

# Exponential Growth & Decay

## Difficulty: Hard

### Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Number
Sub-Topic	Exponential Growth & Decay
Paper	Paper 2
Difficulty	Hard
Booklet	Question Paper 1

**Time allowed:** 28 minutes

**Score:** /22

**Percentage:** /100

#### Grade Boundaries:

##### CIE IGCSE Maths (0580)

A*	A	B	C	D	E
>88%	76%	63%	51%	40%	30%

##### CIE IGCSE Maths (0980)

9	8	7	6	5	4	3
>94%	85%	77%	67%	57%	47%	35%

## Question 1

Marcel invests \$2500 for 3 years at a rate of 1.6% per year simple interest.

Jacques invests \$2000 for 3 years at a rate of  $x\%$  per year compound interest.

At the end of the 3 years Marcel and Jacques receive the same amount of interest.

Calculate the value of  $x$  correct to 3 significant figures.

[5]

## Question 2

The population of the world grows exponentially at a rate of 1.1% per year.

Find the number of years it takes for the population to grow from 7 billion to 7.31 billion.

Give your answer correct to the nearest whole number.

[2]

### Question 3

It is estimated that the world's population is growing at a rate of 1.14% per year. On January 1st 2014 the population was 7.23 billion.

(a) Find the expected population on January 1st 2020. [2]

(b) Find the year when the population is expected to reach 10 billion. [2]

## Question 4

At the start of an experiment there are 20000 bacteria.  
The number of bacteria increases at a rate of 30% per hour.

(a) Work out the number of bacteria after 4 hours. [2]

(b) After how many **whole** hours, from the start of the experiment, will the number of bacteria be greater than one million?

[2]

## Question 5

Boris invests \$280 for 2 years at a rate of 3% per year compound interest.

Calculate the interest Boris receives at the end of the 2 years.

Give your answer correct to 2 decimal places.

[4]

## Question 6

Zainab borrows \$198 from a bank to pay for a new bed.

The bank charges compound interest at 1.9 % per month.

Calculate how much **interest** she owes at the end of 3 months.

Give your answer correct to 2 decimal places.

[3]