1. Carcinogen **W** can cause changes in tumour suppressor genes, **X**. This can lead to uncontrolled cell division and the formation of a tumour which may spread to other parts of the body forming **Y**.

   Which of the following responses correctly identifies **W**, **X**, and **Y**?

	W	X	Y
A	Nicotine	Ras	mutations
B	Asbestos	P53	metastases
C	Tar	Ras	metastases
D	Benzopyrene	P53	mutations

   Your answer [　]

   [1]

2. A patient with cancer is about to have a scan involving the use of a radioactive injection. Which of the following scans is this patient going to have?

   A CAT
   B Mammogram
   C MRI
   D PET

   Your answer [　]

   [1]

3. Radiotherapy is a widely-used method of cancer treatment.

   Cancer cells are more sensitive to radiotherapy than healthy cells.

   Which of the options, **A** to **D**, is a property of cancer cells that causes increased sensitivity to radiotherapy?

   A faster division rate than healthy cells
   B faster mutation rate than healthy cells
   C altered metabolic pathways
   D impaired oxygen uptake

   Your answer [　]

   [1]

4.   Which of the options, **A** to **D**, is a cancer therapy that damages **only** cancer cells?

      A   chemotherapy

      B   immunotherapy

      C   radiotherapy

      D   surgery

      Your answer   **[1]**

5. The table below shows the results of a survey investigating asthma in children from an urban population of China in 2010.

	Males	Females
Number in population	6096	5986
Number with asthma	352	199

Which of the options, **A** to **D**, is the correctly calculated percentage prevalence rate of asthma in this population of children?

A 5.7%

B 3.3%

C 5.5%

D 4.6%

Your answer [ ]

[1]

6. *HER-2/neu* is a type of gene that produces a protein involved in regulating the normal growth of breast cells.

A mutation in the *HER-2/neu* gene causes large quantities of this protein to be produced which leads to the development of breast cancer.

Which of the statements, **A** to **D**, is correct?

A   *HER-2/neu* is a proto-oncogene that becomes an oncogene when it is mutated.

B   *HER-2/neu* is a tumour suppressor gene that becomes an oncogene when it is mutated.

C   *HER-2/neu* is an oncogene that becomes a proto-oncogene when it is mutated.

D   *HER-2/neu* is a tumour suppressor gene that becomes a proto-oncogene when it is mutated.

Your answer [ ]

[1]

7.   The following information describes a screening technique that can be used for detecting breast cancer:

•   The patient must first be injected with a radioactive tracer.
•   The scanner detects gamma radiation.
•   The coloured images produced show differences between healthy and cancerous tissue.

Which of the screening techniques, **A** to **D**, is being described?

A   Magnetic resonance imaging (MRI)

B   Mammography

C   Positron emission tomography (PET)

D   Computerised tomography (CT)

Your answer   **[1]**

8. Here are three statements about the *BRCA1* gene:

     1   Women with mutations in *BRCA1* are at increased risk of breast cancer.

     2   *BRCA1* mutations can be inherited by males.

     3   *BRCA1* is a proto-oncogene.

Which of the statements is/are correct?

A   1, 2 and 3 are correct

B   Only 1 and 2 are correct

C   Only 2 and 3 are correct

D   Only 1 is correct

Your answer   [1]

END OF QUESTION PAPER

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
1			B	1	
			Total	**1**	
2			D	1	
			Total	**1**	
3			A	1	
			Total	**1**	
4			B ✔	1	**Examiner's Comments** This was a straightforward question which only demanded a small amount of biological knowledge.
			Total	**1**	
5			D	1	**Examiner's Comments** Candidates did have to process some information from a table in this question and choose appropriate values to perform a percentage prevalence calculation. Whilst candidates often struggle with such calculations in section **B**, this posed little problem for 80% of candidates who identified the correct response.
			Total	**1**	
6			A	1	**Examiner's Comments** This question proved challenging for some and required careful reading to choose the most appropriate response regarding the *HER-2/neu* gene.
			Total	**1**	
7			C	1	
			Total	**1**	
8			B	1	<u>**Examiner's Comments**</u> Almost all candidates opted for either A or B. However, *BRCA1* is a tumor suppressor gene.
			Total	**1**	