**Revision questions part 2 (3.1.8 – 3.1.11)**

These questions have been written by an AQA examiner but they are not necessarily in the same style as the questions in the exam. They are intended to help your revision by checking that you understand and can use, in a context, some key parts of the specification.

**3.1.8 Lifestyle and Health**

**Ways of expressing health risks - a summary**

Our chances of suffering adverse health effect can be reported in different ways:

**The rate** - maternal mortality (death due to childbirth) is 12 per 100 000 births (UK)

**The risk** - the risk of dying in childbirth in the UK is 1 in 8333

A change in risk can be shown using either:

**Percentage change –** the death ratechanged from 10 per 100 000 in 1986 to 12 in 2004. This is a 2 x100/10 = 20% increase in risk. (factors include a rise in obesity)

**Relative risk** – The relative risk in 2004 compared to 1986 is 12/10 =1.2

1. Too much salt in the diet is a known risk factor for stroke and heart disease.

a) In a population of men, aged 50 and over, with a diet containing 5mg salt a day, the rate of stroke is 300 per 10 000.

In those eating 10mg salt a day the rate of stroke is 370 per 10 000.

i) Calculate the risk as 1 in ... for men eating 5mg of salt a day.

ii) What is the increase in the rate of stroke in those eating 10mg a day?

iii) Calculate the percentage increase in risk from the extra salt.

iv) Express the increased risk as a relative risk.

b) The death rate from coronary heart disease, CHD, in a population eating 3mg of salt a day is 40 per 100 000.

Raising salt consumption by 5mg a day is believed to increase the risk of death from CHD by 45%

How many extra deaths of CHD per 100 000 would be expected in those eating 8mg of salt a day?

2 a) Lack of vitamins increases the risk of disease A by 80%.

High alcohol consumption increases the risk of disease B by 5%.

A has an incidence rate of 5 per 10 000.

B has an incidence rate of 300 per 10 000

Does lack of vitamins or high alcohol present a greater risk to health in this population? (You will need to calculate the number of extra cases of diseases A and B.)

b) In the light of your answer to (a) discuss whether you think the media should discuss risk factors in terms of percentage change or numbers affected.

**Note:** In the resources for this topic there are several exam style questions on techniques for establishing risk and on analysis of data from such studies. You should ensure that you can answer these questions.

**3.1.9 Evolution**

These questions focus on the science because this seems to often present difficulties. How science works ideas, particularly Developing and Testing Science Explanations are also important.

Darwin’s theory proposes that all life on earth evolved over about 3.5 billion years, from a common origin, by natural selection. All the species which now exist and those that have become extinct can be linked in a single ‘branching tree’ structure.

Natural selection is explained by the following four ideas

* Individuals within a species differ from one another
* Some of this variation between individuals is inherited by offspring
* In every generation there are more offspring than can survive to adulthood and then reproduce.
* Some individuals are more likely to survive and reproduce because, as a result of the inherited variation, they are better suited to their environment.

1. How would you explain each of the following using Darwin’s theory?

a) All known life forms use the same four base genetic code.

b) When a population of bacteria is exposed to antibiotics some individuals die very rapidly whilst others survive.

c) When the survivors of this population of bacteria are again treated with the same antibiotic most survive.

d) The HIV virus in a patient can become resistant to an anti-viral drug in as little time as 3 weeks. It takes much longer for an insect to become resistant to a insecticide.

e) The genome of humans is more similar to that of chimpanzees than it is to that of mice.

f) Modern humans have larger brains than extinct human-like species.

2. Read the passage below and answer the questions.

**Elephants get a helping hand from Evolution**

Evolution is saving elephants in Africa by producing herds with tiny tusks or none at all – which provides no profit for poachers and thus ensures the survival of the species. This phenomenon has been noticed in all parts of Africa where hunting has been going on longest, with both trophy hunters and poachers always shooting the elephants with the biggest tusks. In the 1930s lack of tusks was regarded as a rare mutation.

Lack of tusks is not all good news for elephants, however. Bulls fight for the right to mate with females, and in this respect large tusks are a big advantage. An additional advantage is that tusks are used as tools, particularly in the dry season, for digging in river beds looking for water.

a) Elephants evolved with large tusks but the arrival of poachers and hunters changed the environment for elephants. Use Darwin’s theory of natural selection to explain how this change in the environment leads to a change in the characteristics of elephants.

(4 marks)

b) Predict the tusk sizes of elephants in Africa in 500 years time if poaching and hunting are allowed to continue. Give reasons for your prediction.

(2 marks)

c) Predict the tusk sizes of elephants in Africa in 500 years time if all poaching and hunting stopped now. Give reasons for your prediction.

(2 marks)

d) i) Explain the meaning of the term *mutation* used in the text.

(1 mark)

ii) Explain why the idea of mutation is important to a theory of evolution.

(2 marks)

**3.1.10 The Universe**

1. The Earth is a planet that orbits the Sun under the influence of gravity. The Sun is a star and continuously emits large amounts of energy as radiation. The Sun is part of a galaxy called the Milky Way. Light takes about 100 000 light years to cross the Milky Way. The Universe consists of many galaxies, current estimates of the total number vary between 100 billion and 500 billion. These galaxies are moving apart from each other at an ever increasing rate.

1. Name two other planets.
2. What is meant by *gravity*?
3. What is meant by the term *galaxy*?
4. We see the Moon as a white object. What is the source of the white light?
5. We can observe other stars but it is much harder to know whether there are planets orbiting these stars. Why?
6. Why is there so much uncertainty about the number of galaxies in the Universe?

2. The Big Bang is believed to have happened about 13.7 billion years ago.

1. Explain what is meant by the Big Bang theory.
2. Describe one piece of evidence that supports the Big Bang theory.
3. Scientific theories make predictions that can be tested. Some of the predictions made by the big Bang theory have **not** been borne out by observation. Describe one such observation.
4. Why did scientists not abandon the Big Bang theory when one of its predictions turned out to be false?