4. A survey was carried out with students that had studied Maths, Physics and Chemistry at a college between 2016 and 2020. The students were divided into two groups *A* and *B*.

(a) Explain how a sample could be obtained from this population using quota sampling.

(2)

The students were asked which of the three subjects they enjoyed the most.
The results of the survey are shown in the table.

	Subject enjoyed the most			
	Maths	Physics	Chemistry	Total
Group *A*	16	10	13	39
Group *B*	38	13	10	61
Total	54	23	23	100

(b) Test, at the 5% level of significance, whether the subject enjoyed the most is independent of group.
You should state your hypotheses, expected frequencies, test statistic and the critical value used for this test.

(8)

The Headteacher discovered later that the results were actually based on a random sample of 200 students but had been recorded in the table as percentages.

(c) For the test in part (b), state with reasons the effect, if any, that this information would have on

(i) the null and alternative hypotheses,

(ii) the critical value,

(iii) the value of the test statistic,

(iv) the conclusion of the test.

(4)

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Question 4 continued

(Total for Question 4 is 14 marks)