

Biology A (Salters Nuffield)
Advanced
PAPER 2: Energy, Exercise and Coordination

Friday 16 June 2023 – Morning

Diagram Booklet

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There may be spare copies of some diagrams in case you need them.

THIS DIAGRAM BOOKLET *MUST* BE RETURNED WITH THE QUESTION PAPER AT THE END OF THE EXAMINATION.

Contents

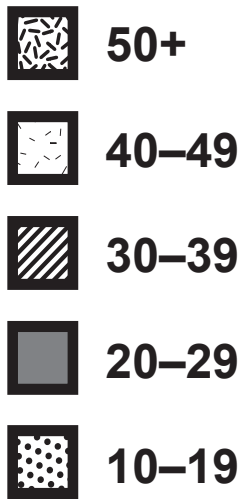
Page

4	Question 3(b)
5	Question 3(c)
6	Question 5(b)(i)
7	Question 6(a)
8	Question 6(b)
9	Question 7(a)
10	Question 7(b)(ii)
11	Question 8(c)
12	Question 9(a)(i)
13	Question 9(a)(ii)
14	Question 10(a)
15	Question 10(b)
16–18	Question 10(b)(ii)

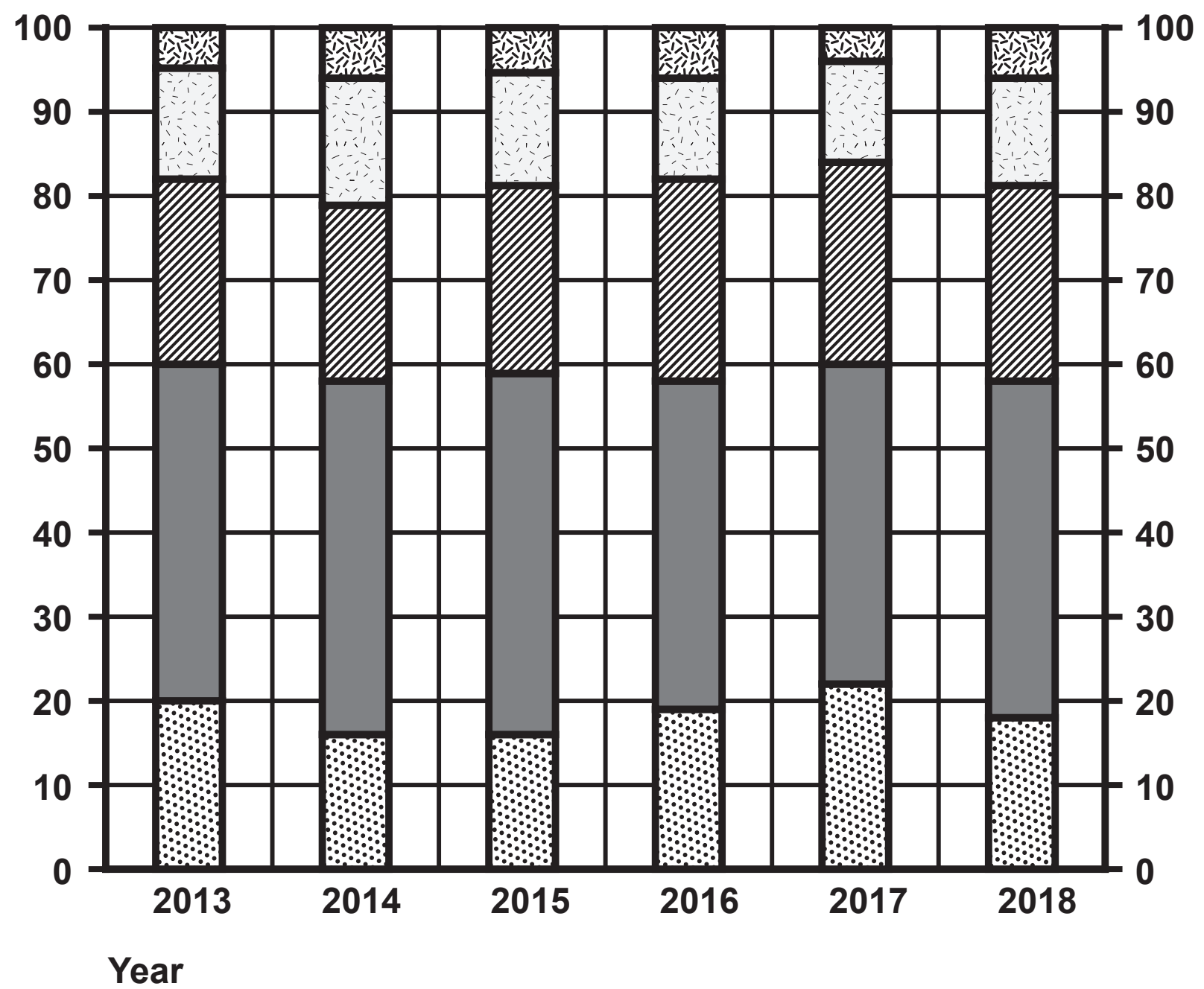
Spare Copies

19	Question 3(c)
20	Question 5(b)(i)

Question 3(b)

Key
age groups

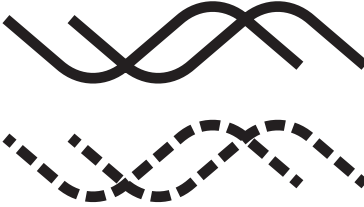
Percentage of people (%)



Question 3(c)

Type of surgery	Number of surgeries	Number of wound infections after surgery	Ratio of wound infections to number of surgeries
Keyhole surgery	2623	2	0·0008 : 1
Open surgery	13 472	68	

Question 5(b)(i)

Type of DNA replication	DNA before first replication	DNA after first replication in 14N	DNA after second replication in 14N
Conservative			
Semi-conservative			

Key

 = one strand of DNA containing heavy / 15N

 = one strand of DNA containing light / 14N

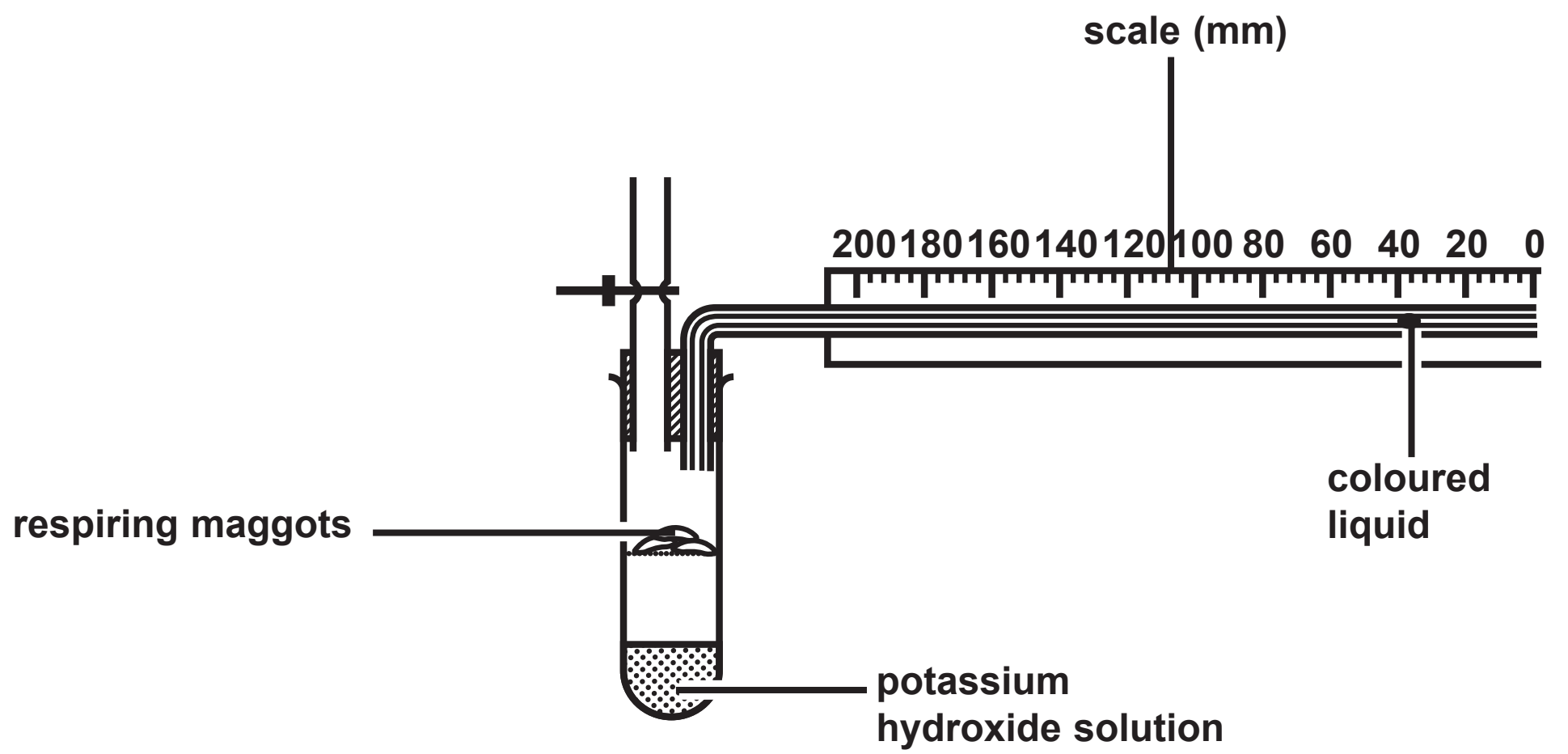
Question 6(a)**Key**

nC = number of carbons present in the molecule

For example, 6C = a six-carbon molecule



Question 6(b)



Question 7(a)

Properties	Muscle fibre	
	Type I	Type II
Speed of contraction	slow	four times the speed of type I
Time taken to fatigue	long	short
Concentration of mitochondria	high	low
Level of anaerobic respiration carried out	low	high

Question 7(b)(ii)

A	A	T	T	C	G				
				G	C	T	T	A	A

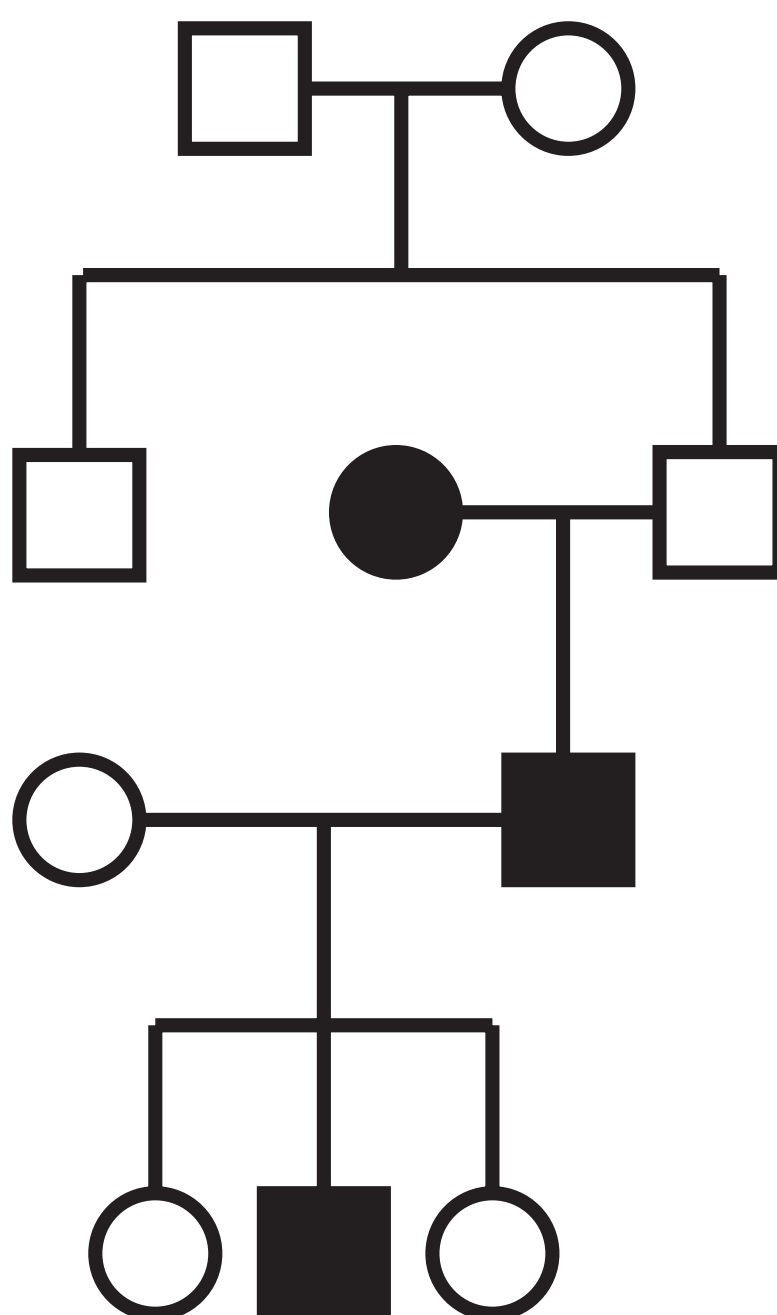
Question 8(c)

Cell of the nervous system	Percentage composition of the cell surface membrane (%)	
	LIPID	PROTEIN
Motor neurone	50	40
Schwann cell	70	30

Question 9(a)(i)

Key:

- = male without RP
- = female without RP
- = male with RP
- = female with RP



Question 9(a)(ii)

Rhodopsin from	Absorbance ratio (280 nm : 500 nm)
person without RP	2·0 : 1
person with RP	5·6 : 1

Question 10(a)

Component	Four biscuits contain	Percentage of total recommended daily intake (%)	Recommended daily intake (RI)
Energy content	700 kJ	8	
Fats	7·6 g	11	70 g
of which are saturated	4·7 g	23	20 g
Sugars	20·3 g	23	90 g

Question 10(b)

Age range / years	Percentage incidence of CHD over 5 years for different BMI values (%)			
	BMI 22.5	BMI 27.5	BMI 32.5	BMI 37.5
55–59	1.0	1.5	1.8	2.2
60–64	1.9	2.4	3.0	3.5
65–69	3.0	3.7	4.3	4.8
70–74	4.5	5.1	5.8	7.1

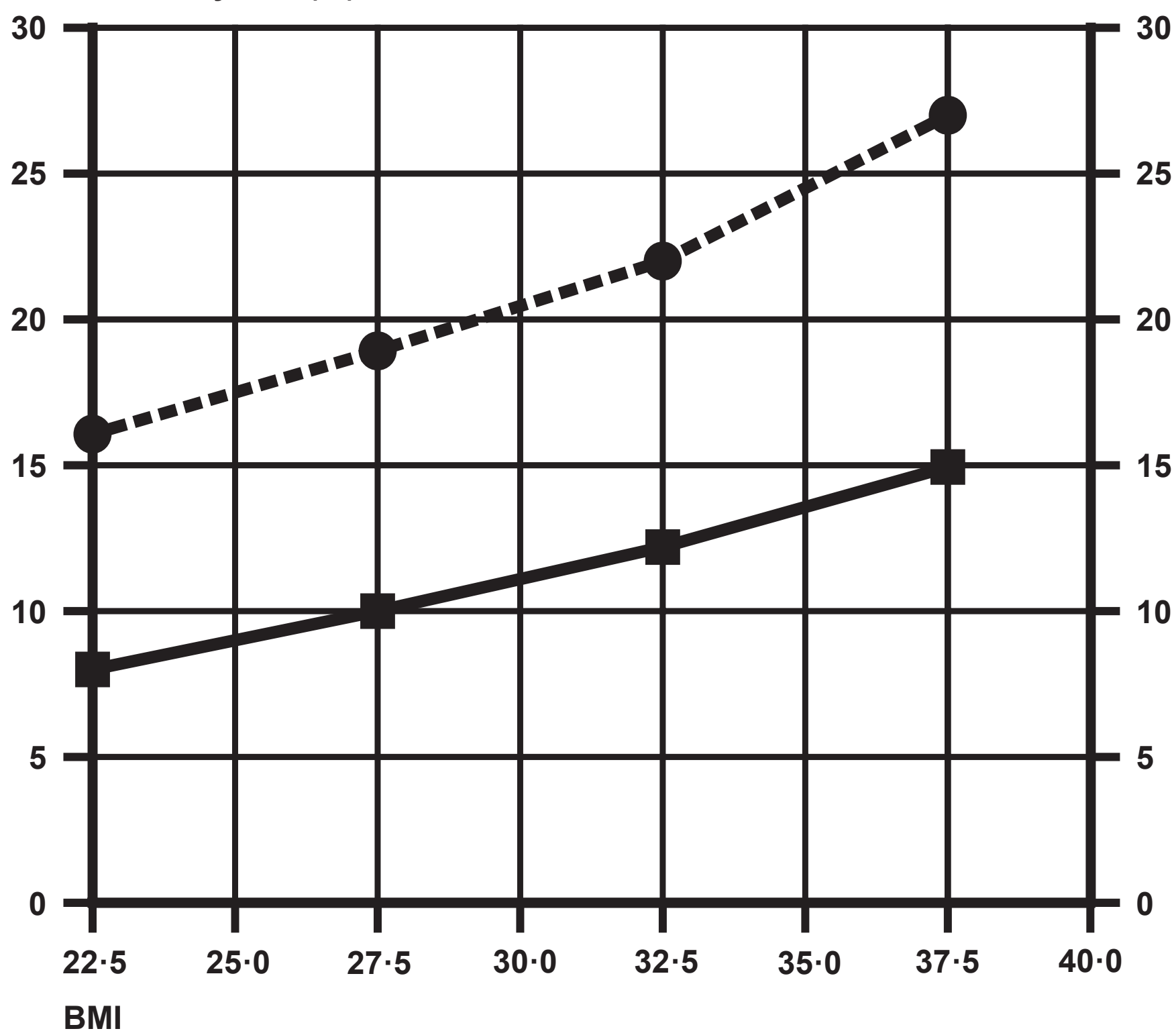
Question 10(b)(ii)

Key

■ ■ ■ Current smoker

— Never smoked

A: By smoking

Percentage incidence of
CHD over 20 years (%)

(continued on the next page)

Question 10(b)(ii) continued.

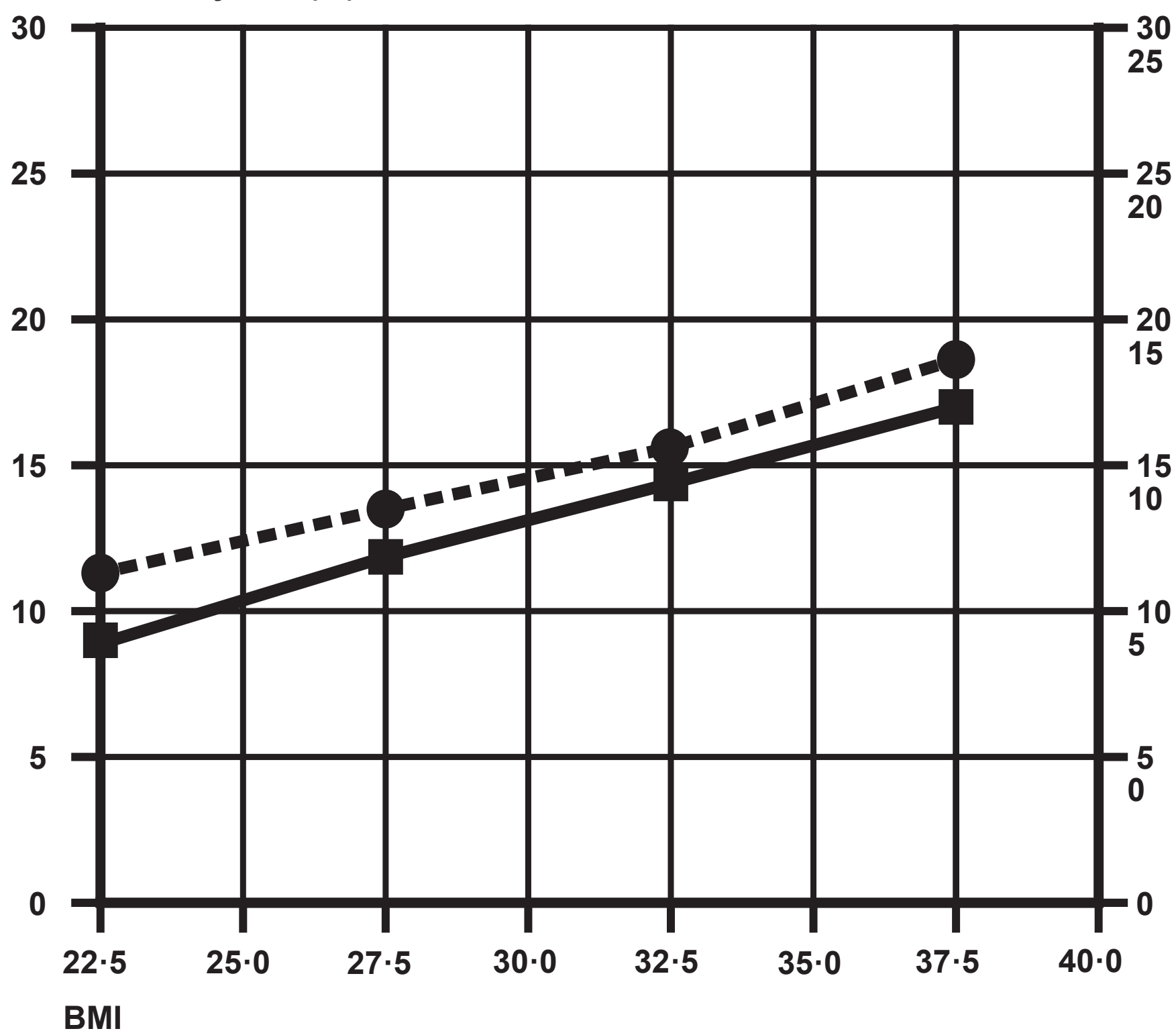
Key

--- Inactive

— Active

B: By physical activity

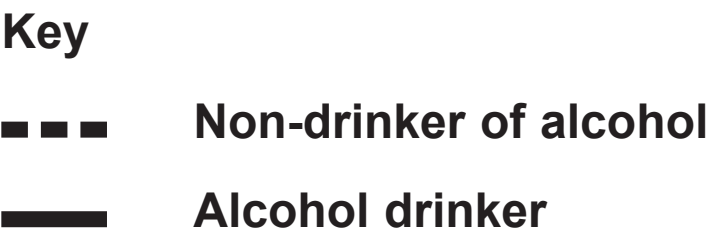
Percentage incidence of
CHD over 20 years (%)



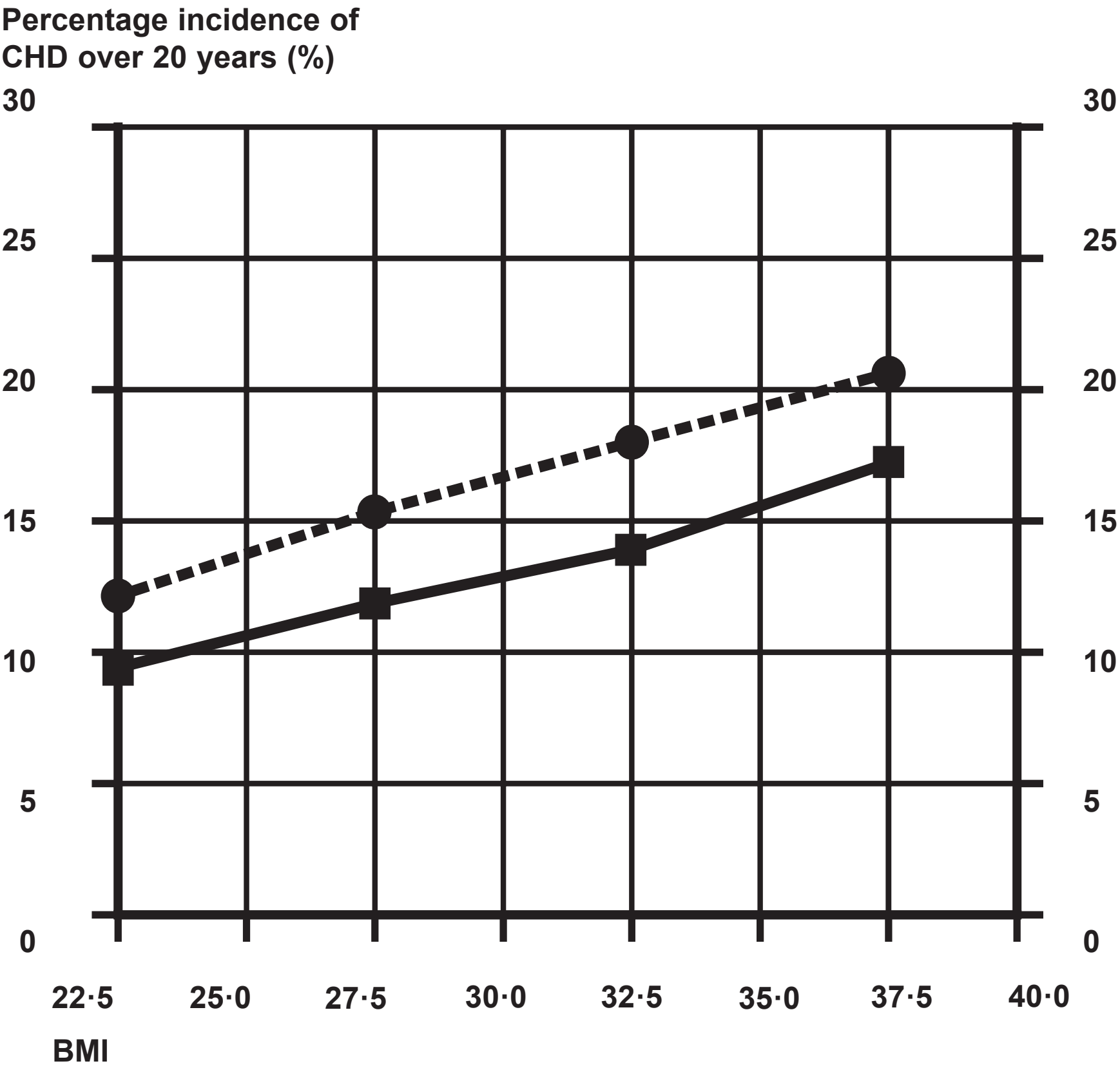
(continued on the next page)

Turn over

Question 10(b)(ii) continued.



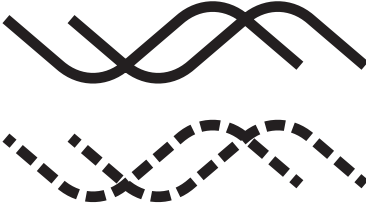
C: By alcohol intake



Question 3(c)

Type of surgery	Number of surgeries	Number of wound infections after surgery	Ratio of wound infections to number of surgeries
Keyhole surgery	2623	2	0·0008 : 1
Open surgery	13 472	68	

Question 5(b)(i)

Type of DNA replication	DNA before first replication	DNA after first replication in 14N	DNA after second replication in 14N
Conservative			
Semi-conservative			

Key

 = one strand of DNA containing heavy / 15N

 = one strand of DNA containing light / 14N