Chhetri Academy

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GCSE MATHS

Statistics

Edexcel 1MA1 | Subtopic collection Topic 61

Sampling and capture–recapture

Higher tier

Past paper question booklet

78	2003-2024	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

Leave blank

9. Mr Beeton is going to open a restaurant.
He wants to know what type of restaurant people like.
He designs a questionnaire.

(a) Design a suitable question he could use to find out what type of restaurant people like.

(2)

He asks his family "Do you agree that pizza is better than pasta?"

This is **not** a good way to find out what people who might use his restaurant like to eat.

(b) Write down **two** reasons why this is **not** a good way to find out what people who might use his restaurant like to eat.

First reason .....

.....

Second reason .....

.....

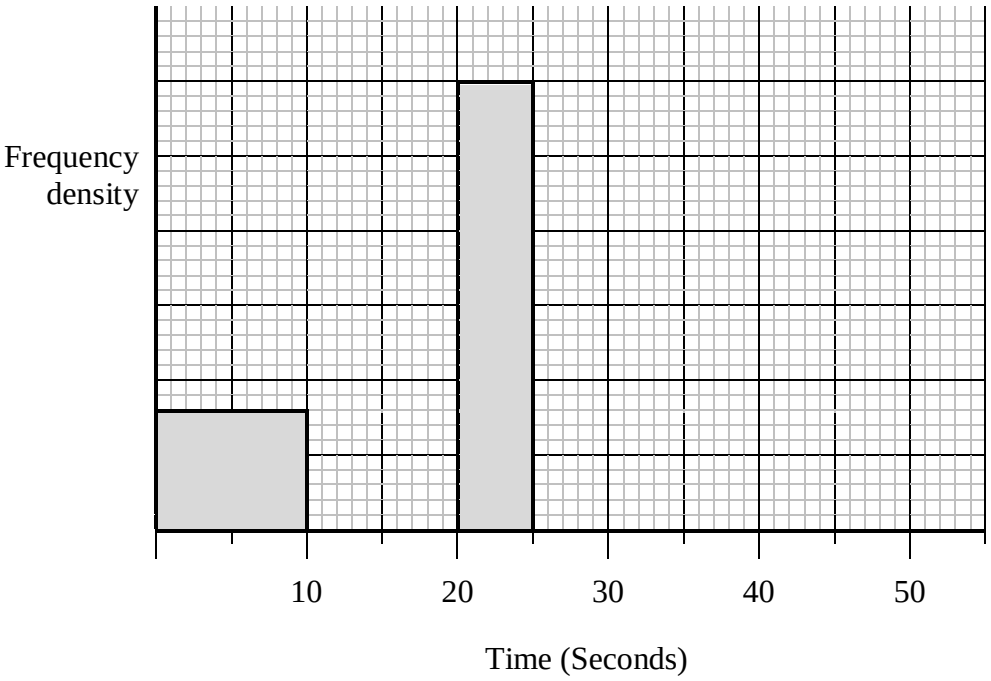
(2)

13. One Monday, Victoria measured the time, in seconds, that individual birds spent on her bird table.

She used this information to complete the frequency table.

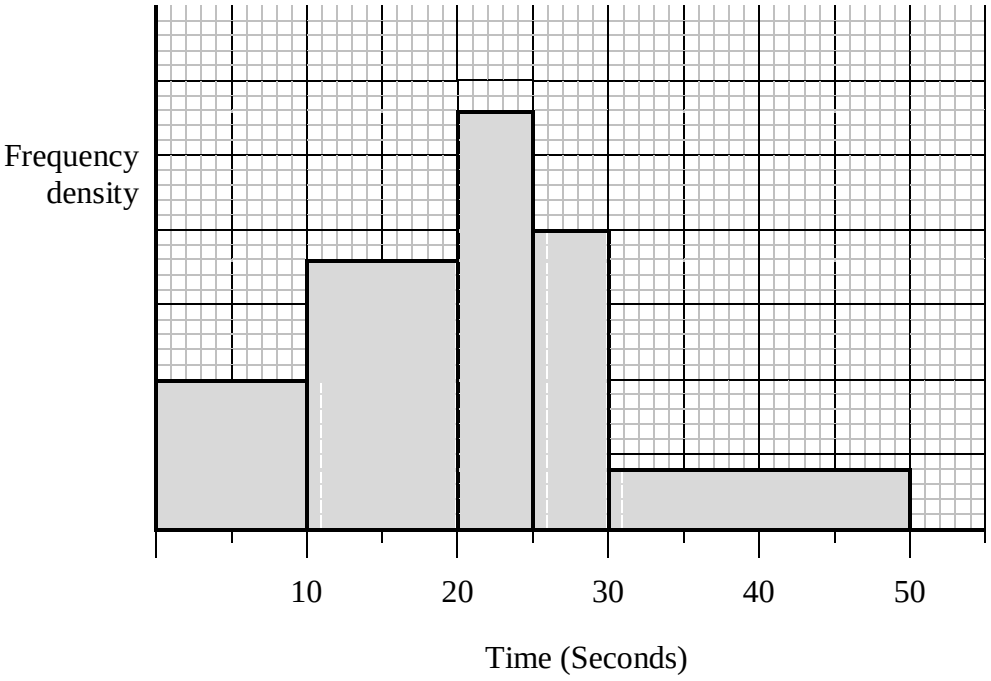
Time (t seconds)	Frequency
$0 < t \leq 10$	8
$10 < t \leq 20$	16
$20 < t \leq 25$	15
$25 < t \leq 30$	12
$30 < t \leq 50$	6

(a) Use the table to complete the histogram.



(3)

On Tuesday she conducted a similar survey and drew the following histogram from her results.



(b) Use the histogram for Tuesday to complete the table.

Time (t seconds)	Frequency
$0 < t \leq 10$	10
$10 < t \leq 20$	
$20 < t \leq 25$	
$25 < t \leq 30$	
$30 < t \leq 50$	

(2)

3. Matthew wants to collect information about the time students take to travel to school.

Design a suitable question he could use on a questionnaire.

Q3

(Total 2 marks)

Blank

23. The table shows the number of boys and the number of girls in each year group at Springfield Secondary School.

There are 500 boys and 500 girls in the school.

Year group	Number of boys	Number of girls
7	100	100
8	150	50
9	100	100
10	50	150
11	100	100
Total	500	500

Azez took a stratified sample of 50 girls, by year group.

Work out the number of Year 8 girls in his sample.

.....

Q23

(Total 2 marks)

Blank

13. Fred is going to take a survey of the magazines read by students.

He wants to design a questionnaire.

(a) Design a suitable question that he could use to find out what types of magazine students read.

(2)

Fred put the question below on his questionnaire.

'How many magazines have you read?'

☐ A few ☐ A lot

(b) Design a better question.
You should include some response boxes.

(2) **Q13**

(Total 4 marks)

17. Lucy did a survey about the amounts of money spent by 120 men during their summer holidays.

The cumulative frequency table gives some information about the amounts of money spent by the 120 men.

Amount (£A) spent	Cumulative frequency
$0 \leqslant A < 100$	13
$0 \leqslant A < 150$	25
$0 \leqslant A < 200$	42
$0 \leqslant A < 250$	64
$0 \leqslant A < 300$	93
$0 \leqslant A < 350$	110
$0 \leqslant A < 400$	120

(a) On the grid, draw a cumulative frequency diagram.

(2)

(b) Use your cumulative frequency diagram to estimate the median.

£ .....

(2)

A survey of the amounts of money spent by 200 women during their summer holidays gave a median of £205

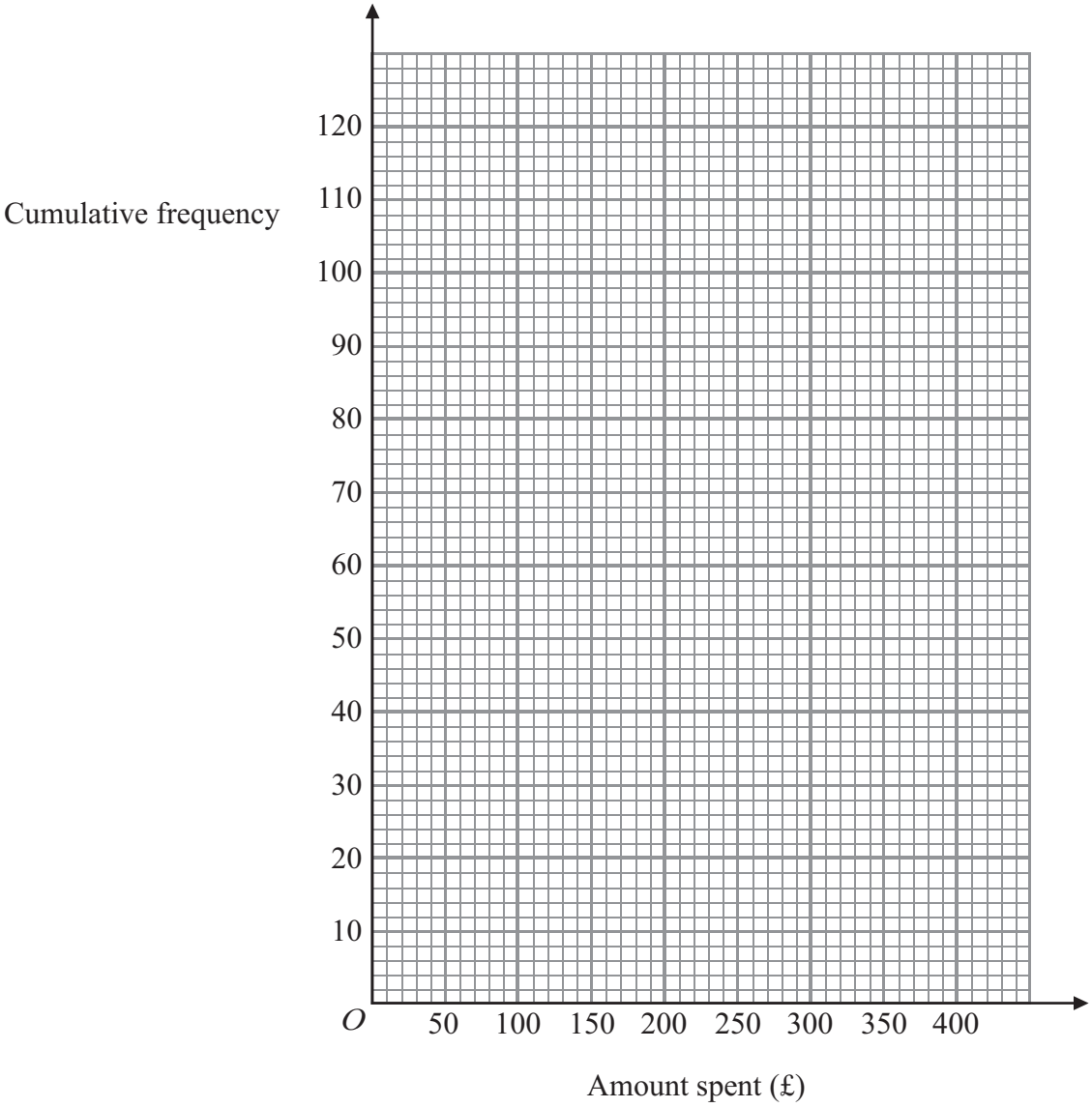
(c) Compare the amounts of money spent by the women with the amounts of money spent by the men.

.....

.....

(1)

blank



Q17

(Total 5 marks)

Blank

21. 258 students each study one of three languages.
The table shows information about these students.

	Language studied		
	German	**French**	**Spanish**
Male	45	52	26
Female	25	48	62

A sample, stratified by the language studied and by gender, of 50 of the 258 students is taken.

(a) Work out the number of male students studying Spanish in the sample.

.....
(2)

(b) Work out the number of female students in the sample.

.....
(2)

Q21

(Total 4 marks)

8. Simon wants to find out how much people spend using their mobile phone.

He uses this question on a questionnaire.

How much do you spend using your mobile phone?

☐ £1–£5 ☐ £5–£10 ☐ £10–£15

(a) Write down **two** things that are wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Design a better question for his questionnaire to find out how much people spend using their mobile phone.
You should include some response boxes.

(2) **Q8**

(Total 4 marks)

4. Frank did a survey on the areas of pictures in a magazine.

The magazine had 60 pages.
Frank worked out the area of each of the pictures in the first 2 pages.

This may not be a good method to do the survey.
Explain why.

.....

.....

Q4

(Total 1 mark)

24. The table below gives some information about some students in a school.

Year group	Boys	Girls	Total
Year 12	126	94	220
Year 13	77	85	162
Total	203	179	382

Andrew is going to carry out a survey of these students.
He uses a sample of 50 students, stratified by year group and gender.

Work out the number of Year 13 girls that should be in his sample.

.....

Q24

(Total 2 marks)

Blank

8. Sasha carried out a survey of 60 students.
She asked them how many CDs they each have.

This table shows information about the numbers of CDs these students have.

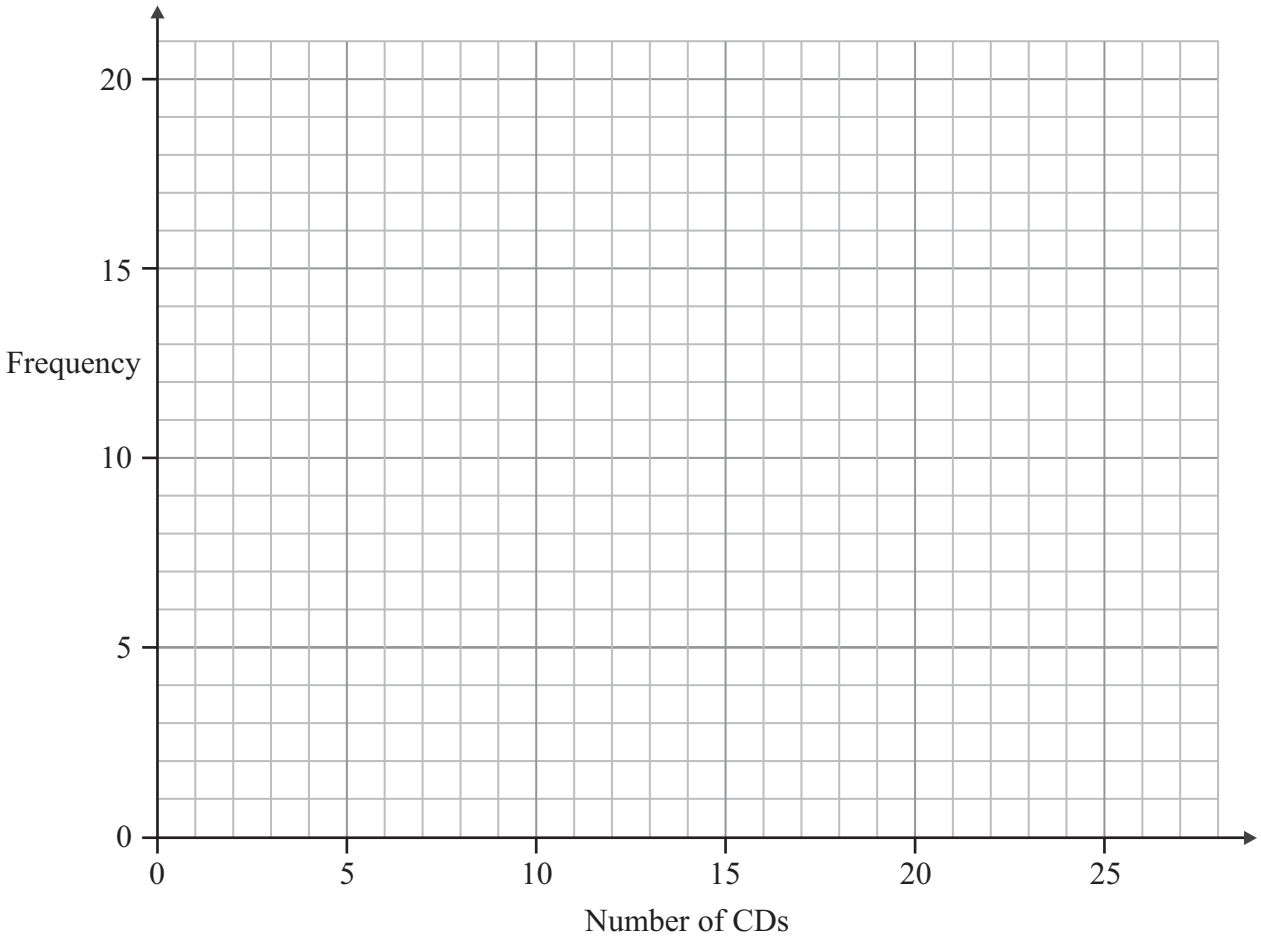
Number of CDs	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24
Frequency	8	11	9	14	18

(a) Write down the class interval containing the median.

.....

(1)

(b) On the grid, draw a frequency polygon to show the information given in the table.



(2) **Q8**

(Total 3 marks)

13. Anil wants to find out how many DVDs people buy.

He uses this question on a questionnaire.

How many DVDs do you buy?

☐ 1 – 5 ☐ 5 – 10 ☐ 10 – 15 ☐ 15 – 20

Write down **two** different things wrong with this question.

1 .....

.....

2 .....

.....

Q13

(Total 2 marks)

25. The table shows information about the ages, in years, of 1000 teenagers.

Age (years)	13	14	15	16	17	18	19
Number of teenagers	158	180	165	141	131	115	110

Simone takes a sample of 50 of these teenagers, stratified by age.

Calculate the number of 14 year olds she should have in her sample.

.....

(Total 2 marks)

Blank

Q25

Blank

15. 200 students in Year 11 took a mathematics test.
Kamini wants to find out whether students in Year 11 like mathematics.

For her sample she asks the 20 students who got the highest marks in the test.

This is **not** a good sample to use.

(a) Write down **one** reason why.

.....

.....

(1)

She uses this question on her questionnaire.

What do you think of mathematics?

☐ Excellent ☐ Very good ☐ Good

(b) Write down **one** thing that is wrong with this question.

.....

.....

(1)

Kamini also wants to find out how many hours students spend on their mathematics homework.

(c) Design a suitable question that Kamini could use on her questionnaire.
You must include some response boxes.

(2)

(Total 4 marks)

Q15

13 The table below shows the population of each of three villages.

Village	Population
Ashley	243
Brigby	370
Irton	127

Mr Akhtar carries out a survey of the people living in these three villages.
He uses a sample stratified by village population.

There are 50 people from Brigby in his sample.

Work out the number of people from Irton in his sample.

.....

(Total for Question 13 is 2 marks)

1 (a) Dan is doing a survey to find out how much time students spend playing sport.
He is going to ask the first 10 boys on the register for his PE class.

This may **not** produce a good sample for Dan's survey.

Give **two** reasons why.

Reason 1

.....

.....

.....

Reason 2

.....

.....

.....

(2)

(b) Design a suitable question for Dan to use on a questionnaire to find out how much time students spend playing sport.

(2)

(Total for Question 1 is 4 marks)

12 182 students go to an outdoor activity centre for a day.
Each student chooses one activity, climbing or sailing.

The table shows information about the activities the students chose.

	Activity chosen	
	Climbing	**Sailing**
Male	34	57
Female	26	65

The manager of the centre gives a questionnaire to some of the students.
He takes a sample of 50 students stratified by gender and the activity chosen.

Work out the number of male students who chose climbing he should have in his sample.

.....

(Total for Question 12 is 2 marks)

8. Sophie wants to find out the amount of time people exercise.
She will use a questionnaire.

(a) Design a suitable question for Sophie to use in her questionnaire.
You must include some response boxes.

(2)

Sophie asks the people at her swimming pool to complete her questionnaire.
This may **not** be a suitable sample.

(b) Give a reason why.

.....

.....

(1) **Q8**

(Total 3 marks)

22. There are three secondary schools in Banley.
The table shows the number of students in each of these schools.

Adis College	Greslow High	Fripp School
750	700	900

Germaine takes a sample of 50 students stratified by school.

Work out the number of students from Greslow High in the sample.

.....

(Total 2 marks)

Q22

6 Helen carries out a survey on healthy eating.

She uses these two questions in a questionnaire.

question 1	What is your age?
	☐ under 20 ☐ 20 to 40 ☐ 40 to 60 ☐ over 60
question 2	You should eat fruit every day. You do agree, don't you?
	☐ Yes ☐ No ☐ Don't know

(a) Write down **one** thing wrong with each of these questions.

question 1

.....

.....

question 2

.....

.....

(2)

Helen wants to find out the amount of fruit people eat.

(b) Design a question that Helen could use in her questionnaire.

(2)

The table shows some information about the people at Helen's college.

	Student	Teacher
Male	536	48
Female	384	73

Helen is going to ask people at her college to do her questionnaire.
She asks a sample of 100 people stratified by type and gender.

(c) Work out the number of female teachers in her sample.

.....

(2)

(Total for Question 6 is 6 marks)

4. Jim did a survey on the lengths of caterpillars he found on a field trip.

Information about the lengths is given in the stem and leaf diagram.

1	3 5 7 7
2	0 6 8 8 8 9
3	1 5 5 5 5 6 8 9
4	1 5
5	2

Key: 5|2 means 5.2 cm

Work out the median.

..... cm

(Total 2 marks)

Q4

3. Gary wants to find out how much time teenagers spend listening to music.

He uses this question on a questionnaire.

How many hours do you spend listening to music?

☐	☐	☐	☐
1 to 5	5 to 10	10 to 20	over 20

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Design a better question for Gary's questionnaire to find out how much time teenagers spend listening to music.

(2) **Q3**

(Total 4 marks)

4 James wants to find out how long his friends spend using the internet.

He uses this question on his questionnaire.

How many hours do you spend using the internet?

☐ 1 – 5 ☐ 5 – 10 ☐ 10 – 20

(a) Write down two things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Write a better question for James to use on his questionnaire to find out how long his friends spend using the internet.

(2)

(Total for Question 4 is 4 marks)

11 There are a total of 300 students in Year 7, Year 8 and Year 9 at Mathsville High School.

The table shows information about the students.

	Boys	**Girls**
Year 7	60	45
Year 8	55	40
Year 9	41	59

The Headteacher takes a sample of 50 students.
His sample is stratified by year and by gender.

Work out the number of girls from Year 9 in the Headteacher's sample.

.....

(Total for Question 11 is 2 marks)

***14** A farmer wants to estimate the number of rabbits on his farm.

On Monday he catches 120 rabbits.
He puts a tag on each rabbit.
He then lets the rabbits run away.

On Tuesday the farmer catches 70 rabbits.
15 of these rabbits have a tag on them.

Work out an estimate for the total number of rabbits on the farm.
You must write down any assumptions you have made.

(Total for Question 14 is 4 marks)

11 Raul is the manager of a restaurant.

He wants to find out how often local people eat in a restaurant.

Raul is going to carry out a survey using a questionnaire.

(a) Design a suitable question for Raul to use on his questionnaire.

(2)

(b) The two-way table shows information about the ages of the customers in Raul's restaurant one evening.

	Age (years)				Total
	0–16	**17–30**	**31–60**	**over 60**	
Male	8	10	17	20	55
Female	7	9	22	34	72
Total	15	19	39	54	127

Raul carries out his survey using only these customers.
He uses a sample of 50 of these customers stratified by gender and by age.

Calculate the number of males aged 17–30 in his sample.

.....

(2)

Raul's survey is biased.

(c) Give **two** possible reasons why.

1 .....

.....

.....

2 .....

.....

.....

(2)

(Total for Question 11 is 6 marks)

1 Sam wants to find out the types of film people like best.

He is going to ask whether they like comedy films or action films or science fiction films or musicals best.

(a) Design a suitable table for a data collection sheet he could use to collect this information.

(2)

Sam collects his data by asking 10 students in his class at school.
This might **not** be a good way to find out the types of film people like best.

(b) Give **one** reason why.

.....

.....

(1)

(Total for Question 1 is 3 marks)

3 Pradeep wants to find out how much time people spend playing sport.

He uses this question on a questionnaire.

How much time do you spend playing sport?

☐ 0 – 1 hours ☐ 1 – 2 hours ☐ 3 – 4 hours

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Design a better question for Pradeep's questionnaire to find out how much time people spend playing sport.

(2)

(Total for Question 3 is 4 marks)

10 Simon is designing a questionnaire for people who visit his sports club.

He wants to find out how often people visit his sports club.

(a) Design a suitable question he could use.

(2)

Simon asks 10 of his friends who visit his sports club to do his questionnaire.
This may **not** be a suitable sample.

(b) Give one reason why.

.....

.....

(1)

There are 365 runners in Simon's sports club.

The table gives information about these runners.

Age (in years)	Number of male runners	Number of female runners
10 – 19	35	36
20 – 29	52	48
30 – 39	45	32
40 – 49	37	29
50 – 69	20	31

Simon surveys the runners in his sports club.
He uses a sample of 50 runners stratified by gender and by age.

(c) Work out the number of male runners with an age 30 – 39 years he should have in his sample.

.....

(2)

(Total for Question 10 is 5 marks)

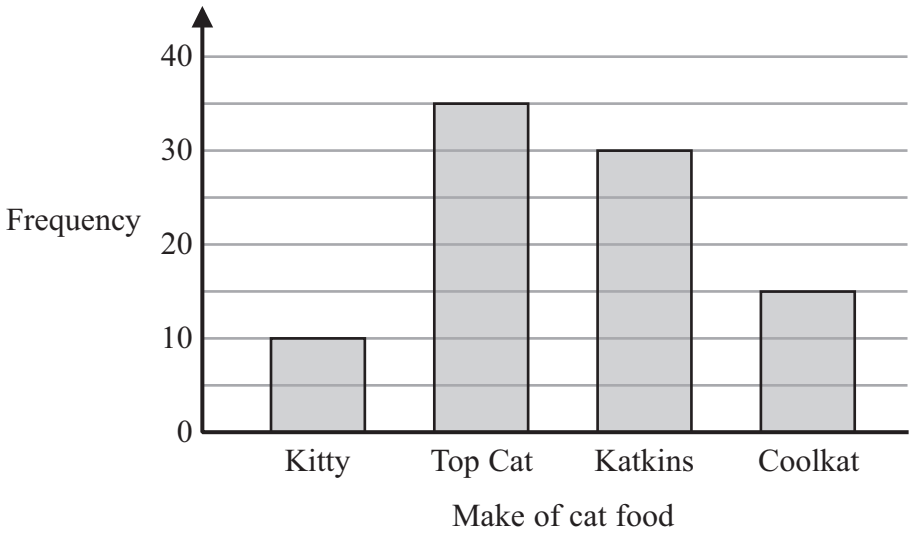
4 Alison wants to find out how much time people spend reading books.
She is going to use a questionnaire.

Design a suitable question for Alison to use in her questionnaire.

(Total for Question 4 is 2 marks)

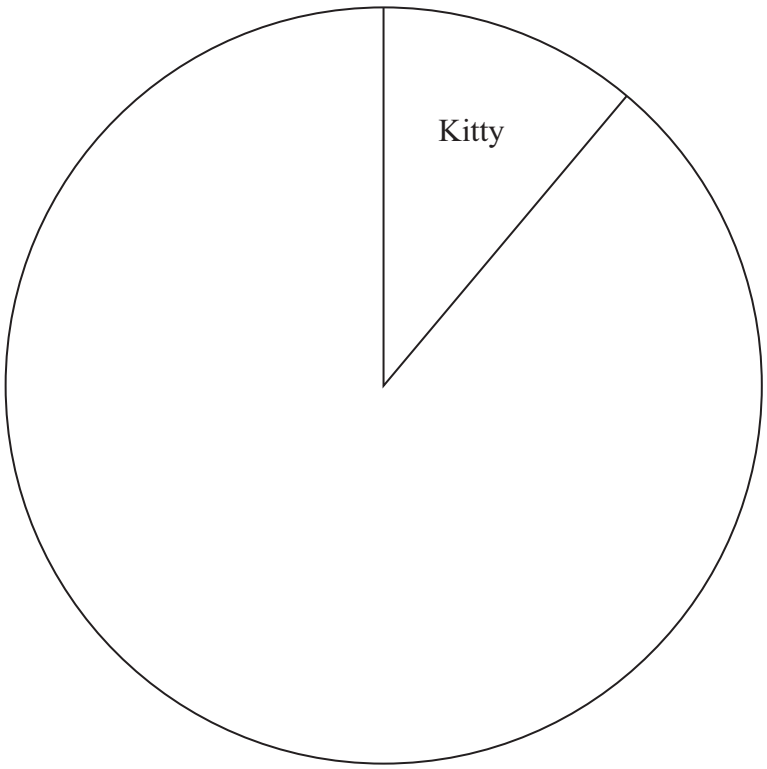
4 A survey was carried out for a magazine.
90 cat owners were asked to write down the make of cat food their cats liked best.

The bar chart shows information about the results.



The information in the bar chart is going to be shown in a pie chart.

Use the information in the bar chart to complete the pie chart.



(Total for Question 4 is 3 marks)

9 Nathan is doing a survey about DVDs.
He writes a questionnaire.

Nathan decides to hand out his questionnaire to the women who are inside a DVD store.

His sample is biased.

(a) Give **two** possible reasons why.

1 .....

.....

2 .....

.....

(2)

This is one of the questions on Nathan's questionnaire.

How many DVDs do you have?

☐ 0 to 5 ☐ 5 to 10 ☐ 11 to 15 ☐ 16 to 20

(b) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(Total for Question 9 is 4 marks)

3 Paula wants to find out how much money people spend buying CDs.

She uses this question on a questionnaire.

How much money do you spend buying CDs?

☐ £10 – £30 ☐ £30 – £50 ☐ £50 – £70 ☐ more than £70

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

Paula asks 100 people in a CD store to do her questionnaire.

(b) Her sample is biased.
Explain why.

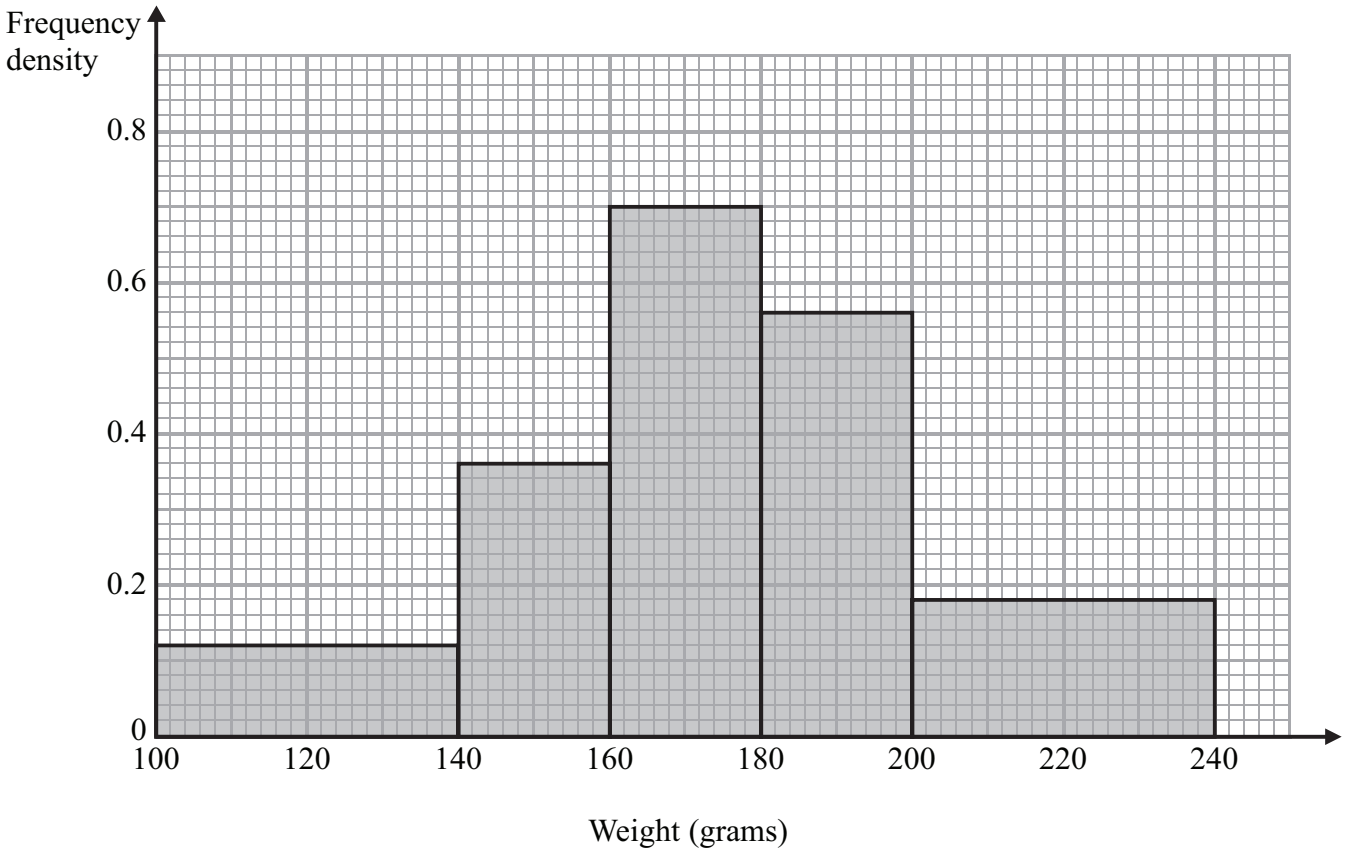
.....

.....

(1)

(Total for Question 3 is 3 marks)

21 The histogram shows some information about the weights of a sample of apples.



Work out the proportion of apples in the sample with a weight between 140 grams and 200 grams.

.....

(Total for Question 21 is 4 marks)

23 The table shows information about the ages, in years, of 300 students.

Age (years)	11	12	13	14	15	16
Number of students	41	40	50	48	53	68

Ian takes a sample of 50 of these students, stratified by age.

Calculate the number of 16 year old students he should have in his sample.

.....

(Total for Question 23 is 2 marks)

3 The manager of a sports centre is planning a new cycle track.
The manager wants to know if many people will use the cycle track.

The manager uses this question on a questionnaire.

How often would you use the cycle track?

☐ A lot ☐ Quite a lot ☐ Not very often

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Design a better question to find out how often people would use the cycle track.

(2)

The manager plans to give the questionnaire to the first 20 people who get to the sports centre on Tuesday morning.

(c) Give two reasons why this may **not** be a suitable sample.

Reason 1 .....

.....

Reason 2 .....

.....

(2)

(Total for Question 3 is 6 marks)

12 The table shows the number of students in each year group at a college.

Year group	Number of students
1	182
2	140
3	98
Total	420

The college secretary took a stratified sample of 135 students, by year group.

Work out the number of year 2 students in her sample.

.....

(Total for Question 12 is 2 marks)

5 Mason is doing a survey to find out how many magazines people buy.

He uses this question on his questionnaire.

How many magazines do you buy?

☐ 0 to 4 ☐ 4 to 8 ☐ 8 to 12

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Write a better question for Mason to use on his questionnaire to find out how many magazines people buy.

(2)

Mason asks his friends at school to do his questionnaire.
This may **not** be a good sample to use.

(c) Give **one** reason why.

.....

.....

.....

(1)

(Total for Question 5 is 5 marks)

21 In Holborn School there are

460 students in Key Stage 3
320 students in Key Stage 4
165 students in Key Stage 5

Nimer is carrying out a survey.
He needs a sample of 100 students stratified by Key Stage.

Work out the number of students from Key Stage 3 there should be in the sample.

.....

(Total for Question 21 is 2 marks)

4 Visage is an internet site.
Jaz is going to carry out a survey on the lengths of time people spend using Visage.

He uses this question on a questionnaire.



How much time do you spend using Visage?

☐ none ☐ a little ☐ not much ☐ a lot

(a) Write down **two** things that are wrong with this question.

1. .....

.....

2. .....

.....

(2)

(b) Design a better question that Jaz could use.

(2)

Jaz is going to give his questionnaire to his friends.

(c) This may not produce a good sample.
Give one reason why.

.....

.....

(1)

(Total for Question 4 is 5 marks)

13 Henri is carrying out a survey of the people aged 65 and over in his village.

The table shows information about these people.

Age	Male	Female
65 – 69	20	22
70 – 74	18	21
75 – 79	15	18
80 – 84	8	16
85 – 89	5	10
90+	2	5
Total	**68**	**92**

Henri is going to take a sample of 30 people stratified by age.

How many people aged 75 – 79 should be in the sample?

.....

(Total for Question 13 is 3 marks)

9 Julia is investigating how much exercise people do in a week.

She uses these two questions in a questionnaire.

Question 1 What is your age?

☐ Under 15 ☐ 15 to 25 ☐ 25 to 40 ☐ over 40

Question 2 How much exercise do you do?

☐ A bit ☐ Some ☐ A lot

(a) Write down **one** thing wrong with each of these questions.

Question 1

.....

.....

Question 2

.....

.....

(2)

Julia wants to know how much time people spend exercising.

(b) Design a question Julia could use in her questionnaire.

(2)

(Total for Question 9 is 4 marks)

23 The table shows information about 1065 students.

	Male	Female
Year 7	126	109
Year 8	112	134
Year 9	121	114
Year 10	87	94
Year 11	88	80

Elena takes a stratified sample of 120 students by year group and by gender.

Work out the number of Year 8 female students in her sample.

.....

(Total for Question 23 is 2 marks)

1 Kerry wants to find out how much time people spend watching rugby on television.

She is going to carry out a survey using a questionnaire.

(a) Design a suitable question for Kerry to use on her questionnaire.

(2)

Kerry asks the girls in her class to do her questionnaire.

Her sample is biased.

(b) Give **two** reasons why.

1 .....

.....

2 .....

.....

(2)

(Total for Question 1 is 4 marks)

14 156 students went to London.

Each student visited one of the British Museum or the National Gallery or the Stock Exchange.

The table gives information about these students.

	Place visited		
	British Museum	**National Gallery**	**Stock Exchange**
Male	25	18	35
Female	27	32	19

Kate takes a sample of 30 of these students.
The sample is stratified by place visited and by gender.

Work out the number of male students who visited the Stock Exchange in the sample.

.....

(Total for Question 14 is 2 marks)

17 Clive wants to estimate the number of bees in a beehive.

Clive catches 50 bees from the beehive.
He marks each bee with a dye.
He then lets the bees go.

The next day, Clive catches 40 bees from the beehive.
8 of these bees have been marked with the dye.

(i) Work out an estimate for the number of bees in the beehive.

..... bees

(ii) Write down any assumptions you have made.

.....

.....

.....

(Total for Question 17 is 4 marks)

5 Rebecca wants to find out how many books people buy.
She is going to use a questionnaire.

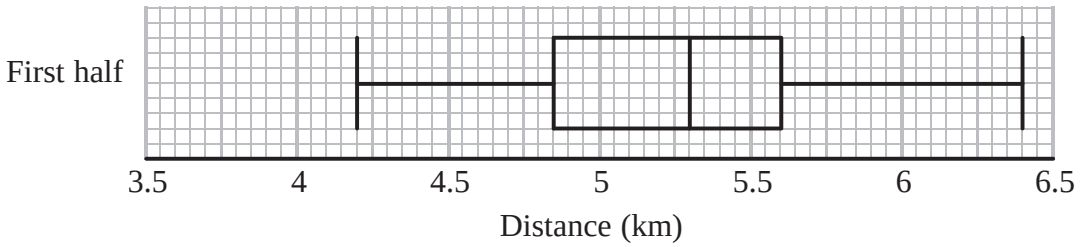
Design a suitable question for Rebecca to use in her questionnaire.

(Total for Question 5 is 2 marks)

16 Colin took a sample of 80 football players.

He recorded the total distance, in kilometres, each player ran in the first half of their matches on Saturday.

Colin drew this box plot for his results.



(a) Work out the interquartile range.

..... km

(2)

There were 80 players in Colin's sample.

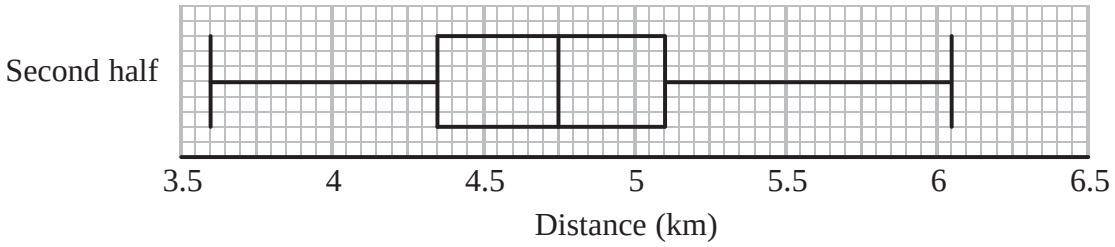
(b) Work out the number of players who ran a distance of more than 5.6 km.

.....

(2)

Colin also recorded the total distance each player ran in the second half of their matches.

He drew the box plot below for this information.



(c) Compare the distribution of the distances run in the first half with the distribution of the distances run in the second half.

.....

.....

.....

.....

(2)

(Total for Question 16 is 6 marks)

23 (a) Explain what is meant by a stratified sample.

.....

.....

(1)

The table shows information about the ages of the people living in a village.

Age group	Number of people
Under 21	72
21–40	90
41–60	123
Over 60	314

Mrs Parrish carries out a survey of these people.
She uses a sample size of 50 people stratified by age group.

(b) Work out the number of people over 60 years of age in the sample.

.....

(2)

(Total for Question 23 is 3 marks)

1 Shemoly wants to find out how often people play sport.
She uses this question on a questionnaire.

"Exercise is good for you. How often do you play sport?"

A lot ☐ Sometimes ☐ Never ☐

Write down **two** things that are wrong with this question.

1 .....

.....

.....

2 .....

.....

.....

(Total for Question 1 is 2 marks)

8 Ali throws a biased dice 200 times.

The table shows information about his results.

Score	Frequency
1	47
2	4
3	25
4	56
5	38
6	30

Charlie throws the dice 550 times.
Work out an estimate for the total number of times that Charlie will get a score of 4

.....

(Total for Question 8 is 3 marks)

14 The table shows some information about the students in a school.

Age	Number of male students	Number of female students	Total number of students
16	90	85	175
17	110	115	225
18	87	117	204
19	104	76	180
20 and over	123	127	250
Total number of students	514	520	1034

Alice wants to give a questionnaire to some of these students.
She takes a sample of 150 students stratified by age and gender.

Work out the number of 18-year-old female students there should be in the sample.

.....

(Total for Question 14 is 2 marks)

9 Jack wants to find out how far people live from their nearest supermarket.

He uses this question on a questionnaire.

How far do you live from your nearest supermarket?

☐ 0 to 2 ☐ 2 to 3 ☐ 3 to 4 ☐ 5 to 6

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

Jack also wants to find out how often people go shopping.

(b) Write a question Jack could use on his questionnaire to find out how often people go shopping.

(2)

(Total for Question 9 is 4 marks)

2 Tendai is doing a survey to find out how often people travel by bus.
She is going to ask 10 women leaving a railway station.

(a) This may **not** produce a good sample for Tendai's survey.
Give 2 reasons why.

Reason 1 .....

.....

.....

Reason 2 .....

.....

.....

(2)

(b) Design a suitable question for Tendai to use on a questionnaire to find out the number of times people travel by bus.

(2)

(Total for Question 2 is 4 marks)

14 (a) Explain what is meant by a stratified sample.

.....

.....

(1)

1786 people belong to a sports club.
They have either peak membership or off-peak membership.

The table shows information about the membership.

	Membership Type	
	Peak	**Off-peak**
Male	650	213
Female	429	494

The manager of the sports club gives a questionnaire to some of these people.

He takes a sample of 120 people stratified by membership type and gender.

(b) Work out the number of females with off-peak membership there should be in the sample.

.....

(2)

(Total for Question 14 is 3 marks)

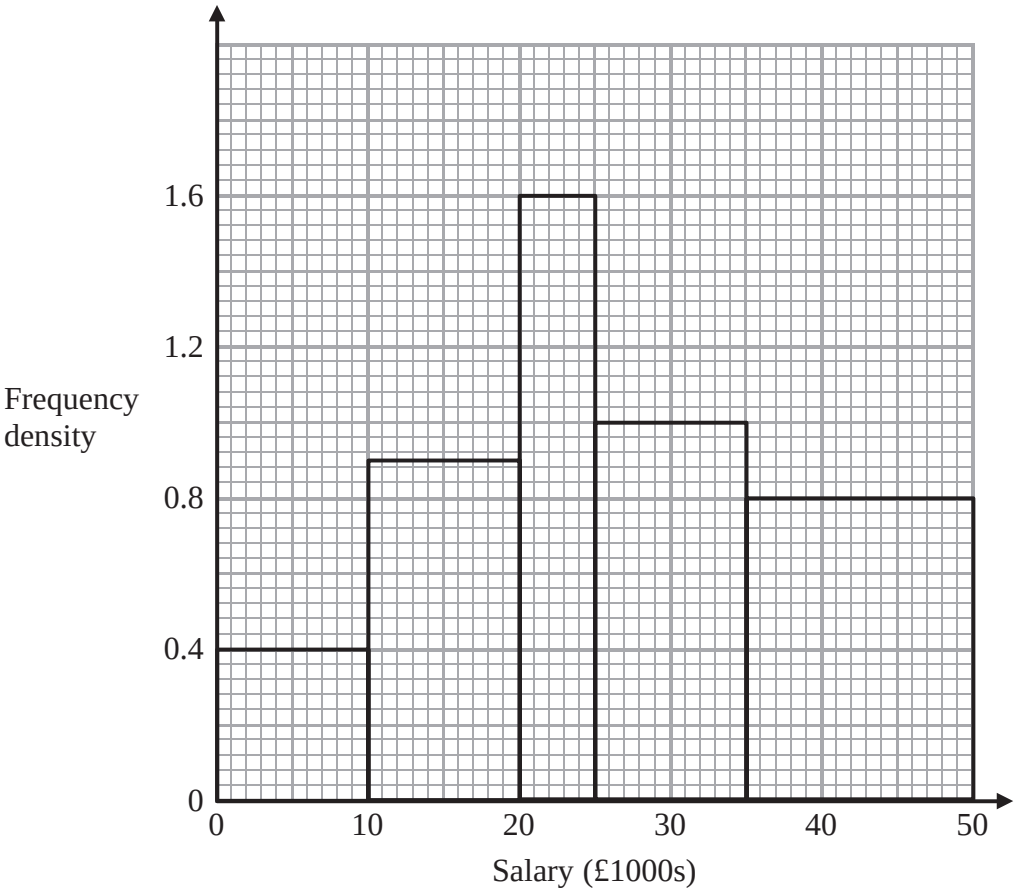
Question 56

3 Sean works for a town council.
He wants to find out how often people use the BMX track in the town.
He is going to use a questionnaire.

Design a suitable question for Sean to use in his questionnaire.

(Total for Question 3 is 2 marks)

26 The histogram shows some information about the salaries of a sample of people.



(a) Use the histogram to complete the frequency table.

Salary (p) in £1000s	Frequency
$0 < p \leqslant 10$	4
$10 < p \leqslant 20$	
$20 < p \leqslant 25$	
$25 < p \leqslant 35$	
$35 < p \leqslant 50$	

(2)

(b) Work out the proportion of people in the sample who have a salary greater than £40 000

.....

(2)

(c) Find an estimate for the median salary.

£.....

(2)

(Total for Question 26 is 6 marks)

3 Julian wants to find out whether people in his town like to buy food from the market.
He wants to carry out a survey.
He is going to ask people as they leave the market.

This is not a good way of collecting information.

(a) Give a reason why.

.....

.....

(1)

Julian also wants to know what people think about the price of food from the market.

He uses this question on a questionnaire.

Food from the market is very cheap. Do you agree?

Yes	No	Do not know
☐	☐	☐

(b) Write down **one** thing wrong with this question.

.....

(1)

Julian also wants to know how far people travel to buy food from the market.

(c) Design a suitable question for Julian to use on his questionnaire.

(2)

(Total for Question 3 is 4 marks)

10 (a) Explain what is meant by a stratified sample.

.....

.....

.....

(1)

The table gives some information about the number of people at a fitness centre one day.

	Gender	
Age (years)	**Male**	**Female**
Under 40	45	78
40 and over	73	25

Mr Ellory wants to give a questionnaire to some of these people.
He takes a sample of 60 people stratified by age and gender.

(b) Work out the number of males aged 40 and over that should be in the sample.

.....

(2)

(Total for Question 10 is 3 marks)

7 Martin wants to find out how often students use the local tram service.
He uses this question on a questionnaire.

How often do you use the local tram service?

☐ a little ☐ sometimes ☐ a lot

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Design a better question for a questionnaire for Martin to find out how often students use the local tram service.

(2)

(Total for Question 7 is 4 marks)

21 148 students went to Brighton.

Each student went to the Aquarium or the Brighton Wheel or the Royal Pavilion.

The table gives information about these students.

	Aquarium	Brighton Wheel	Royal Pavilion
Male	16	15	22
Female	36	35	24

The teacher takes a sample of 40 of these students.
The sample is stratified by gender and by place visited.

Work out the number of students in the sample who are female and went to the Brighton Wheel.

.....

(Total for Question 21 is 2 marks)

5 Alice wants to find out how many litres of petrol people buy.

She writes this question for a questionnaire.

How much petrol do you buy?

☐ 0–5 ☐ 5–10 ☐ 10–15

Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(Total for Question 5 is 2 marks)

12 The table below shows some information about 600 students at a school.

Year	Boys	Girls
7	40	60
8	50	30
9	60	40
10	76	54
11		

A teacher is carrying out a survey.
She takes a sample, stratified both by Year group and by gender, of 40 of the 600 students.

(a) Calculate the number of Year 8 boys in the sample.

.....

(2)

There are 5 Year 11 girls in the sample.

(b) Find an estimate for the number of Year 11 girls at the school.
You must show all your working.

.....

(2)

(Total for Question 12 is 4 marks)

***13** Toga wants to estimate the number of termites in a nest.

On Monday Toga catches 80 termites.
He puts a mark on each termite.
He then puts all 80 termites back in the nest.

On Tuesday Toga catches 60 termites.
12 of these termites have a mark on them.

Work out an estimate for the total number of termites in the nest.
You must write down any assumptions you have made.

.....

(Total for Question 13 is 4 marks)

3 Richard wants to find out how often people buy crisps.
He uses this question on a questionnaire.

How often do you buy crisps?

Often ☐ Sometimes ☐ Never ☐

(a) Write down **two** things that are wrong with this question.

1 .....

.....

2 .....

.....

(2)

(b) Design a better question for Richard to use on his questionnaire to find out how often people buy crisps.

(2)

Richard is going to ask the students in his maths class to answer his questionnaire.

(c) This may **not** be a good sample to use.
Give one reason why.

.....

.....

(1)

(Total for Question 3 is 5 marks)

19 The table gives information about 234 students in a school.

Year group	Number of female students	Number of male students
Year 12	77	51
Year 13	53	31
Year 14	13	9

Sadia is doing a survey of these students.
She is using a sample of 50 students stratified by year group and by gender.

Work out the number of Year 12 male students in the sample.

.....

(Total for Question 19 is 2 marks)

1 Zack is doing a survey to find out how much time students spend listening to music.
He is going to ask 10 of the boys who play in a school band.

This may **not** be a good sample for Zack's survey.

(a) Give a reason why.

.....

.....

(1)

Zack is going to use a questionnaire to find out how much time students spend listening to music.

(b) Design a suitable question for Zack to use on his questionnaire.

(2)

(Total for Question 1 is 3 marks)

13 The table shows information about 1720 people treated at a doctors' surgery.

Age	Male	Female
Under 16	125	130
16 to 59	486	465
60 and over	230	284

The surgery manager takes a sample of 50 patients stratified by age and by gender.

Work out the number of male patients of age 16 to 59 that should be in the sample.

.....

(Total for Question 13 is 2 marks)

17 Pierre is going to carry out a survey using a questionnaire.
He wants to find out how often people play sport.

(a) Design a suitable question for Pierre to use on his questionnaire.

(2)

The two-way table gives information about the gender and the ages of the people who live in a small town.

	Age (years)			Total
	0–18	**19–60**	**over 60**	
Male	248	503	171	922
Female	198	460	129	787
Total	446	963	300	1709

Pierre gives his questionnaire to a sample of these people.
He uses a sample of 200 of these people stratified by gender and by age.

(b) Calculate the number of females aged 19–60 in the sample.

.....

(2)

(Total for Question 17 is 4 marks)

4 Khanna wants to find out how much time people spend listening to the radio.
She is going to use a questionnaire.

(a) Design a suitable question for Khanna to use on her questionnaire.

(2)

Khanna asks the people in her dance class to do the questionnaire.

(b) Her sample is biased.
Explain why.

.....

.....

(1)

(Total for Question 4 is 3 marks)

14 176 people each bought a hot dog or a burger or a pizza from a snack bar.
The table gives information about the people and the type of food they bought.

	Hot dog	Burger	Pizza
Male	29	45	17
Female	23	37	25

Oscar is going to take a sample of 20 of these people.
The sample will be stratified by type of food and by gender.

Work out how many males who bought a pizza will be in the sample.

.....

(Total for Question 14 is 2 marks)

17 There are a large number of white beads in a bag.
There are only white beads in the bag.

Felicity wants to find an estimate for the number of beads in the bag.

Felicity replaces 30 of the white beads in the bag with 30 black beads.

She then takes 50 beads from the bag.
2 of the 50 beads are black.

Felicity then puts the 50 beads back in the bag.

(a) Work out an estimate for the number of beads in the bag.

.....

(2)

(b) Write down one assumption you have made.

.....

.....

(1)

(Total for Question 17 is 3 marks)

Question 73

1 Anna wants to find out how often people travel by train.
She is going to use a questionnaire.

Design a suitable question for Anna to use on her questionnaire.

(Total for Question 1 is 2 marks)

3 Hannah is planning a day trip for 195 students.

She asks a sample of 30 students where they want to go.
Each student chooses one place.

The table shows information about her results.

Place	Number of students
Theme Park	10
Theatre	5
Sports Centre	8
Seaside	7

(i) Work out how many of the 195 students you think will want to go to the Theme Park.

.....

(2)

(ii) State any assumption you made **and** explain how this may affect your answer.

.....

.....

.....

(1)

(Total for Question 3 is 3 marks)

4 Each person in a fitness club is going to get a free gift.
Stan is going to order the gifts.

Stan takes a sample of 50 people in the fitness club.
He asks each person to tell him the gift they would like.

The table shows information about his results.

Gift	Number of people
sports bag	17
gym towel	7
headphones	11
voucher	15

There are 700 people in the fitness club.

(i) Work out how many sports bags Stan should order.

.....

(2)

(ii) Write down any assumption you made **and** explain how this could affect your answer.

.....

.....

.....

.....

(1)

(Total for Question 4 is 3 marks)

16 Shirley wants to find an estimate for the number of bees in her hive.

On Monday she catches 90 of the bees.
She puts a mark on each bee and returns them to her hive.

On Tuesday she catches 120 of the bees.
She finds that 20 of these bees have been marked.

(a) Work out an estimate for the total number of bees in her hive.

.....

(3)

Shirley assumes that none of the marks had rubbed off between Monday and Tuesday.

(b) If Shirley's assumption is wrong, explain what effect this would have on your answer to part (a).

.....

.....

.....

(1)

(Total for Question 16 is 4 marks)

14 Saffron wants to work out an estimate for the total number of fish in a lake.

On Friday, Saffron catches 180 fish from the lake.
She puts a tag on each of these fish and puts them back into the lake.

On Saturday, Saffron catches 305 fish from the same lake.
She finds that 45 of the 305 fish are tagged.

Work out an estimate for the total number of fish in the lake.

.....

(Total for Question 14 is 3 marks)

18 Maria wants to find an estimate for the number of frogs in a lake.

On Saturday she catches 40 of the frogs.
She puts a tag on each frog and releases them.

On Monday she catches 55 of the frogs.
11 of the frogs have tags.

(a) Work out an estimate for the total number of frogs in the lake.
You must show all your working.

.....

(3)

(b) State one assumption you have made.

.....

.....

.....

(1)

(Total for Question 18 is 4 marks)