GCSE Biology B (Twenty First Century Science)

J257/03 Breadth in Biology (Higher)

Question Set 5

1 Cancer is a non communicable disease.

(i) Describe what causes cancer.

Uncontrollable rapid cell division by mitosis which leads to a tumour. **[2]**

(ii) Identify **one** factor that could increase a person's risk of developing cancer.

Obesity **[1]**

(iii) In the past it has been estimated that 1 in 3 people will develop cancer in their lifetime.

Recent estimates suggest the ratio is 1 in 2.

The UK population is 65 640 000.

If the **recent estimate** is correct, how many people can be expected to develop cancer?

Give your answer to **2** significant figures.

$\frac{65,640,000}{2} = 32,820,000 = 33,000,000$

$= 3.3 \times 10^7$

Number of people = ... 3.3×10^7 ..... **[2]**

(iv) Suggest why the figure calculated in **(a)(iii)** will be an estimation.

Because the orisinal figures are an estimate. **[1]**

(b) Cancer of the ovaries is a common type of cancer. Most women diagnosed with cancer of the ovaries will have an operation to remove their ovaries.

(i) Before the operation, the doctor will discuss the risks of the operation with the patient. This is a high risk operation.

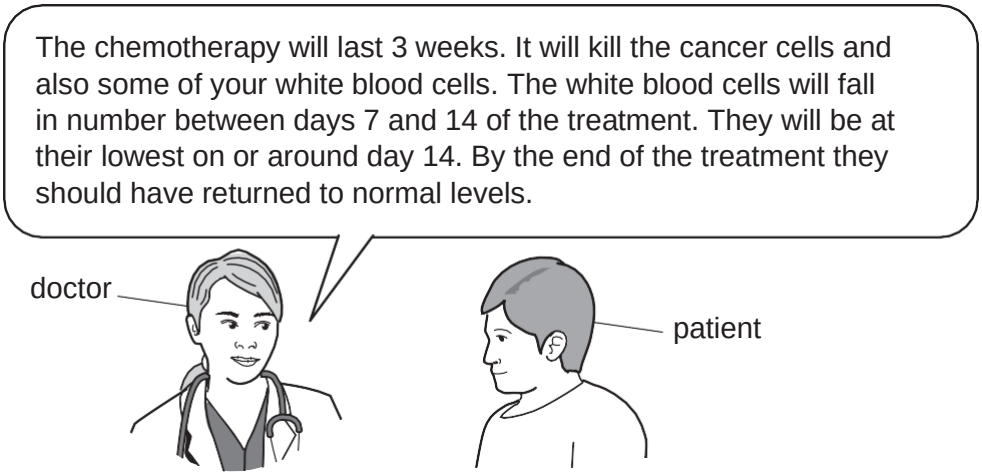
Suggest why a patient would decide to go ahead with this operation.

Risk of death from cancer higher than risk of death from surgery. **[1]**

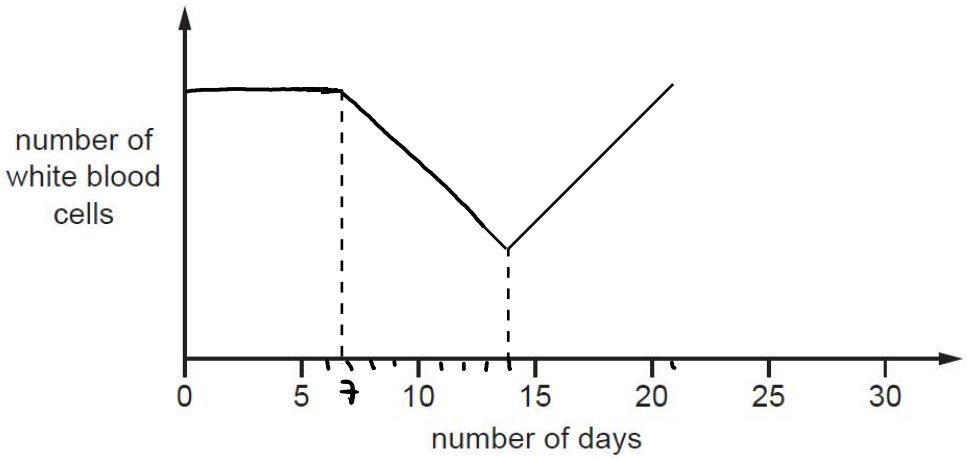
After surgery, the patient may have chemotherapy to kill any remaining cancer cells.

Chemotherapy also kills white blood cells.

A doctor describes this effect to the patient.



(ii) Draw a line graph on the axes below to show what happens to the number of white blood cells during each cycle of chemotherapy.



[2]

(iii) During the chemotherapy treatment, the patient is advised to seek urgent medical attention if they become ill and have a raised temperature.

Suggest between which days the patient is most at risk of becoming ill.

Use data from the graph in your answer. Day 14 **[1]**

(iv) Why is a high temperature in the human body a problem? **[3]**

Will cause enzymes to denature and as all reactions in human body are controlled by enzymes the rate of reactions will slow down too much.

(c) New drugs and treatments have to go through rigorous clinical trials.

A clinical trial was conducted to see if using a particular combination of chemotherapy drugs increased survival rates for a type of cancer of the ovaries. The two drug combinations being tested were:

- drugs 1 and 2
- drugs 3 and 4.

(i) The table shows some details of the clinical trial design.

Use your knowledge of clinical trials to justify each part of the design.

Design	Justification
Only women took part in the trial.	Men do not get ovarian cancer.
All women who took part in the trial had ovarian cancer.	Testing for drug effectiveness so patients have to have cancer.
A placebo was not used.	Unethical as patient needs treatment.
An open trial was conducted.	Patient needs to agree to have treatment

[4]

The results of the trial are shown in the table.

	Group A (Drugs 1 and 2)	Group B (Drugs 3 and 4)
Number of women who took part in the trial.	305	314
Number of women who were still alive two years after treatment.	247	222
Most severe side effects.	• A drop in total blood cell number • Nerve damage • Joint pain	• Loss of appetite • Diarrhoea • Feeling or being sick • High temperature • Low white blood cell number

(ii) Use the information in the table to recommend which drug combination the doctors should use.

Justify your decision.

[2]

Group A as a higher percentage of women survived. Cancer death rate is high so increased survival outweighs the risk of severe side effects.

(iii) Explain why scientists should communicate findings such as these to a range of audiences. Because it raises awarness. **[1]**

(d) Scientists have been developing the use of monoclonal antibodies in cancer treatment.

Monoclonal antibodies specific to a cancer cell antigen are produced and are injected into the blood of a cancer patient.

Describe how monoclonal antibodies are used to treat cancer. **[3]**

Antibodies bind to cancer antigens which tags these cancer cells for attack by white blood cells. This allows substance to be delivered only to cancer cells which are then destroyed by white blood cells.

Total Marks for Question Set 5: 23