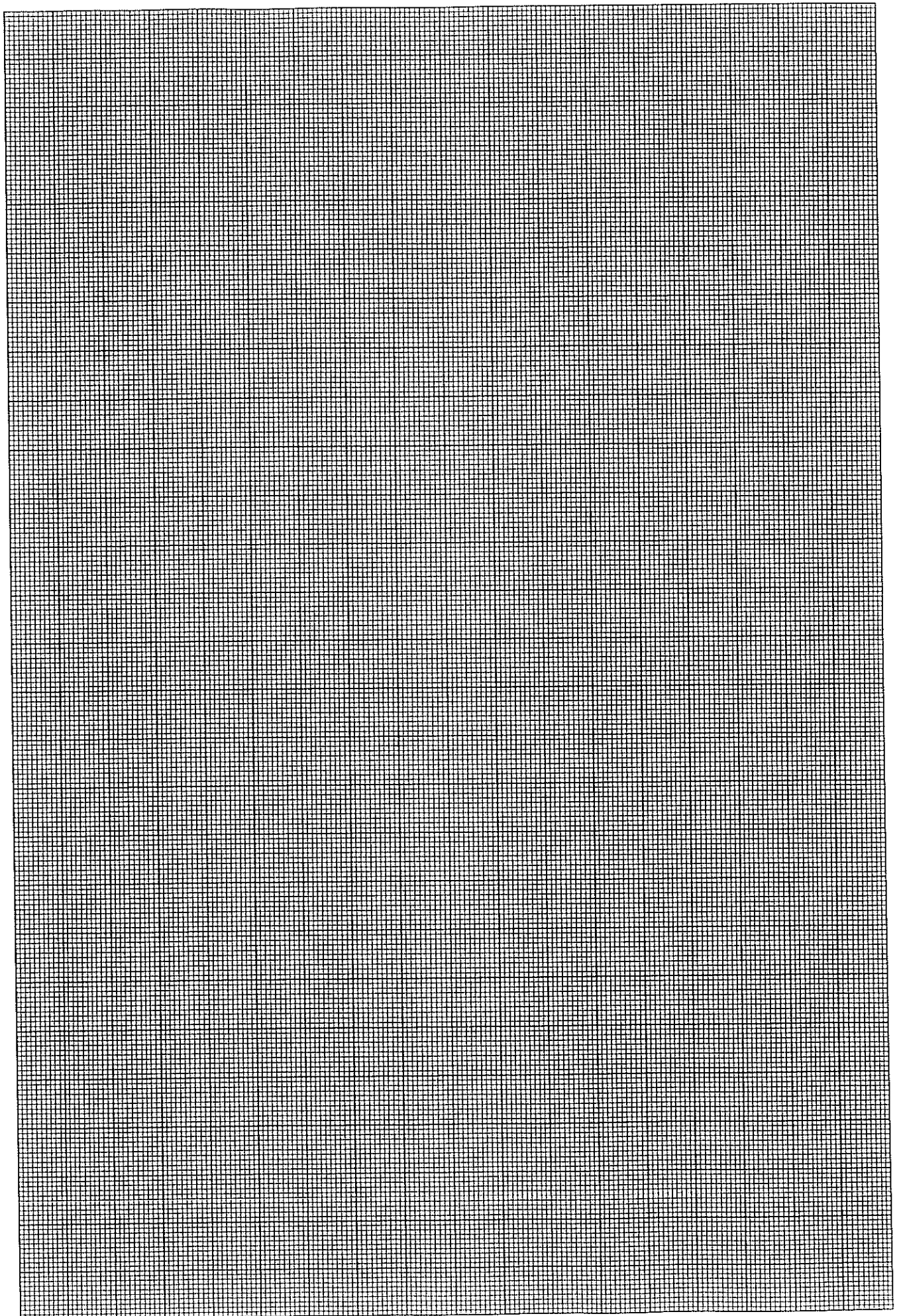
solvent, solute, solid, gas, white, red, blue, purple, melt, boil, evaporates, evaporated, sublimes, sublimed, condenses, condensed, cool, hot, moist, dry

6. The blue solution is heated gently using a Bunsen burner. Eventually the solution begins to _____, and the _____.
- _____ . After some time, a blue _____ forms at the bottom of the beaker and, on continued heating, when all of the water has _____, the blue solid begins to turn _____.
- At the same time, steam is given off, which _____ on the _____ part of the beaker. If the solid left in the beaker is allowed to cool and stand in _____ air, the solid turns _____.

Copper chloride is another green compound of copper. It is soluble in water. A student measured what mass of copper chloride could just dissolve in 100 g of water at various temperatures. When a solvent can dissolve no more solute, the solution is said to be saturated. The results of his experiment are given in a table below:

Temperature of water / °C	25	35	45	55	65	75	85
Mass of copper chloride dissolved / g	71.0	71.3	71.7	72.3	73.1	74.5	76.5

7. Show these results by plotting a suitable graph of the results on the grid overleaf. The temperature should be plotted along the x-axis. [5]



8. A saturated solution of copper chloride at 70°C was allowed to cool to 35°C . Describe as fully as you can what happened. To get full credit, you will need to take some readings from your graph and use them to answer the question.

[5]

9. Another solution of copper chloride was taken in a test tube, and a small amount of iron powder was added. The mixture was stirred and the solid allowed to settle. A pinkish solid formed and the solution changed colour. Identify the pinkish solid, and describe the colour change in the solution.

[3]

Pinkish solid = _____

Colour change = _____ to _____

10. Describe as fully as you can why this reaction takes place.

[2]

11. After the iron has been added to the copper chloride solution, the mass of the test tube and contents is recorded. After the stirring, the mass is recorded again. What do you expect to have happened to the mass during the chemical reaction. Explain your answer.

[2]

12. Some of the pink solid is collected and added to dilute hydrochloric acid.
Describe and explain what happens. [2]

Total = 35 marks

NAME: _____



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Wednesday, March 9th, 10.00 a.m. to 10.30 a.m.

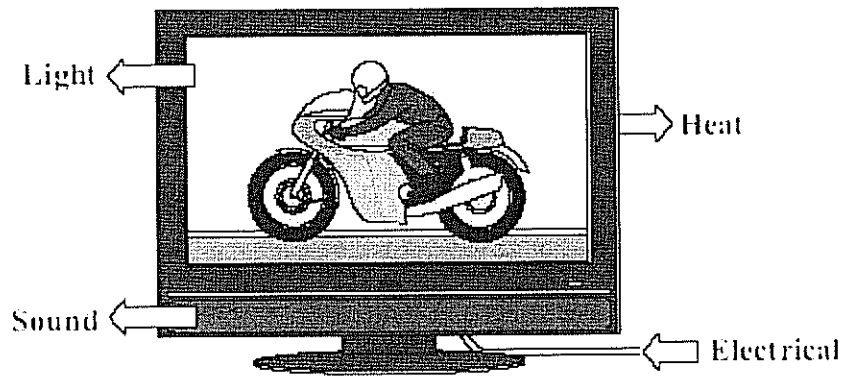
PHYSICS

Answer ALL questions in the spaces provided. All working must be shown.

You may use a calculator if you wish.

13+ Scholarship Exam 2011
Physics

1. The diagram shows the energy transformations produced by a TV.



- (a) Use words from the diagram to complete the following sentence.

The TV is designed to transform energy into light and energy.

(2)

- (b) Which **one** of the following statements is **false**?

Put a tick (✓) in the box next to the **false** statement.

The energy transformed by the TV makes the surroundings warmer.

The energy transformed by the TV becomes spread out.

The energy transformed by the TV will be destroyed.

(1)

- (c) Two different makes of television, **A** and **B**, transform energy at the same rate. Television **A** wastes less energy than television **B**.

Complete the following sentence by drawing a ring around the correct line in the box.

Television **A** has

a higher efficiency than
the same efficiency as
a lower efficiency than

television **B**.

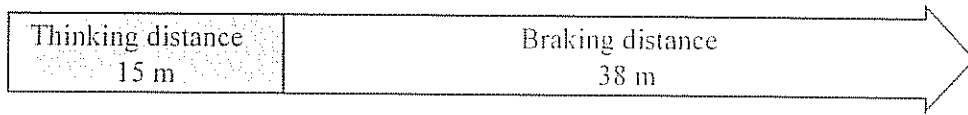
(1)

(Total 4 marks)

13+ Scholarship Exam 2011
Physics

2. (a) A car driver makes an emergency stop.

The chart shows the 'thinking distance' and the 'braking distance' needed to stop the car.



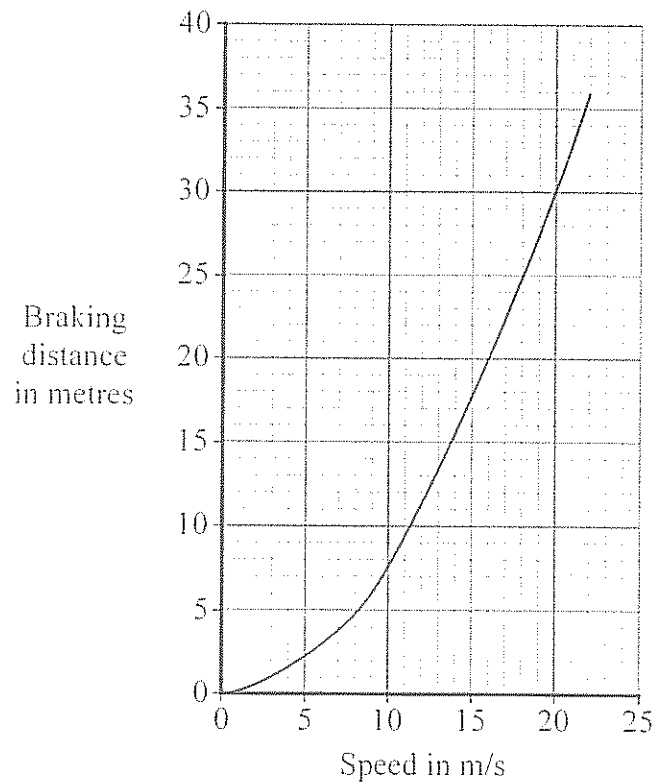
Calculate the total stopping distance of the car.

.....

Stopping distance = m

(1)

- (b) The graph shows how the braking distance of a car driven on a dry road changes with the car's speed.



The braking distance of the car on an icy road is longer than the braking distance of the car on a dry road.

- (i) Draw a new line on the graph to show how the braking distance of the car on an icy road changes with speed.

(2)

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(ii) Which **two** of the following would also increase the braking distance of the car?

Put a tick (✓) next to each of your answers.

rain on the road

the driver having drunk alcohol

car brakes in bad condition

the driver having taken drugs

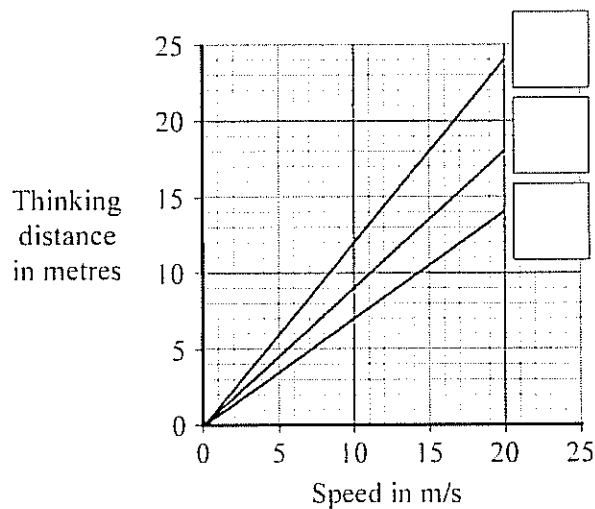
(2)

(c) The thinking distance depends on the driver's reaction time.

The table shows the reaction times of three people driving under different conditions.

Car driver	Condition	Reaction time in seconds
A	Wide awake with no distractions	0.7
B	Using a hands-free mobile phone	0.9
C	Very tired and listening to music	1.2

The graph lines show how the thinking distance for the three drivers, **A**, **B** and **C**, depends on how fast they are driving the car.



(i) Match each graph line to the correct driver by writing **A**, **B** or **C** in the box next to the correct line.

(2)

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- (ii) The information in the table cannot be used to tell if driver C's reaction time is increased by being tired or by listening to music.

Explain why.

.....

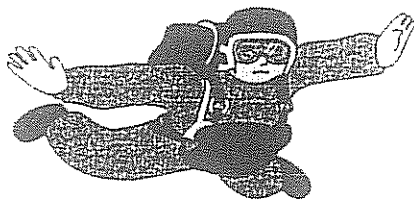
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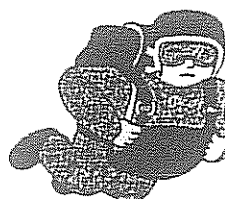
.....

(2)
(Total 9 marks)

3. (a) Two skydivers jump from a plane. Each holds a different position in the air.



A



B

Adapted from Progress with Physics by Nick England, reproduced by permission of Hodder Arnold

Complete the following sentence.

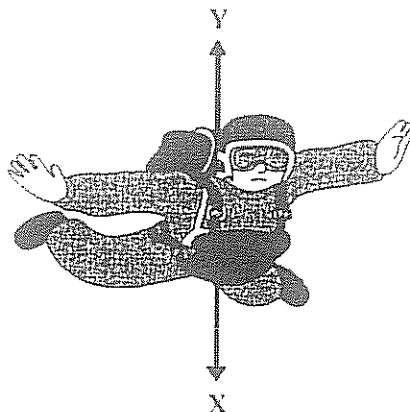
Skydiver will fall faster because.....

.....

.....

(2)

The diagram shows the direction of the forces acting on one of the skydivers.



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(b) In the following sentences, cross out in each box the **two** lines that are wrong.

(i) Force **X** is caused by

air resistance
friction
gravity

(1)

(ii) Force **Y** is caused by

air resistance
gravity
weight

(1)

(iii) When force **X** is bigger than force **Y**, the speed of the

skydiver will

go up
stay the same
go down

(1)

(iv) After the parachute opens, force **X**

goes up
stays the same
goes down

(1)

(c) How does the area of an opened parachute affect the size of force **Y**?

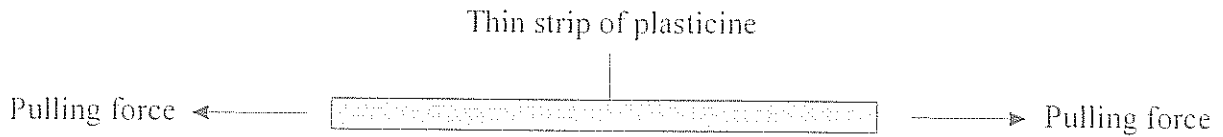
.....
.....

(1)

(Total 7 marks)

4. (a) The diagrams below show pairs of forces acting on different objects. In each case describe what happens when the forces are increased. Then describe what happens when the forces are removed.

(i)



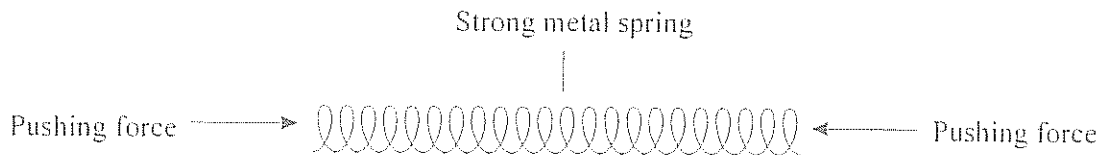
When the forces are increased

.....
.....

When the forces are removed

.....
.....

(ii)



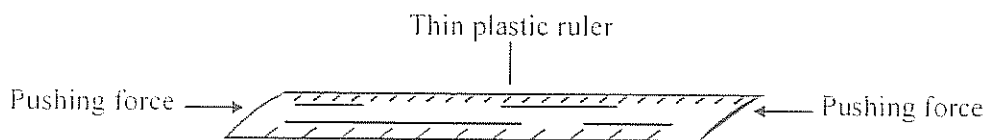
When the forces are increased

.....
.....

When the forces are removed

.....
.....

(iii)



When the forces are increased

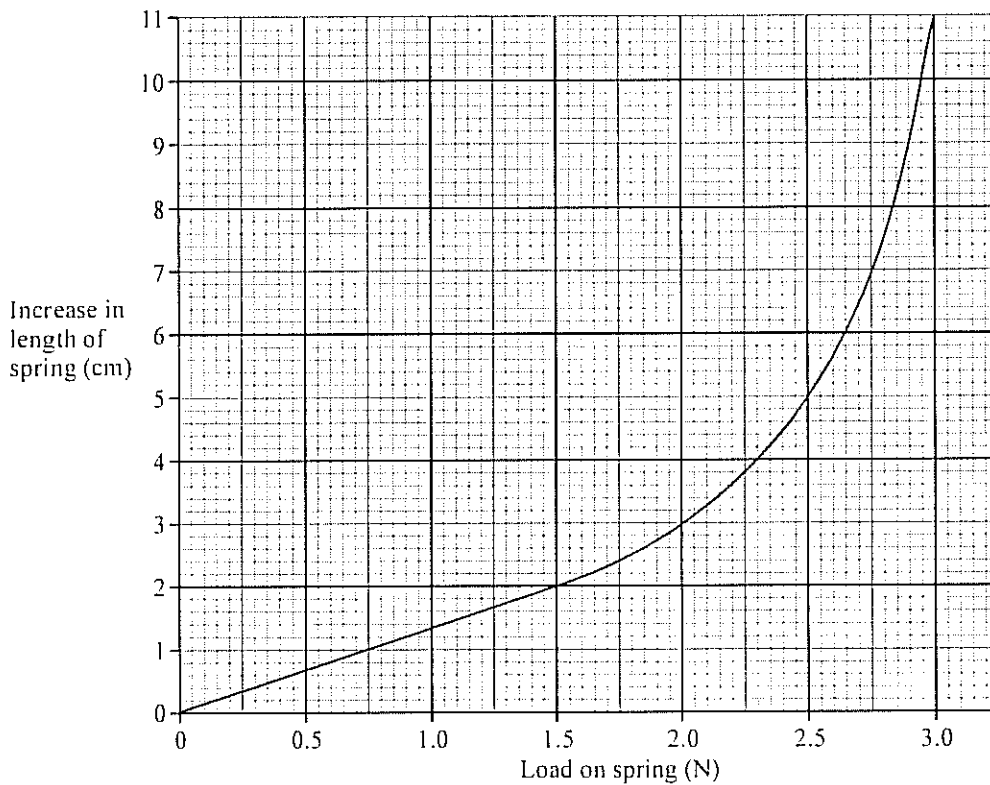
.....
.....

When the forces are removed

.....
.....

(6)

(b) The graph shows the increase in length of a spring against **load** (force).



The length of the spring with no load was 15 cm.

Use the graph to find:

(i) The load needed to produce an increase in length of 2 cm.

.....

(ii) The increase in length produced by a load of 2.3 N.

.....

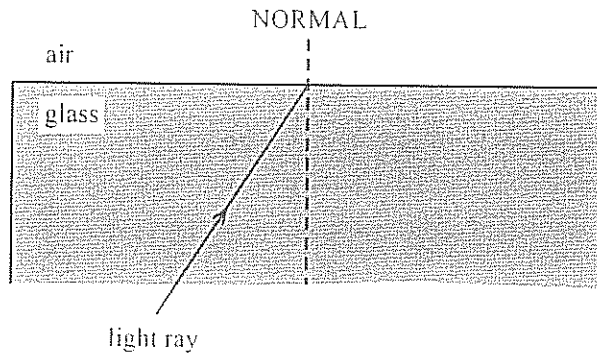
(iii) The **length** of the spring when the load was 2.3 N.

.....

(3)

(Total 9 marks)

5. The diagram shows a ray of light travelling through a glass block.



(a) Complete the diagram to show what happens to the ray of light when it comes out of the glass.

(2)

(b) Explain why this happens to the ray of light.

.....

(2)

(Total 4 marks)

6.

(a) Choose words from the list to complete the following sentences:

higher louder lower quieter

(i) If the frequency is increased, the pitch of the sound becomes

(ii) If its amplitude is increased, the sound becomes

(2)

(b) The diagram shows a pre-natal scan.



(i) What type of waves are used for pre-natal scanning?

.....

(1)

(ii) Explain why we cannot hear these waves.

.....

(2)

(Total 5 marks)



H A R R O W S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Wednesday, March 9th, 11.00 a.m. to 12.30 p.m.

HISTORY

There are three sections.

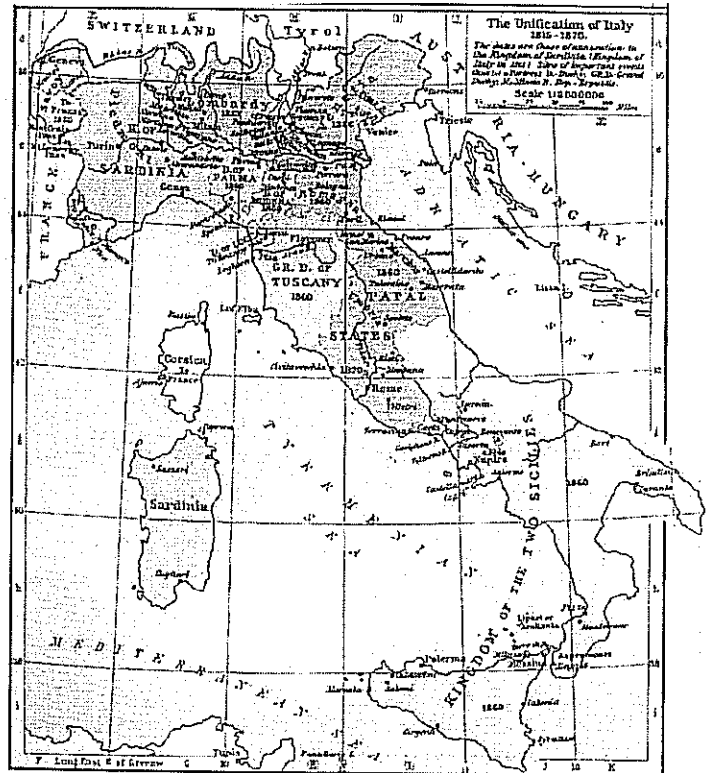
You are advised to spend approximately 30 minutes on each.

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

In 1848 Italy was not a united country as today, but a patchwork of states and kingdoms. In the South was the Kingdom of the Two Sicilies, ruled from Naples; in central Italy Pope Pius IX controlled the Papal States, with his capital at Rome; while in the North several states were under the control of the Austrian Empire, including Piedmont-Sardinia and Lombardy. In 1848 revolutions broke out in several places throughout Italy. They began in Sicily and spread to other parts of Italy, including Lombardy and Piedmont-Sardinia. There is disagreement over what these revolutions were about. Some historians see them as nationalist movements, fighting against Austrian rule and in favour of a united Italy. Others see them as an attempt to achieve liberal reforms, such as freedom of speech, freedom of the press, limitations on the powers of monarchs and greater powers for democratically elected parliaments.



Pope Pius IX is sometimes blamed for raising the hopes of the liberals: in the Papal States he released thousands of political prisoners and announced plans for an elected parliament and freedom of the press, and this led to demands for similar reforms in other Italian states, including Lombardy and Piedmont-Sardinia. In March an uprising in the Lombard capital Milan forced the Austrian military commander General Radetzky to withdraw his troops and resulted in the establishment of a new revolutionary government, known as the Provisional Government. In Sardinia King Charles Albert introduced liberal reforms, and assumed leadership of the Italian efforts to expel the Austrians: other rulers sent him reinforcements, including Pope Pius IX, who sent 10,000 men from the Papal States. However, after an initial victory, Charles Albert suffered a series of setbacks. The Pope withdrew his support and his troops, and his army was completely crushed by General Radetzky's forces, after which the revolutions collapsed and Austrian dominance was restored.

Study the following sources about the Italian revolutions of 1848, and then answer the following question.

- (1) How far do these sources support the view that the revolutions in Italy in 1848 were caused by hatred of Austrian rule?

[30 marks]

Source A: In 1840 our hospitals numbered 72. The Milan hospital alone takes in 24,000 sick, while Paris, which has four times the population, takes in only three times as many patients. The country is similarly provided with engineers who in the city of Milan alone amount to around 450, whereas in the whole of France there are only 568. Lombardy has a larger number of educated families in relation to the uneducated population than any other country in Europe.

From a speech at a meeting of Italian scientists, held in Milan in 1844.

Source B: Events have been brought about by the brutality of the police and the ferocity of Radetzky. Four months ago I could never have believed that hatred could have spread everywhere so fast. The armies of spies have been doubled. People live in continual fear of being arrested even on the slightest excuse. We rely on Piedmont to save us.

From a letter by a Milanese politician, written in February 1848.

Source C: The news that Italy had a liberal Pope spread through the country like a forest fire. In Venice at a meeting of scientists a speaker constantly mentioned Pius IX to great applause. In Milan young men surged through the city singing hymns in his honour. In Tuscany Grand Duke Leopold copied the Pope by freeing the press. Alarmed by this popular hysteria, the Austrians made it treason to shout 'Long live Pius IX' in Lombardy. In Naples King Ferdinand cursed 'the wretched little priest' and banned people from cheering him.

From a British history book published in 1984.

Source D: My information from the countryside is very alarming, for the whole country is in revolt and even the peasants are armed. Here in Milan, the streets have been pulled up to an extent you can hardly imagine. There are hundreds, even thousands, of barricades across the streets. The character of the people has been altered as if by magic and fanaticism has taken hold of every age group, every class and both sexes. I have still a few days' bread left. I cannot obtain anything more.

From a dispatch from Field Marshal Radetzky to Vienna in March 1848. Shortly after sending this dispatch he withdrew his troops from Milan.

Source E: We have conquered. We have made the Austrians flee. We have sworn never to lay down our weapons, we swear it again with the generous Prince who associates himself with our glory – all Italy swears it and so it shall be. To arms then, to arms, to secure the fruits of our glorious revolution – to fight the last battle of independence and the Italian Union.

Issued by the Provisional Government in Milan, set up by revolutionaries in 1848. It was published in April 1848, just after Charles Albert, King of Piedmont, had agreed to support the revolutionaries and declare war on Austria.

Source F : We see there is some desire that we should join in war against the Austrians. We have thought it necessary to proclaim that such action is the opposite to our duty. We reject the treacherous advice published in newspapers, of those who want the pope to be head of a republic of the whole Italian people. We urge them to live in loyalty to their sovereigns whose goodwill they have already experienced.

From an official speech by Pope Pius IX in 1848 after his army commander had disobeyed orders and sent his troops to join Charles Albert, King of Piedmont, who had gone to help the revolution in Milan.

SECTION B

Answer ONE of these questions. Each question is worth 30 marks.

Either

- (2) 'Only in the fields of science and technology is there evidence of progress in History' Use any period or periods of History you have studied to say whether you agree with this claim.

or

- (3) 'History is shaped more by chance than anything else.' Use any period or periods of History you have studied to say whether you agree with this claim.

SECTION C

- (4) The BBC says that its mission is 'to enrich people's lives with programmes and services that inform, educate and entertain.'

Write a proposal for either a one hour television documentary or a short television series for the BBC on a historical subject. Explain what it would be about and how you would make it **informative, educational and entertaining**. It would be a good idea to pick a subject that has not already been turned into a programme or series, as far as you know, but if you do pick a subject that has already been done, then use your proposal to suggest a different approach.

[30 marks]



H A R R O W

S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Wednesday 9th March – 2.15p.m. to 3.45p.m.

LATIN

GENERAL INSTRUCTIONS:

You must attempt questions one (40 marks), two (20 marks), three (20 marks), which all cover the same story, split into three passages. You must then do either question four or question five (worth 20 marks each). These are much harder. If you have time, you may attempt both questions four and five, and the marks you score in these two questions will be combined to give you a mark out of 20.

You are not permitted to write anything down for the first 15 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 15 minutes. You are also advised to read all the footnotes carefully, as they contain helpful information.

New words in this paper are only given in footnotes the first time they appear.

You should make an intelligent guess at words you do not know, using any hints in the footnotes or in the English introduction to each passage.

Question One

Please note that the Latin passages in Questions 1-3 form a continuous story.

Read the following passage and answer the questions on the facing page.

Polycrates and the Ring 1 : The advice of Amasis

This story was originally told by the Greek historian Herodotus. After murdering one of his brothers and exiling the other, Polycrates became tyrant of Samos, an island in the Aegean Sea. He was the most prosperous ruler of his day and one of the first Greeks to make an alliance with Egypt, whose King at the time was called Amasis. The Greeks believed that a man who enjoyed nothing but good luck in life would one day pay the price, since the Gods always like to keep the fortunes of men balanced. In this first passage, Amasis advises Polycrates to sacrifice something very dear to him, in the hope that the Gods will not punish him.

- 1 Polycrates tyrannus erat Sami, quae insula erat in mari Aegaeo posita, et in frugibus¹
2 et in gemmis² opulenta.³ hic potentissimus⁴ erat, naves longas⁵ centum, mille
3 sagittarios⁶ habens. olim cum Amase, qui rex Aegyptorum⁷ erat, societatem⁸ facere
4 constituit ut imperium⁹ divitiasque¹⁰ augetet.¹¹ ille societatem accepit, sed anxius
5 erat quod Polycrates nimium¹² bonae fortunae habebat. scripsit igitur hanc epistulam:
6 "Amasis salutationem¹³ Polycrati mittit. gaudium¹⁴ est cum amicus bona fortuna
7 fruitur.¹⁵ deis tamen invisus¹⁶ est homo qui prosperitatem sine fine¹⁷ habet.
8 hoc igitur praeceptum¹⁸ effice¹⁹: rem, quam maxime amas, abice.²⁰
9 ita dei te non punient."
10 Polycrates, cum epistulam accepisset, praeceptum Amasis statim efficere constituit.
11 itaque, prope Samum navigans, in mare qui carissimus sibi erat abiecit: anulus²¹
12 aureus.²² omnes servi viderunt quid fecisset.²³

¹ fruges, frugum (f) = crops

² gemma -ae (f) = precious stone, gem

³ opulentus-a-um = wealthy, rich

⁴ potens, potentis (adj) = powerful

⁵ navis longa = warship

⁶ sagittarius -i (m) = work this out, based on your knowledge of the Latin word sagitta.

⁷ Aegypti-orum (m.pl) = the Egyptians [Aegyptus -i (f) = Egypt]

⁸ societas, societatis (f) = alliance

⁹ imperium -i (n) = power

¹⁰ divitiae-arum (f.pl) = riches

¹¹ augeo, augere, auxi, auctus = I increase

¹² nimium + gen. = too much of

¹³ salutatio, salutationis (f) = greeting

¹⁴ gaudium -i (n) = joy

¹⁵ fruor, frui, fructus sum + abl = I enjoy

¹⁶ invisus-a-um = hateful

¹⁷ prosperitatem sine fine: you can work out prosperitas from a very similar English word; finis, finis (f) = end, limit

¹⁸ praeceptum -i (n) = command, order, instruction

¹⁹ efficio, efficere, effeci, effectus = I carry out, accomplish (compound form of facio)

²⁰ abicio, abicere, abieci, abiectus = I throw away (compound form of iacio).

²¹ anulus -i (m) = using the information in the title of the passage, work out what this word means...!

²² aureus-a-um = golden

²³ quid fecisset = 'what he had done' (translate this directly following viderunt).

Questions on Passage One:

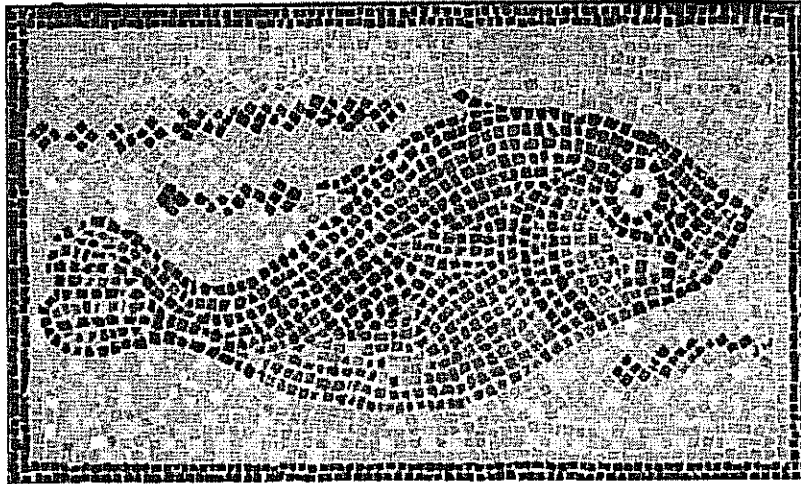
- a) Where was Samos? [1]
- b) In lines 1-2 what two reasons are we given to explain the island's wealth? [2]
- c) Write down in Latin and translate the word in line 2 which describes Polycrates. [1]
- d) From lines 2-3, give details of the land and sea forces Polycrates had at his disposal. [4]
- e) Lines 3-4 (*olim.... augetur*):
- i. What did Polycrates decide to do? [2]
 - ii. What did he hope to achieve by doing this? [3]
- f) Why was Amasis worried (lines 4-5)? [2]
- g) According to Amasis in his letter, what kind of man is hateful to the gods? [2]
- h) Lines 8-9 (*hoc...punient*):
- i. As accurately as you can, translate the instruction which Amasis told Polycrates to carry out. [5]
 - ii. What did Amasis hope would happen if Polycrates did carry out this instruction? [2]
- i) Give in Latin and translate the word that shows whether Polycrates responded to Amasis' instruction slowly or quickly. [1]
- j) What does '*anulus aureus*' mean (lines 11-12)? [1]
- k) Translate '*in mare qui carissimus sibi erat abiecit*'. [4]
- l) If the sentence:
All the slaves said that they saw the event.
contains an Indirect (or Reported) *Statement*, what does the sentence:
All the slaves saw what he had done.
contain? [2]
- m) Which Latin noun in the passage is derived from the verb *fruor*? [1]
- From the passage...
- n) Write down in Latin the genitive singular of the Latin word for Samos. [1]
- o) Write down in Latin the ablative singular of the Latin word for Amasis. [1]
- p) Write down in Latin the dative singular of the Latin word for Polycrates. [1]
- q) Write down in Latin an example of each of the following:
- i. a relative pronoun [1]
 - ii. a verb in the future tense [1]
 - iii. a present participle [1]
 - iv. a subjunctive [1]

[40 Marks]

P.T.O.

Question Two

Translate the following passage into good English. Write your translation on alternate lines.



Polycrates and the Ring 2 : A Samian fisherman makes a surprising discovery

Less than a week later, an event occurred which suggested Amasis had every reason to be worried.

quinque post¹ diebus, piscator Samius piscem² ingentem pulcherrimumque cepit. ille piscis tam splendidus erat ut piscator fidelis³ eum Polycrati donare⁴ constitueret.

Polycrates, cum piscator ad aulam⁵ advenisset, pisce oblato⁶ et sollemniter ⁷tradito, hoc donum amavit et piscatorem ad cenam⁸ invitavit.

servi tamen, qui cenam parabant, in ventre⁹ piscis invenerunt anulum ipsum quem Polycrates antea¹⁰ abiecerat. servi laeti, perterritus Polycrates: nam putavit¹¹ hoc monstrum¹² opus deorum esse.

[20 marks]

¹ post = later (taken with an expression of time in the ablative)

² piscis, piscis (m) = fish

³ fidelis -e (adj) = *this is the adjective formed from the noun fides, fidei (f) - so if you form an English adjective (describing word) taken from the English meaning of fides you will have the correct translation of fidelis.*

⁴ dono, donare, donavi, donatus = *this verb means the same thing as do, dare, dedi, datus, and is closely connected with the Latin word donum which occurs in this passage.*

⁵ aula-ae (f) = palace

⁶ offero, offerre, obtuli, oblatus = I offer, present

⁷ sollemniter (advb) = ceremoniously

⁸ cena, cenae (f) = dinner

⁹ venter, ventris (m) = stomach

¹⁰ antea (advb) = previously

¹¹ puto, putare, putavi, putatus = I reckon, think

¹² monstrum -i (n) = miracle

Question Three

Read the following passage and answer the questions below.

Polycrates and the Ring 3 : Amasis breaks off the alliance

1 Polycrates nuntium ad Amasem mittit. ille, cum nuntius de monstro omnia
2 narravisset, animum maxime demisit.¹ 'hic sine dubio a deis punietur,' dixit.
3 rex igitur nuntium referre² iussit se societatem defringere.³ timebat enim ne⁴ ipse
4 quoque, Polycrate punito, dolorem ferret.⁵
5 quae vero ita acciderunt:⁶ Samus a Persis⁷ magno cum exercitu superari, Polycrates
6 interfici, Aegyptus ad terras Persicas postea⁸ adiungi.⁹
7 sic Polycratis potentissimi bona fortuna ad finem ducta est.

- a) Give in Latin the word in line 1 which shows that Polycrates' messenger gave a thorough report of the miracle. [1]
- b) Line 2 ('hic....punietur'):
i. Translate these words, which give Amasis' reaction to the messenger. [4]
ii. Explain carefully why Amasis might think this. You should refer back to the previous two passages in your answer. [3]
- c) What message did the Egyptian king tell the messenger to report to Polycrates? [1]
- d) What did Amasis fear might happen otherwise (lines 3-4)? [2]
- e) *Polycrate punito* (line 4): which of the following best describes this phrase (write the correct option):
IMPERATIVE ABLATIVE ABSOLUTE RELATIVE CLAUSE [1]
- f) Lines 5-7 (*quae.... interfici*): explain how the three events that followed the end of the alliance between Amasis and Polycrates proved that Amasis was right to be afraid? [3]
- g) Line 7: *ad finem ducta est*: translate these words into fluent English. [1]
- h) Do you think Polycrates deserved his fate? Explain your opinion fully, using all the relevant information on this question paper in your answer. [4]

[20 Marks]

P.T.O.

¹ animum demitto = I am disheartened

² refero, referre, rettuli, relatus = I report

³ defringo-ere, defregi, defractus = *this is a compound of frango; perhaps the title of the passage offers a clue?!*

⁴ timebat enim ne = 'for he was afraid that....'

⁵ dolorem fero = I suffer

⁶ quae vero ita acciderunt = 'this is exactly what happened'

⁷ Persae-arum (m.pl) = the Persians (Persicus-a-um (adj) = Persian)

⁸ postea (advb) = *the opposite of antea*

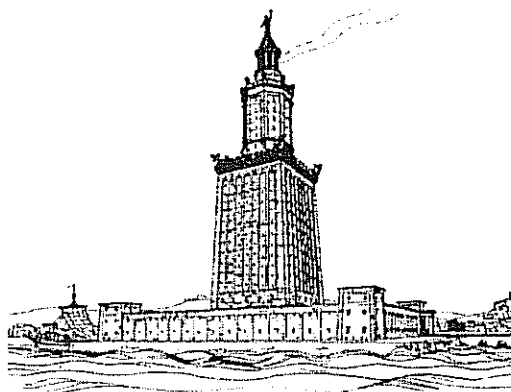
⁹ adiungo-ere, adiunxi, adiunctus = I join – *note that superari, interfici and adiungi are all present passive infinitives, but should be treated as being the main verbs in the sentence (this is a construction called the 'historic infinitive').*

Remember, you can attempt either question four or question five, but if you have time, attempt both questions and your scores on each question will be combined to create a mark out of 20 (maximum mark = 20).

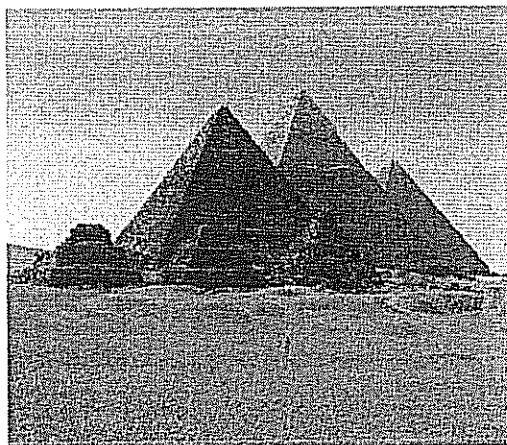
Question Four

Study the images of ancient Egypt (A, B, & C).

A:



B:



C:



Question Four (continued)

Read the following three passages (1,2, & 3) about Ancient Egypt:

1:

Aegyptum Nilus irrigat, et cum tota aestate¹ obrutam oppletamque² tenuit, tum recedit mollitosque et oblimatos³ agros ad serendum⁴ relinquit. [Cicero, *de Natura Deorum*]

2:

Pharus est in insula turris magna altitudine, mirificis operibus extracta; quae nomen ab insula cepit. haec insula obiecta Alexandriae portum efficit; sed a superioribus⁵ regibus in longitudinem passuum DCCC⁶ in mare iactis molibus⁷ angusto itinere et ponte cum oppido coniungitur. in hac sunt insula domicilia⁸ Aegyptiorum et vicus oppidi magnitudine. [Caesar, *de bello civili*]

3:

dicantur obiter et pyramides in eadem Aegypto, regum pecuniae otiosa⁹ ac stulta ostentatio,¹⁰ quippe cum faciendi eas causa a plerisque tradatur, ne¹¹ reges pecuniam successoribus aut aemulis insidiantibus praeberent¹² aut ne plebs esset otiosa. multa circa hoc vanitas¹³ hominum illorum fuit. vestigia complurium incohatarum extant.

[Pliny the Elder, *Naturalis Historia*]

- a) Each of the above passages describes one of the images on the opposite page. Studying the passages carefully, write down *which* passage describes *which* image. [6]
- b) Study the Latin as carefully as possible and use the footnotes to work out as much as you can about the three landmarks from the writings of these Roman authors. [14]

[20 Marks]

P.T.O.

¹ aestas, aestatis (f) = summer

² oppleo-ere, opplevi, oppletus = I flood, fill up

³ oblimatus-a-um (adj) = covered with mud

⁴ sero, serere, sevi, satus = I sow, plant

⁵ superior, superioris (adj) = previous

⁶ in longitudinem passuum DCCC = stretching about 1,500 yards

⁷ moles = jetty, pier

⁸ domicilia = dwellings

⁹ otiosus-a-um (adj) = idle

¹⁰ ostentatio, ostentationis (f) = way of showing off

¹¹ faciendi eas causa a plerisque tradatur ne....aut ne.... = most authors record that they were built so that (reges) might not....and so that (plebs – the common people) might not....

¹² praebeo, praeberere, praebeui, praebitus = I show, display

¹³ vanitas, vanitatis (f) = vanity

Question Five

Translate the following sentences into Latin. Use the vocabulary given earlier in the paper.

a) The Egyptians had already seen the miracle. [5]

b) We planted crops in the fields. [5]

c) The powerful Persians conquered Samos as quickly as possible. [7]

d) What did Polycrates say? [3]

[20 Marks]

Total Marks: 100



H A R R O W
S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Thursday, March 10th, 9.00 a.m. to 10.30 a.m.

MATHEMATICS II

GENERAL INSTRUCTIONS:

You may attempt all the questions if you have time, but greater credit will be given for complete solutions. Show all your working. Calculators may NOT be used.

1. Young David Williams had three friends round for the afternoon. When the four boys had gone off to play tennis David's father, mother and sister were arguing about the names of his friends. Mr Williams thought the two who were at school with David were John Smith and Philip Brown. Mrs Williams thought that the boys were John Brown, Philip Jones and Simon Smith. David's sister, Phoebe, thought that that the two she liked best were John Jones and Philip Brown. Strangely enough they were all right about at least one of the names. What were the correct names? (A mere answer will receive no credit. Explain your solution, giving your argument in diagrammatic form if possible.)

2. (i) (a) Solve the equation

$$\frac{x}{5x-3} = \frac{3}{15-x}$$

- (b) Hence, write down the solutions of

$$\frac{x^2}{5x^2-3} = \frac{3}{15-x^2}$$

- (ii) Solve the simultaneous equations

$$3x^2 + 2y^3 = 91$$

$$x^2 + y^3 = 33$$

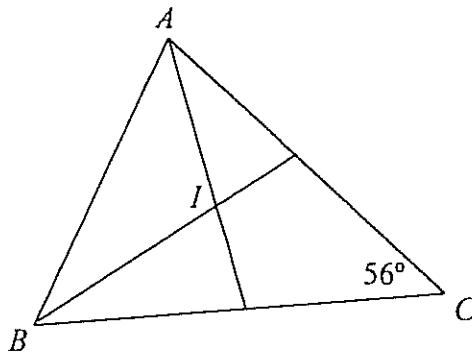
- (iii) A garden furniture shop sells tables, chairs and umbrellas. The cost of a standard set of the furniture consisting of 1 table, 6 chairs and an umbrella is £160. The cost of a super set of furniture consisting of 3 tables, 14 chairs and an umbrella is £300. Find the cost of an economy set of furniture consisting of 1 table and 4 chairs. State any assumption that you have made about the tables, chairs and umbrellas.

3. (a) Evaluate the following (i) $\frac{1}{2} + \frac{1}{4}$, (ii) $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$, (iii) $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$
- (b) Without adding up all the fractions work out the total of the first eight terms of the sequence that begins $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} \dots$
- (c) Write down an expression for the total of the first n terms of this series.
- (d) What happens to this total as the number of terms becomes very large?
- (e) Evaluate the following (i) $\frac{1}{3} + \frac{1}{9}$, (ii) $\frac{1}{3} + \frac{1}{9} + \frac{1}{27}$
- (f) Write down the total of the first four terms of the sequence that begins $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} \dots$
- (g) Write down an expression for the total of the first n terms of this series.
- (h) What happens to this total as the number of terms becomes very large?

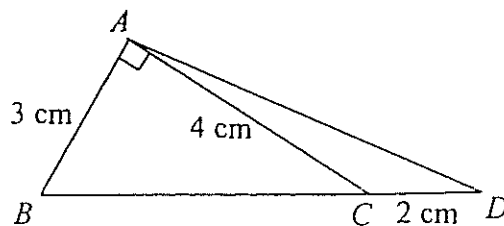
4. Supergran walks from her chalet to the top of a mountain. She knows that if she walks at a speed of 6 mph she will arrive at 1pm, whereas if she leaves at the same time but walks at 10 mph she will arrive at 11am. At what speed should she walk if she wants to arrive at 12 noon.
5. *In this question give your answers in terms of π . There is no need to do any long multiplication.*
- (a) Colin the clown rides a monocycle which has a circular wheel of radius 30cm.
- (i) Colin's first act is to ride in a straight line. How far has he travelled when the wheel has made five full rotations?
 - (ii) Colin's next act is to ride the monocycle up a step that is 30cm high. He meets the step after the wheel has made 5 revolutions, goes up the step without the wheel slipping or losing contact with the ground and then continues for another 5 full revolutions. Find the total distance travelled by the point at the centre of the wheel during this act.
- (b) Colin has a friend called Daffy who rides a monocycle that has a rectangular wheel which is 80cm by 60cm in size.
- (i) Daffy's first act is also to ride his cycle in a straight line for five full revolutions of the wheel. Find the total distance moved by the point at the centre of the wheel during this act.
 - (ii) Daffy's second act is to go down a step which is 60cm high. He starts with one of the long sides of the wheel on the ground and the front corner of the wheel level with the top corner of the step. Assuming that the wheel rotates without slipping until it is on the lower level, find the total distance moved by the point at the centre of the wheel during this act.

[TURN OVER FOR QUESTIONS 6 & 7]

6. (a) In the diagram below the bisectors of angles BAC and ABC meet at I . Angle $ACB = 56^\circ$. Find the size of angle AIB .



- (b) In the diagram below $AB = 3$ cm, $AC = 4$ cm, $CD = 2$ cm and angle $BAC = 90^\circ$. BCD is a straight line. Find the area of triangle ACD .



7. On squared paper draw a square that is 5 small squares long and high. Now draw in a diagonal of the square. Through how many small squares does the diagonal pass?

If the large square is n small squares long and high then through how many small squares will a diagonal pass?

Now draw a rectangle of size 2 small squares long by 1 high. Through how many small squares does a diagonal of this rectangle pass?

For a rectangle that is n by 1 small squares through how many small squares will a diagonal pass?

Now draw a rectangle of size 3 by 2 small squares. Through how many small squares does a diagonal of this rectangle pass?

Explore more rectangles that are 2 small squares high but of increasing length. Can you find a general rule for the number of small squares passed through by the diagonal of an n by 2 square?

Now investigate n by 3 squares and see if you can find a general rule in this case.

Now try to state as clearly as possible general rule for the number of diagonals intersected by an n by m square, where $n > m$.



H A R R O W

S C H O O L

ENTRANCE SCHOLARSHIPS EXAMINATION 2011

Thursday 10th March - 11.00 a.m. to 12 noon

GREEK

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

NB. New words in this paper are only given in footnotes the first time they appear.

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

SECTION A (70 marks)

1 Identify the following characters; some are real, some are fictional.

- (a) Έκτωρ
- (b) Ίασων
- (c) Μυβαρακ
- (d) Φερνανδο Τορρης
- (e) Άγριδ [5]

2 Transliterate the following (i.e. write them in Greek letters). All 'e' and 'o' vowels in the English words are short (requiring epsilon / omicron). Remember to add breathings where appropriate:

- (a) crisis
- (b) dogma
- (c) climax
- (d) graph
- (e) mania
- (f) plasma
- (g) idea [7]

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:

- (a) 11 - 5 - 3 - 24
- (b) 1 - 3 - 15 - 17 - 1
- (c) 16 - 15 - 11 - 5 - 12 - 9 15 - 9
- (d) 5 - 14 [8]

4 Translate into English:

- (a) οἱ Ἀθηναῖοι ἐθεραπεύον μέγαν τὸν θεόν. [6]
(b) ὁ μὲν υἱὸς τὸν πατέρα φιλεῖ, ἡ δὲ θυγατὴρ τὴν μητέρα. [7]
(c) οἱ στρατιῶται τοὺς βαρβάρους ἔχουσιν ἐν τῇ πόλει. [5]
(d) ὑμεῖς οὔτε εἶδετε οὔτε ἤκουσατε τοὺς λόγους. [7]
[25]

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

- (a) τοὺς κηρυκὰς
(b) τὰ τεῖχη
(c) τὸν δεσποτὴν [6]

6 Give the Greek word (and its meaning) that the following English words are derived from:

- (a) polemic
(b) angel
(c) helium
(d) xenophobe (give 2 Greek words) [10]

7 Write out any THREE of the following:

- (a) The strong aorist active of λαμβάνω.
(b) ἡ νύξ in all its forms (singular & plural).
(c) ὁ λόγος in all its forms (singular & plural).
(d) The Definite Article. [9]

SECTION B (10 marks)

Translate into Greek:

- (a) We fought here. [3]
(b) Death finds everyone. [3]
(d) The leaders went through the island. [4]

P.T.O.

SECTION C (20 marks)

Translate the following into good English. Write your translation on alternate lines.

Remember, unfamiliar words are only underlined the first time they are used. 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.

The names in this story are **all mentioned** in the description below the title (see below), and you should use the English description of the story to help you work out the Greek.

The Sirens

Odysseus, while sailing back from Ilium (Troy) to his beloved home in his homeland of Ithaca, encountered the Sirens, whose song was so beautiful that anyone who heard it lost all desire to return home. The adventurous Odysseus, however, found a cunning way to hear their song without any chance of this happening.

ὁ Ὀδυσσεύς, ἐπει εἰς τὴν Ἴθακὴν ἔβαινεν μετὰ τὸν πόλεμον τὸν ἐν τῷ Ἴλιῳ, ἐγγυς¹ τῶν Σειρηνηῶν ἐπλευσεν.

ὅτι ἀοιδὴν² καλὴν ἤειδον³ αἱ Σειρηναίαι καὶ ἠναγκαζόν⁴ τοὺς ἀνθρώπους ἀκουσαντάς⁵ τῆς οἰκίας ἐπιλανθανεσθαι,⁶ ὁ Ὀδυσσεύς τοὺς ἑταίρους⁷ ἐκελευσεν πληροῦν⁸ μὲν τὰ ὠτά⁹ κηρῷ,¹⁰ παρασκευάζειν δὲ τὰ δεσμά¹¹ αὐτῶν. οὕτως¹² ὁ μὲν Ὀδυσσεύς οὐ κινεῖ,¹³ οἱ δὲ ἑταῖροι οὐκ ἀκούουσιν.

ὁ γὰρ Ὀδυσσεύς ἀκούειν ἠθέλεε τὴν ἀοιδὴν καλὴν ἀνευ¹⁴ ληθῆς¹⁵ τῆς οἰκίας.

αἱ οὖν Σειρηναίαι ἤειδον περὶ τοῦ πολέμου καὶ περὶ τῶν τοῦ Ὀδυσσεύος ἔργων, καὶ οἱ λόγοι καλοὶ ἦσαν τῷ Ὀδυσσεύϊ. ἀλλὰ διὰ τὸν κηρὸν καὶ τὰ δεσμά, ὁ Ὀδυσσεύς μετὰ τῶν ἑταίρων ἐπλευσεν πορρω¹⁶ καὶ τέλος¹⁷ εἰς τὴν Ἴθακὴν ἦλθεν.

[20 marks]

¹ ἐγγυς - near (+ genitive)

² ἀοιδῆ-ης - song

³ ἀειδῶ - I sing

⁴ ἀναγκαζῶ - I force, compel

⁵ ἀκουσαντάς - 'when they heard it'

⁶ ἐπιλανθανεσθαι (+ genitive) 'to forget' (infinitive)

⁷ ἑταῖρος, ἑταίρου (m) - companion

⁸ πληροῦν - 'to fill'

⁹ οὖς, ὠτος (n) - ear

¹⁰ κηρός, κηρου (m) - wax

¹¹ δεσμά, δεσμιῶν (n.pl) - bonds

¹² οὕτως - thus, in this way

¹³ κινεῶ - I move

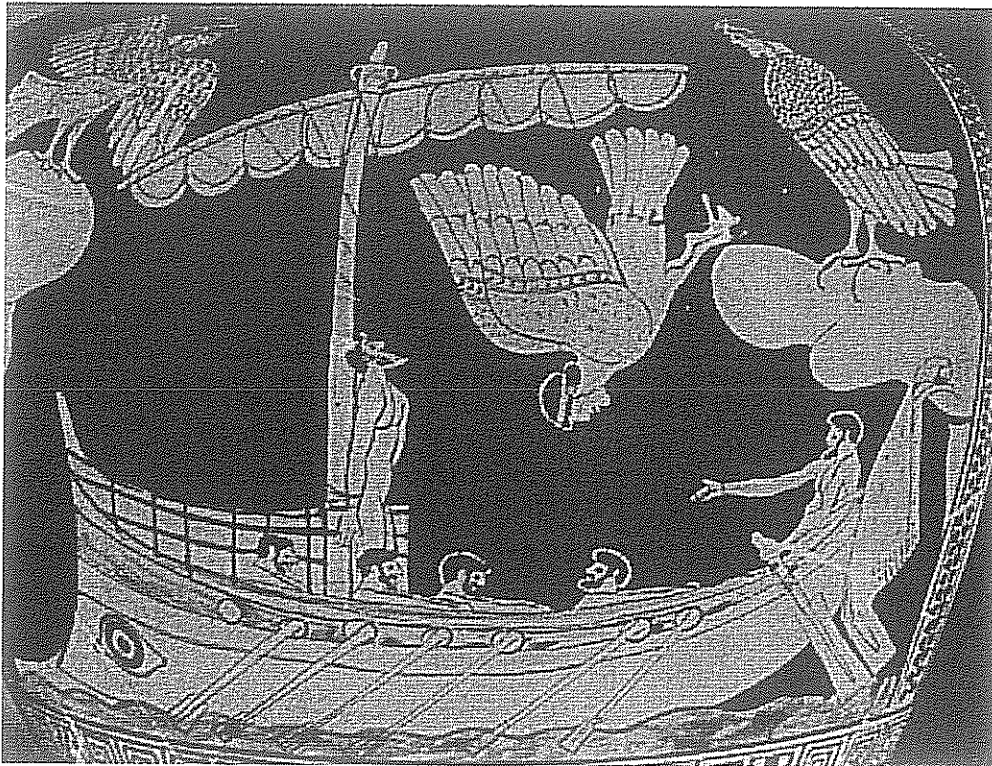
¹⁴ ἀνευ (+ genitive) - without

¹⁵ ληθῆ, ληθῆς (f) = forgetfulness

¹⁶ πορρω (advb) - further on, past

¹⁷ τέλος (advb) - finally, at last

The following image from an Ancient Greek Vase may help you to picture what is going on in the story of Odysseus and the Sirens.



Notice that this artist imagines the Sirens to be like birds with human heads.

