



LEVEL 3 CERTIFICATE/DIPLOMA

4463U10-1

MONDAY, 19 MAY 2025 – MORNING

MEDICAL SCIENCE

Unit 1: Human Health and Disease

2 hours plus your additional time allowance

Surname _____

First name(s) _____

Centre Number _____

Candidate Number 4 _____

Section A

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1 – 10.	24	
11.	9	
12.	8	
13.	20	
14.	23	
15.	6	
Total	90	

ADDITIONAL MATERIALS

You will need the resource folder that contains the pre-release article.

You will need a calculator and ruler for this examination.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces provided on the front cover.

Answer ALL questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

(Turn over)

INFORMATION FOR CANDIDATES

The total number of marks for this paper is 90.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

Questions in Section A are based on the pre-release article.

You should show your working to calculations.

SECTION A

Answer ALL questions.

- 1. Name THREE types of spots caused by acne.**

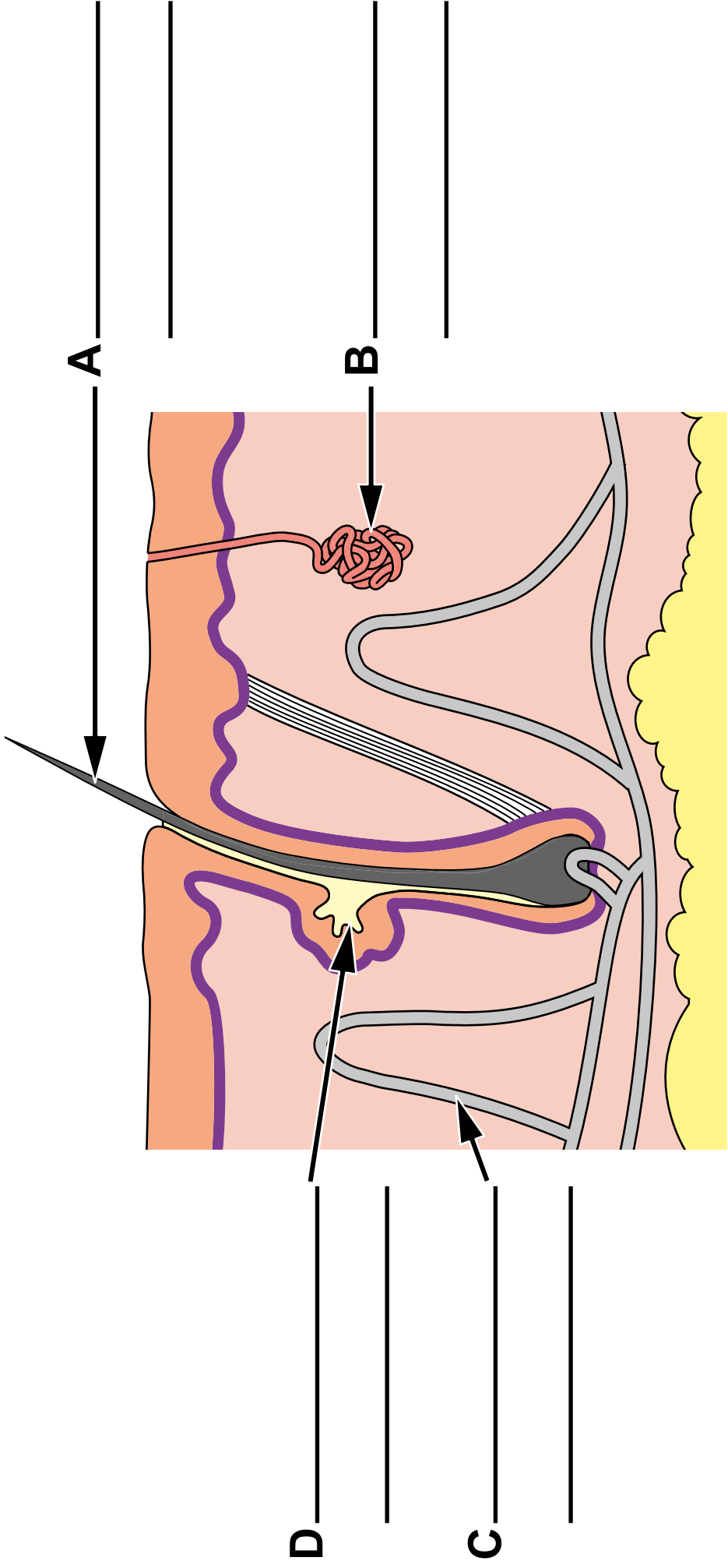
[1 mark]

(Turn over)

2. Describe how sebum and hormones contribute to acne. [2 marks]

Sebum: _____

Hormones: _____



3. Acne is a common skin condition. Label parts **A, B, C** and **D** on the vertical section of the skin opposite. [4 marks]

4. The skin provides a natural barrier to reduce the risk of infection. Describe **TWO OTHER** natural defence mechanisms and how the body uses these to reduce the risk of infection. [4 marks]

1. _____

2. _____

- 5. Suggest a reason for women being more likely to suffer from acne than men. [1 mark]**

- 6. During diagnosis, the severity of acne is categorised. Describe TWO symptoms of severe acne. [2 marks]**

1.

2.

7. Complete the table opposite about acne treatments. The first row has been completed for you. [3 marks]
8. State TWO lifestyle changes that a person could make in order to reduce acne. [1 mark]

- 9 (a) Suggest a reason for the decrease in the number of people with acne in different age groups in the UK in 2019, as seen in FIGURE 4. [1 mark]**

- (b) FIGURE 5 shows the prevalence of acne in the USA and Botswana.
Suggest TWO reasons to account for the differences in the data. [2 marks]**

1.

2.

(Turn over)

10 (a)

In 2022, 11.5% of adults in England were suffering from acne. Calculate the number of adults with acne in England in 2022 when the adult population was 43.7 million. [1 mark]

number of adults = _____

(Turn over)

10 (b)

NHS England spent £22.7 million on topical treatments for adult acne between February 2021 and January 2022. Use your answer to part (a) to calculate the cost of acne treatments per patient during this time. Give your answer in pence.

[2 marks]

cost per patient = _____ p

SECTION B

11. Bile is released into the small intestine to aid in the digestion of lipids.

(a) (i) State the site of production of bile. [1 mark]

(ii) Describe the function of bile during lipid digestion. [1 mark]

(iii) Name the enzyme responsible for the digestion of lipids. [1 mark]

(Turn over)

Process	Part of the digestive system
Site of the storage of bile.	Gall bladder
Site of the production and release of saliva.	
Site of the digestion of protein by peptidases.	
Secretes carbohydrases, proteases and lipases.	
Hydrolysis of starch begins here.	

11 (a) (iv)

State TWO classes of lipid. [2 marks]

1. _____

2. _____

(b) Complete the table opposite to give the name of ONE part of the digestive system where each process occurs. The first one has been done for you. [4 marks]

9

(Turn over)

12. Creutzfeldt-Jakob disease (CJD) is a rare and fatal condition caused by a prion which affects the nervous system.

(a) Name the part of the nervous system that is affected by CJD. [1 mark]

(b) State the class of biological molecule to which a prion belongs. [1 mark]

12 (c)

State TWO modes of transmission of the prion.

[2 marks]

1. _____

2. _____

(Turn over)

12 (d)

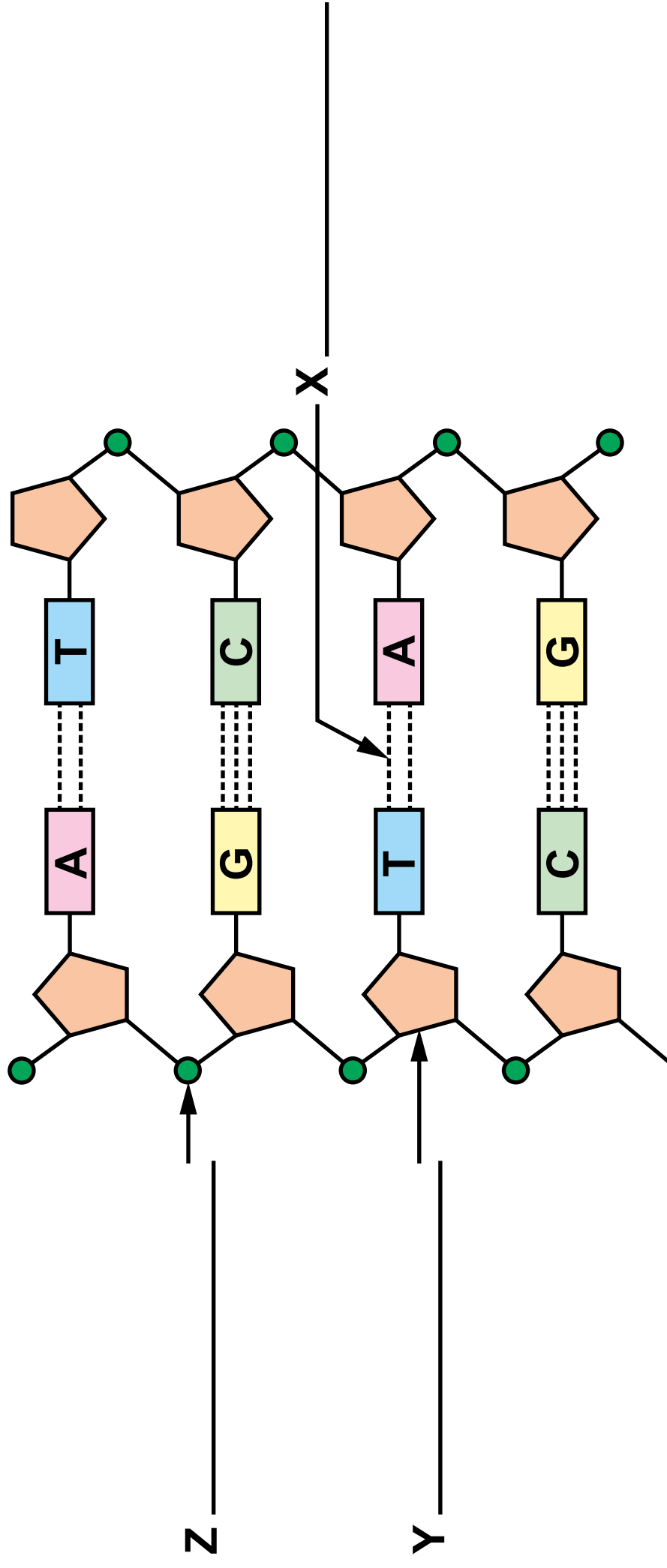
Suggest TWO ways that transmission can be reduced or prevented. [2 marks]

1. _____

2. _____

12 (e)

An EEG is a physiological test used to assess changes in the nervous system. Describe the principles of an EEG. [2 marks]



13. DNA is a nucleic acid.

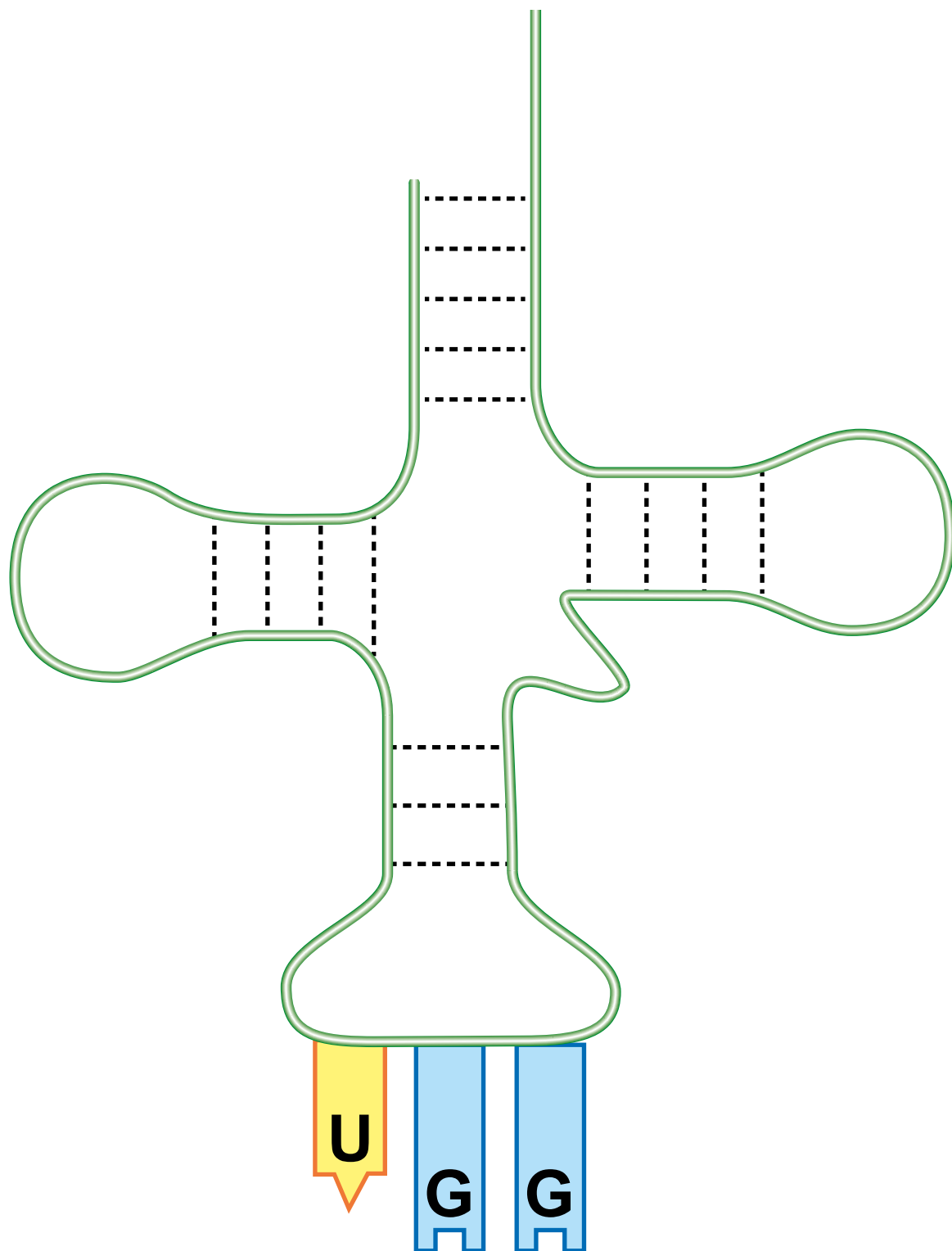
(a) Label the DNA molecule opposite. [3 marks]

(b) RNA is another type of nucleic acid. Give THREE differences between RNA and DNA. [3 marks]

1. _____

2. _____

3. _____



13 (c)

**The diagram opposite shows a tRNA molecule.
It is involved in protein synthesis.**

- (i) I. Name the stage of protein synthesis that uses tRNA. [1 mark]**

- II. Describe the role of tRNA in this stage. [2 marks]**

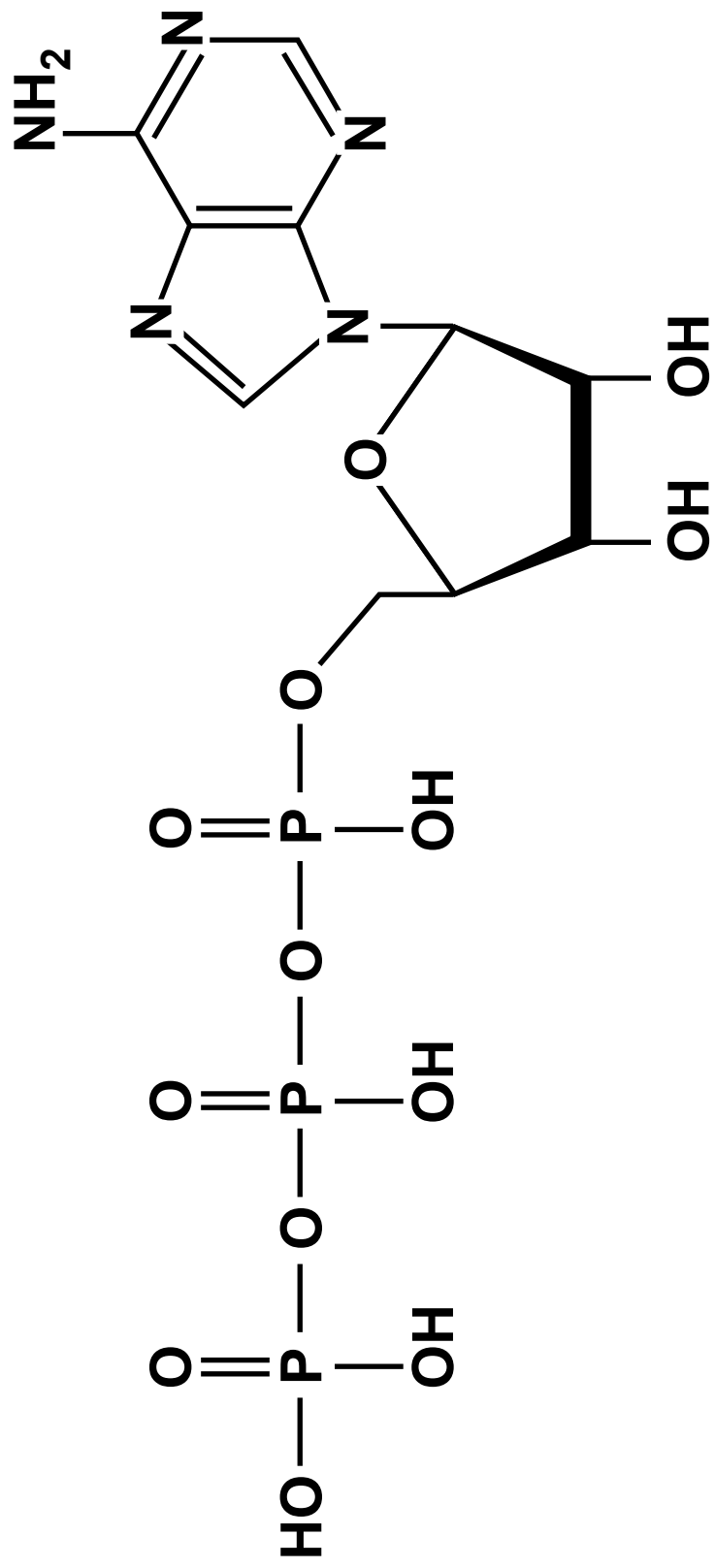
(Turn over)

13 (c) (ii)

Complete the table below for TWO other types of RNA molecule. [2 marks]

Name	Function
rRNA	
mRNA	

(Turn over)



13 (d)

The structure of ATP is shown opposite.

(i) Name the nitrogenous base found in ATP.

[1 mark]

ATP + water



+

13 (d) (ii)

Complete the equation opposite showing the formation of a molecule of ATP. [2 marks]

(iii) Name the type of chemical reaction that takes place during the formation of ATP. [1 mark]

13 (d) (iv)

Explain what is meant by the term ‘universal energy currency’ for ATP. [2 marks]

(v) State THREE biological processes that use ATP. [3 marks]

1.

2.

3.

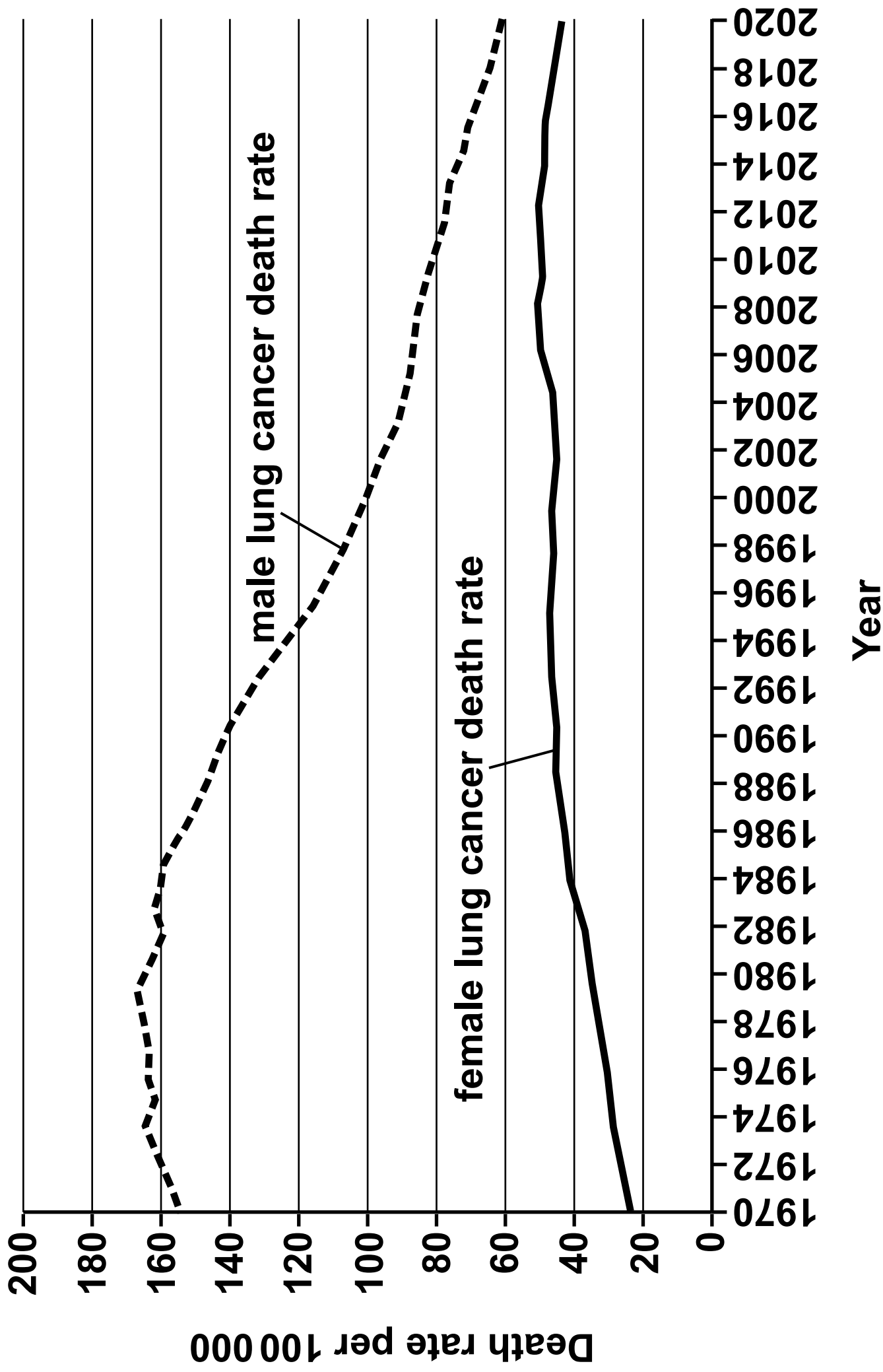
14. Lung cancer accounts for more deaths in the UK than any other cancer. Data for lung cancer deaths per year, per 100 000 population in the UK for selected years, can be seen in the table below.

Year	Number of deaths caused by lung cancer per 100 000 population.
1971	81
1981	87
1991	82
2001	68
2011	63
2019	55

- (a) (i) Draw a line graph to represent this data on the grid opposite. [4 marks]

14 (a) (ii)

Suggest a reason for the trend shown in your graph. [1 mark]



- (b) Smoking is a major contributor to the number of deaths caused by lung cancer.

The graph opposite shows the number of deaths from lung cancer per 100 000 population for males and females between 1970 and 2020.

Describe TWO trends in the data. [2 marks]

1. _____

2. _____

14 (c) (i)

Spirometry is a physiological test that can be used to identify patients at risk of developing lung cancer. Describe how this test is carried out.

[3 marks]

(Turn over)

14 (c) (ii)

Describe how another physiological test used to measure lung capacity is carried out. [4 marks]

14 (d)

The TRACERx research programme was set up in 2014 to study the genetics of lung cancer. It has recently acquired funding for the TRACERx EVO programme that aims to understand the evolution, diagnosis, prevention and treatment of lung cancer. Blood and tissue samples are collected from lung cancer patients for this study.

- (i) Name the TYPES of variables that would need to be considered for this research. [2 marks]**

(Turn over)

14 (d) (ii)

The participants were selected for this research by opportunity sampling. State ONE advantage and ONE disadvantage of this sampling method.

[2 marks]

Advantage: _____

Disadvantage: _____

(Turn over)

14 (d) (iii)

Describe TWO ethical considerations that would need to be considered before this research could take place. [2 marks]

1. _____

2. _____

14 (d) (iv)

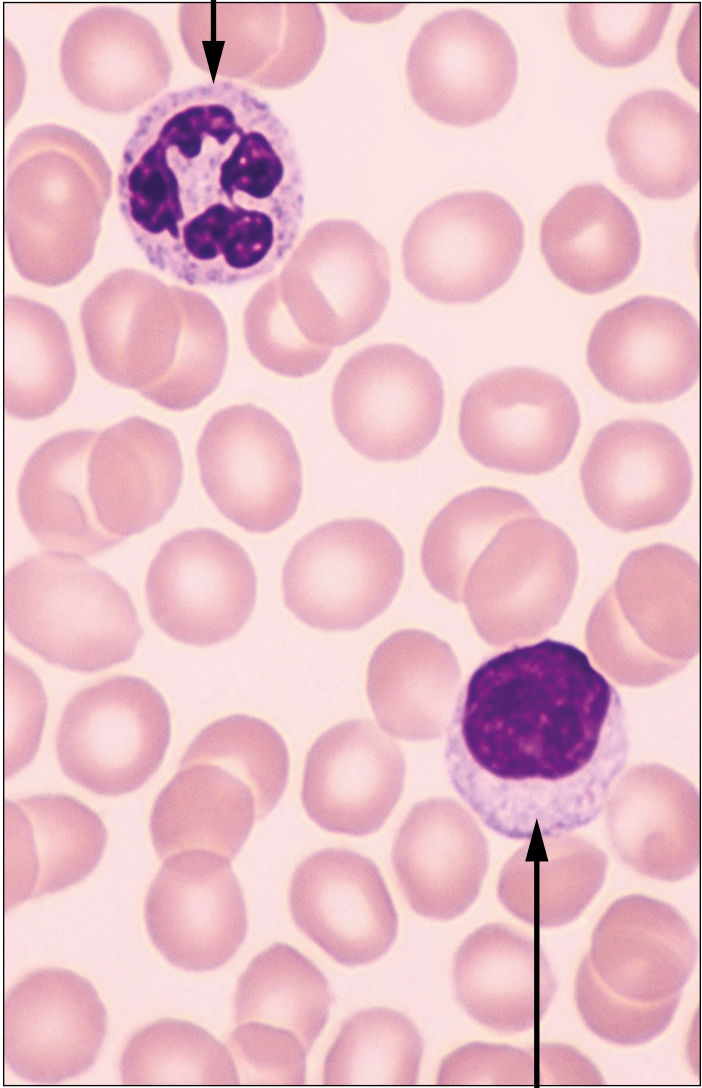
Scientists will evaluate the procedures used during the research.

State THREE aspects of the procedures that will be evaluated. [3 marks]

- 1.** _____

- 2.** _____

- 3.** _____



phagocyte

lymphocyte

15. The image of blood opposite shows a phagocyte and a lymphocyte. They are both important in defending the body against infection and are part of the immune system.

(a) Describe the roles of the following cells during the humoral immune response.

(i) Phagocyte: [1 mark]

15 (a) (ii)

Lymphocyte: [3 marks]

15 (b)

State TWO differences between cell-mediated and humoral immune responses. [2 marks]

1. _____
- _____
- _____
- _____
2. _____
- _____
- _____
- _____

END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

(Turn over)

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Name of treatment	How the treatment works	Length of course of treatment	Reason(s) why patients may not wish to use the treatment
benzoyl peroxide	reduces the number of bacteria on skin surface	6 weeks	can make skin more sensitive to UV light
topical retinoids			can make skin more sensitive to UV light
azelaic acid		minimum of 1 month	
	reduces the production of sebum	2–6 month course	

