

# Heart & Circulation

## Question Paper 3

<b>Level</b>	International A Level
<b>Subject</b>	Biology
<b>Exam Board</b>	Edexcel
<b>Topic</b>	Molecules, Transport and Health
<b>Sub-Topic</b>	Heart & Circulation
<b>Booklet</b>	Question paper 3

**Time Allowed:** 41 minutes

**Score:** /34

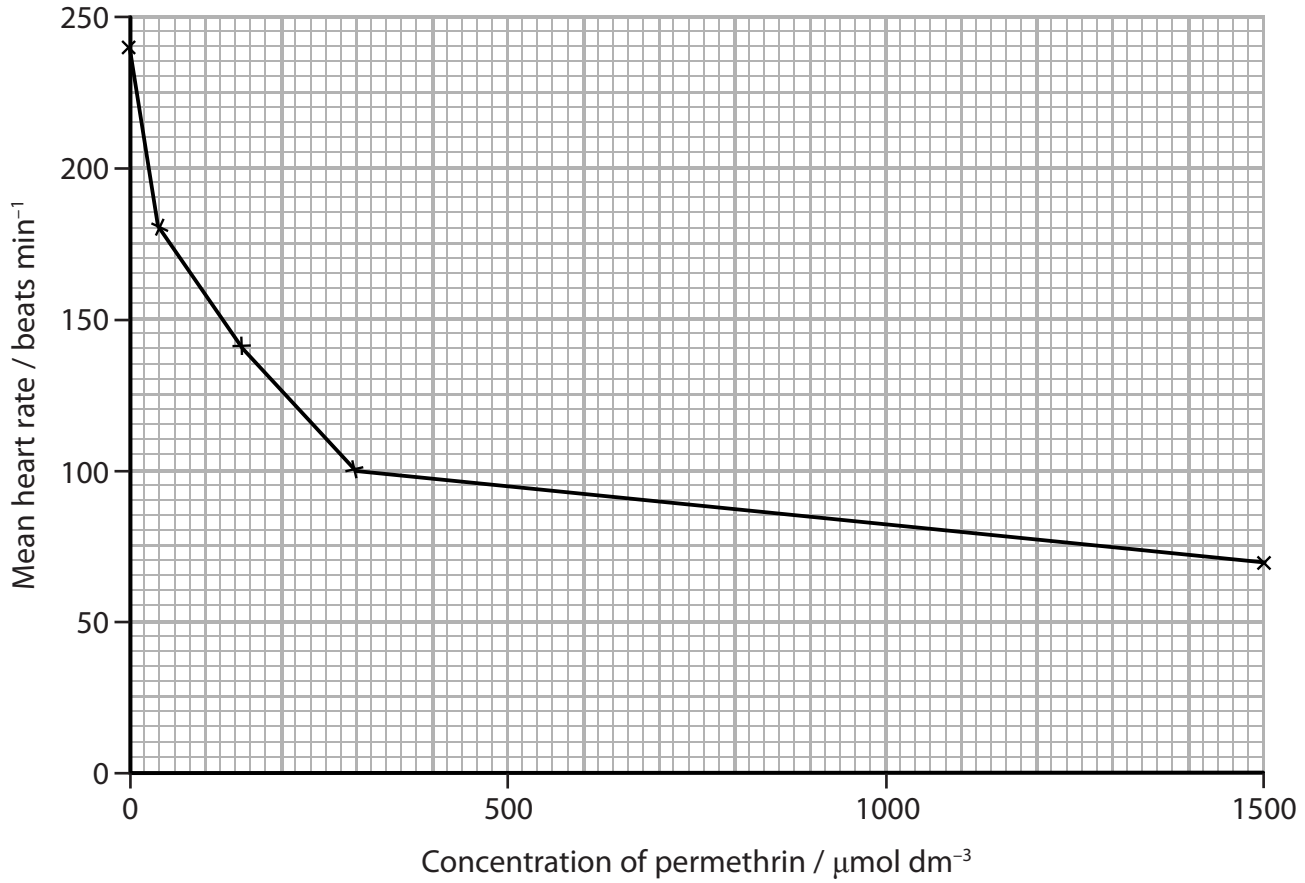
**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 Permethrin is a chemical used to kill invertebrate animals.

The graph below shows the results of an investigation into the effect of permethrin on the heart rate of *Daphnia*.



(a) Calculate the percentage change in the heart rate of *Daphnia* when the concentration of permethrin increases from 0 to 300  $\mu\text{mol dm}^{-3}$ .

(2)

.....%

(b) Describe how an experiment could be carried out to obtain these results.

(3)

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(c) Suggest **two** reasons why *Daphnia* were used in this investigation.

(2)

1 .....

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2 .....

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**(Total for Question 1 = 7 marks)**



(b) Several anticoagulants are available to reduce the risk of thrombophilia in major surgery.

One anticoagulant drug, METHRO II, developed for the treatment of thrombophilia, has been tested on patients.

Each patient was randomly placed in one of four groups receiving a different dose of METHRO II.

Some results from the trial are shown in the table below.

Dose of METHRO II / a.u.	Percentage of patients (%)	
	With serious clotting	With excessive bleeding
1.0	37.8	0.8
1.5	24.1	1.2
2.3	23.7	3.5
3.0	15.1	5.5

(i) Describe the effect of METHRO II on thrombophilia.

(1)

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(ii) Using the information in the table, suggest why a dose of 1.5 a.u. of METHRO II should be given to patients undergoing major surgery.

(2)

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**(Total for Question 2 = 8 marks)**

3 Pulmonary thrombosis is a condition in which blood clots form in the lungs.

(a) Put a cross ☒ in the box that completes each of the following statements.

(i) The role of thrombin in blood clotting is to

(1)

- A stimulate the release of prothrombin from platelets
- B catalyse the conversion of fibrinogen to fibrin
- C stimulate the release of thromboplastin from platelets
- D catalyse the conversion of fibrin to fibrinogen

(ii) The ion required in the conversion of prothrombin to thrombin is

(1)

- A calcium
- B chloride
- C potassium
- D sodium

(iii) Blood clots form only when required because the clotting factors used are

(1)

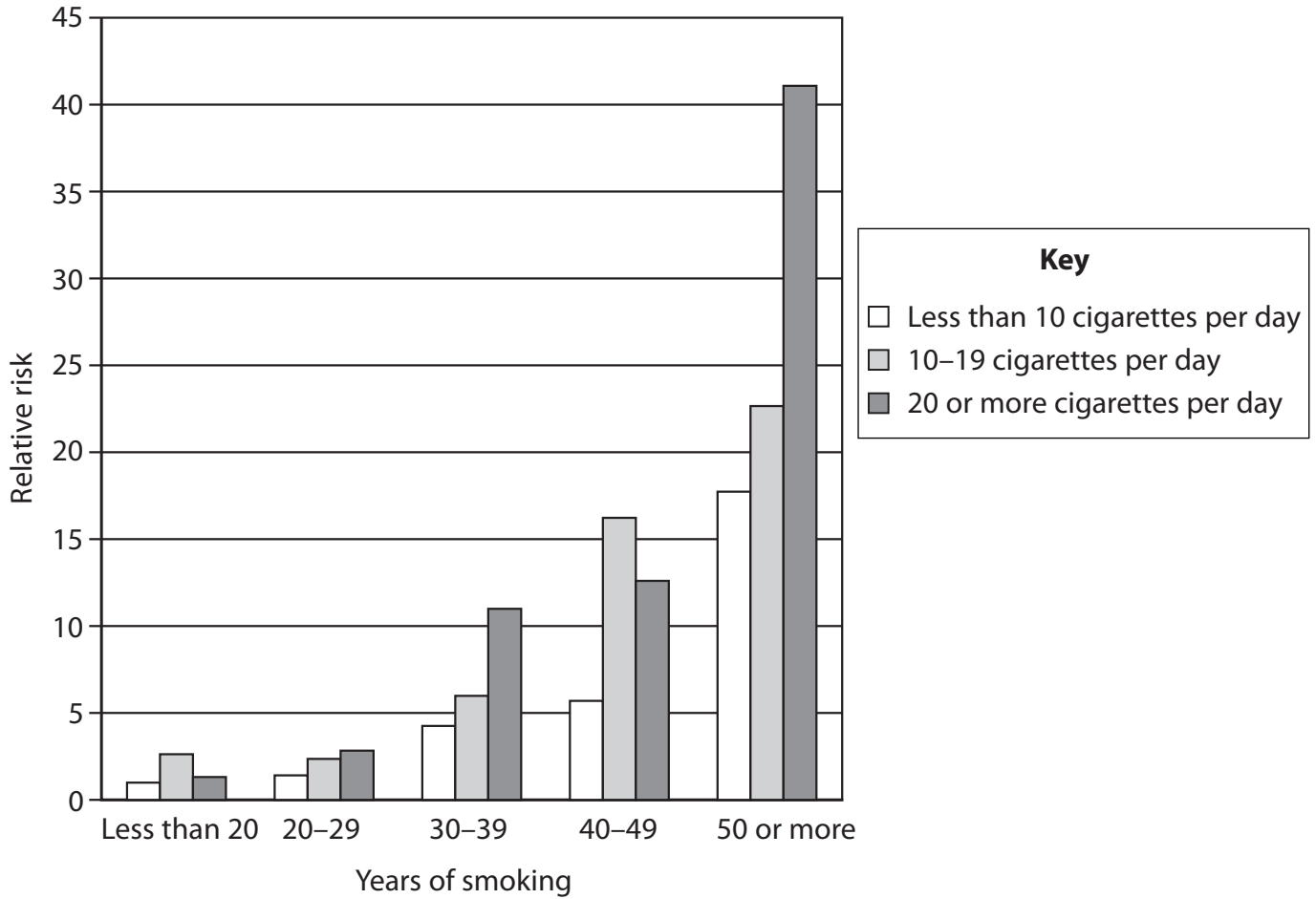
- A pre-synthesised in an active form in the blood
- B present in an inactive form in the blood
- C synthesised in an active form when required
- D synthesised in an inactive form when required



4 Smoking cigarettes increases the risk of developing lung cancer.

The graph below shows the relative risk of developing lung cancer in people who have smoked for different numbers of years.

The relative risk is how many times more likely a person is of developing lung cancer than a non-smoker.



(a) Using the information in the graph, describe the effect that smoking has on the relative risk of developing lung cancer.

(2)

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- (b) It has been reported that the relative risk of developing lung cancer is doubled if a person has a close family member who has developed lung cancer.

Explain what this suggests about the causes of lung cancer.

(1)

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- (c) Identical twins can provide evidence for the relative effects of the factors that affect a phenotype.

Identical twins develop from one fertilised egg.

- (i) Explain why studies of identical twins can provide evidence for the relative effects of the factors that affect a phenotype.

(2)

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