

# Undergraduate Admissions Assessment March 2018

## TEST 2 - (Sections A, B2 and C). Three Hour Assessment.



The UG Admissions Assessment (UGAA) gives Admissions Tutors the opportunity to see a sample of the applicant's original work, produced under examination conditions, and seeks to assess applicants from a variety of backgrounds in a fair and equitable manner.

The assessment has three sections: comprehension exercises (**Section A**); essay questions (**Section B**); and mathematical problems (**Section C or D**). The purpose is to assess the applicant's English language and mathematics abilities. *It is not an assessment of general knowledge.* The following criteria are of particular importance:

- Clarity and precision of language
- Sophisticated vocabulary
- Logical structure and argument
- Mathematical accuracy, techniques and conceptual understanding

**Before beginning the assessment, please read the following guidance and instructions carefully.**

Depending on the course to which you have applied, you have been entered for Test 1 or 2. Before beginning the assessment please check that you have received the correct paper. A list of courses and corresponding papers can be found overleaf.

The assessment lasts three hours and **all three sections must be completed**. The marks for each section are weighted according to the paper. More time should be spent completing the sections with more marks attached. However, please note that to pass the UGAA a minimum grade in *all three sections* is required, as well as a good grade overall.

**Test 1:** Section A (25%), Section B1 (25%), Section D (50%)

**Test 2:** Section A (25%), Section B2 (50%), Section C (25%)

### **Answer Booklets**

You must use the **BLUE** booklet for Sections A and B (English Sections) and the **CREAM** booklet for Sections C or D (Maths Sections).

When answering the maths questions, you must show your working out, as well as your final answer.

- Dictionaries may **NOT** be used
- Hand-held calculators **MAY** be used.

If a calculator is used please indicate on the answer booklet the type used (e.g. TI.500)

# Test Papers

## TEST 1

BSc Actuarial Science (N321)	BSc Geography with Economics (L7L1)
BSc Economics (L101)	BSc Management (N200)
BSc Economics with Economic History (L1V3)	BSc Mathematics and Economics (GL11)
BSc Econometrics and Mathematical Economics (L140)	BSc Mathematics with Economics (G1L1)
BSc Economic History with Economics (VL31)	BSc Mathematics, Business, and Statistics (G0N0)
BSc Economics and Economic History (V3L1)	BSc Philosophy and Economics (LV15)
BSc Environmental Policy with Economics (F9L1)	BSc Philosophy, Politics and Economics (LOV0)
BSc Finance (N300)	BSc Social Policy and Economics (LLK1)
BSc Financial Mathematics and Statistics (GN13)	BSc Statistics with Finance (G3N3)
BSc Government and Economics (LL12)	

## TEST 2

BSc Accounting and Finance (NN34)	LLB Law (M100)
BA Anthropology and Law (ML16)	BSc Philosophy, Logic, and Scientific Method (V503)
BSc Economic History (V300)	BSc Politics and Philosophy (LV25)
BSc Economic History and Geography (V3L7)	BSc Politics and International Relations (L290)
BSc Environment and Development (FK84)	BA Social Anthropology (L601)
BA Geography (L702)	BSc Social Anthropology (L603)
BSc Government (L230)	BSc Social Policy (L400)
BSc Government and History (LV21)	BSc Social Policy with Government (LL42)
BA History (V146)	BSc Social Policy and Sociology (LL34)
BSc International Relations (L250)	BSc Sociology (L301)
BSc International Relations and History (VL12)	

**Please check you have received the correct paper. If you think you have received the wrong paper please notify the invigilator immediately.**

# **The Undergraduate Admissions Assessment**

## **TEST 2**

**This page is left intentionally blank.**

## Section A

- **All** candidates should complete this section.
- This section has **one** question only.
- The marks achieved in this section account for **25%** of your final exam result.

### Instructions:

Write a summary (précis) of the following passage, **in not more than 150 of your own words**. You must write a summary, not a discussion of the passage. No credit will be given for answers made up of sentences extracted from the original passage.

President Trump, whose first year in office saw near-constant turmoil and division, claimed Tuesday that he has ushered in an ebullient “new American moment” and issued a summons for “the unity we need to deliver for the people we were elected to serve.”

The conciliatory tone of Trump’s first State of the Union address was sharply at odds with the combative manner in which he has conducted his presidency — and with the tension evident between Republicans and Democrats in the Capitol, where he spoke....

The president set an ambitious agenda for his second year in office, from a \$1.5 trillion plan to rebuild the nation’s crumbling infrastructure to a four-pronged immigration package to a pledge to reduce prescription drug prices. His one-hour, 20-minute speech was the longest since Bill Clinton’s State of the Union address in 2000.

The president laid out details of his immigration package, offering citizenship for undocumented immigrants brought to the United States as children, who are known as “dreamers,” in return for increased spending on border security, including for his promised wall at Mexico’s border; an end to the visa lottery; and limits on family reunification policies.

Trump used some of his most polarizing language when lamenting crime from MS-13 and other gangs, which he blamed on “open borders.” He sought to repurpose the term “dreamer” by saying American citizens have seen their economic prospects dimmed and personal safety put at risk because of illegal immigration.

“Trump calls for unity, pushes GOP agenda in State of the Union speech,” *Washington Post*, 30 January 2018

## Section B2

- Complete Section B2 **ONLY** if you are completing Maths Section C.
- The marks achieved in this section account for **50%** of your final exam result.

**Instructions:**

Write **ONE** essay from the following three choices:

1. What are the main political consequences of the rise of social media?
2. Should multinational companies do more than just maximise their profits?
3. To what extent, and why, is democracy under threat?

## Section C

- The marks achieved in this section account for **25%** of your final exam result.
- All answers must be given to 3 significant figures unless stated otherwise in the question.
- All working must be clearly shown.

### Instructions:

This section has **four** questions, with a total of **100 marks**. Answer **all** questions in this section.

### Question 1

This table shows the people who **do not** have access to safe drinking water in three countries in 2015.

Country	Percentage of population without access to safe water	Number of People (in millions) without access to safe water	Total Population of the country (in millions)
A	60 %	$x$	8.09
B	$y$	76	1320
C	43 %	42	$z$

- a) Find  $x$  (the number of **people** in country A who do not have access to safe water). *(2 marks)*
- b) Find  $y$  (the **percentage** of the population in country B do not have access to safe water). *(2 marks)*
- c) Find  $z$  (the **population** of country C). *(3 marks)*

The following table shows the percentage of the world's population since 1990 without access to safe drinking water and the world population between 1990 and 2015

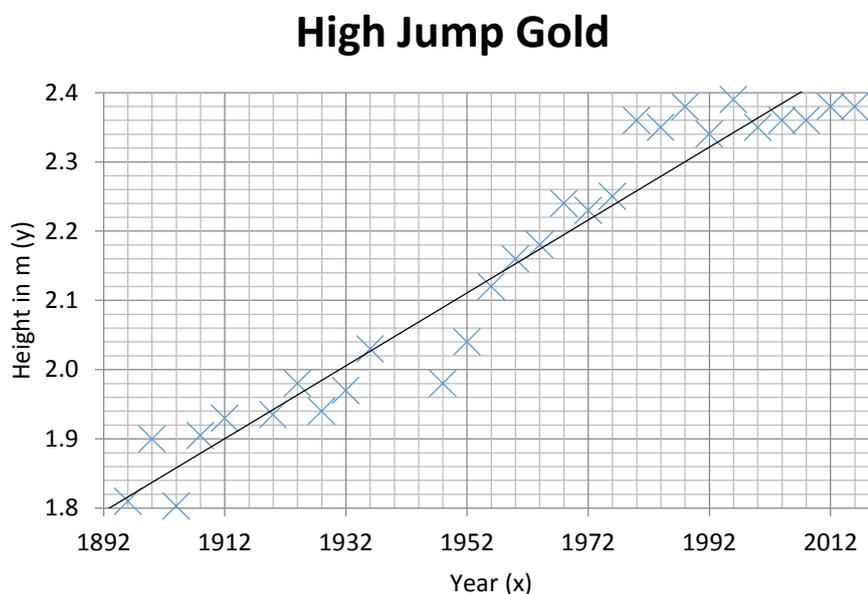
Year	1990	1995	2000	2005	2010	2015
Percentage	23.6 %	20.7 %	17.5 %	14.4 %	11.6 %	9.1 %
Population (in billions)	5.3	5.7	6.1	6.5	7.0	7.4

- d) How **many people** in **1990** did not have access to safe drinking water? *(2 marks)*
- e) Was the number of people in 2015 without access to safe drinking water **more or less** than it was in 2010 and by **how many**? *(3 marks)*

- f) Use your answer to e) to find the **percentage change** in the number of people without access to safe drinking water from 2010 to 2015?  
(3 marks)
- g) During which 5 year period did the population of the world increase the most?  
(1 mark)
- h) Calculate the percentage increase in the world population from 2010 to 2015.  
(2 marks)
- i) Assuming the population continues to grow at the same rate use your answer to h) to estimate the world population in 2020 and 2050.  
(5 marks)
- j) Over the 25 years the **percentage** of the world without access to safe drinking water has fallen.  
i) On average by what **percentage** has it fallen **per year** over this period?  
(2 marks)  
ii) Assuming the percentage falls at this average rate estimate the percentage of the population who will not have access to safe drinking water in 2020.  
(2 marks)
- k) Using the same fall in percentage per year, in what year would everyone have access to safe drinking water if current trends continue?  
(3 marks)
- Total 30 marks**

## Question 2

The scatter graph below shows the men's high jump gold medal heights set at the Olympic Games from 1896 to 2016.



The gold medal height for 1952 was 2.04m.

- a) What was the gold medal height in 1904?  
(1 mark)
- b) In what **year** was the gold medal height 1.9 m?  
(1 mark)

Jack has drawn a line of best fit as shown.

- c) Write down the coordinates of a gold medal result that lies on this line.

(1 mark)

Jack finds the equation of his line in the form  $y = mx + c$

- d) i) Find the **gradient** of Jack's line showing your working clearly.

(2 marks)

- ii) Use your answer to c) and d)i) to find the equation of Jack's line in the form

$$y = mx + c$$

(4 marks)

e)

- i) Use your answer to d)ii) to **estimate** the gold medal height for 2020

(2 marks)

- ii) Give a reason why your answer to e)i) is **not** a good estimate

(1 mark)

- f) Looking at the results for games after 1980 only Jack finds the equation of a new line of best fit as

$$y = 0.000470x + 1.43$$

Use Jack's new equation to

- i) estimate the gold medal height for 2020

(2 marks)

- ii) find the year when the gold record would be 2.5m

(3 marks)

- g) In which year would both the equation you found in d) and Jack's new equation in f) give the same estimate?

(4 marks)

Total 21 marks

### Question 3

- a) Up to the end of 2017 **8.3 billion tonnes** of plastic have been made in total.  
Write this number out in full. *(1 mark)*
- b) Up to the end of 2017 **6.3 billion tonnes** of plastic **waste** have been produced in total.  
What **percentage** of the plastic produced has ended up as **waste**? *(2 marks)*
- c) **Of the plastic waste** 79% is in landfill or in the natural environment, 12% has been incinerated and the rest has been recycled.  
Work out **how many tonnes** of plastic have been **recycled**. *(3 marks)*
- d) It is estimated that by 2050 a total of **12 billion tonnes** of plastic will be in landfill or in the natural environment. **Assuming** that this is still 79% of the plastic waste, work out **how many billions of tonnes of plastic waste** will have been produced in total by 2050. *(3 marks)*
- e) Use your answers to b) and d) to estimate **how many billions of tonnes** of plastic will have been made by 2050. *(3 marks)*

Most of the plastic waste comes from drink bottles.

- f) It is estimated that there were **480 billion drinks** bottles sold in 2017.
- i) Using that estimate how many (on average) were sold **each minute**? *(3 marks)*
- ii) 7% of the bottles sold in 2017 were recycled into replacement bottles for 2018. Each recycled bottle makes 1 new bottle. How many billions of new bottles have been created by recycling old ones? *(2 marks)*
- iii) If the demand for plastic drinks bottles increases by 0.9% per year how many billions of bottles will be needed in 2018? *(2 marks)*
- iv) Use your answers to ii) and iii) to estimate how many billions of **completely new** (not recycled) bottles would need to be produced in 2018? *(1 mark)*
- v) Assume the increase in demand for bottles increases at the same rate and that 7% are recycled each year to use the following year. How many billions of **completely new** bottles will be produced in 2020? *(5 marks)*

*(5 marks)*  
**Total 25 marks**

#### Question 4

Ice cream cones come in a variety of shapes and sizes.

A soft ice cream seller *Softie* has 3 sizes of cones: Small, Medium and Large.

He fills each cone with ice cream and puts the same amount on top so that the ice cream used is **double** the volume of the cone.



The formula for the volume of a cone is:  $\frac{1}{3}\pi r^2 h$  where  $r$  is the radius and  $h$  is the height.

For this small cone the radius is 20mm and the height 78 mm.

a)

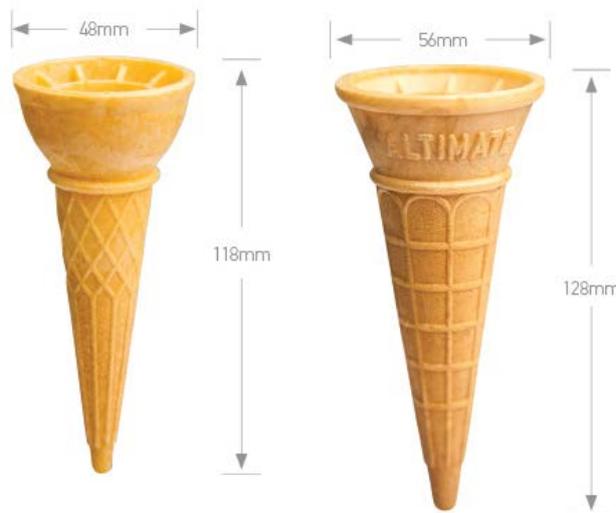
- i) Calculate the volume of the cone shown in  $\text{cm}^3$
- ii) Hence calculate the volume of ice cream used.

(3 marks)

(2 marks)

- b) Calculate the volume of ice cream used for the medium and large cones as shown below, giving your answer in  $\text{cm}^3$

(4 marks)



A different ice cream seller *Freezie* sells hard ice cream that comes in roughly spherical scoops.

The diameter of each scoop is the same as the diameter of the large cone used by *Softie*.

The formula for the volume of a sphere is  $\frac{4}{3}\pi r^3$ , where  $r$  is the radius.



- c) Calculate the volume of ice cream in 1 scoop **in cm<sup>3</sup>** *(3 marks)*
- d) How many complete scoops should *Freezie* use to be the nearest equivalent for each of the medium and large cones that *Softie* sells? Explain your reasoning carefully. *(4 marks)*
- e) *Freezie* is thinking of making his scoops larger. What radius should he use to give the equivalent ice cream as a large *Softie* ice cream cone in a single large scoop? *(4 marks)*
- f) *Softie* is thinking of making a new sized cone so that his ice cream is equivalent to the amount in 3 scoops of *Freezie* ice cream. Suggest some suitable dimensions for his new cone. *(4 marks)*
- Total 24 marks**

**End of Test**