

Questions taken from the WJEC Specimen Paper (Applied)

Question	1	2	6	10	5	7	Total
Marks							
Max Marks	5	4	7	7	2	7	32

SPEND ABOUT 40 MINUTES ON THE QUESTIONS THEN CHECK AND CORRECT YOUR ANSWERS USING THE MARK SCHEME

1. The events A, B are such that $P(A) = 0.2, P(B) = 0.3$. Determine the value of $P(A \cup B)$ when
- (a) A, B are mutually exclusive, [2]
- (b) A, B are independent, [3]
2. Dewi, a candidate in an election, believes that 45% of the electorate intend to vote for him. His agent, however, believes that the support for him is less than this. Given that p denotes the proportion of the electorate intending to vote for Dewi,
- (a) state hypotheses to be used to resolve this difference of opinion. [1]
- They decide to question a random sample of 60 electors. They define the critical region to be $X \leq 20$, where X denotes the number in the sample intending to vote for Dewi.
- (b) (i) Determine the significance level of this critical region. [3]
6. A small object, of mass 0.02 kg, is dropped from rest from the top of a building which is 160 m high.
- (a) Calculate the speed of the object as it hits the ground. [3]
- (b) Determine the time taken for the object to reach the ground. [3]
- (c) State one assumption you have made in your solution. [1]
10. Two forces \mathbf{F} and \mathbf{G} acting on an object are such that
- $$\mathbf{F} = \mathbf{i} - 8\mathbf{j},$$
- $$\mathbf{G} = 3\mathbf{i} + 11\mathbf{j}.$$
- The object has a mass of 3 kg. Calculate the magnitude and direction of the acceleration of the object. [7]

5. Gareth has a keen interest in pop music. He recently read the following claim in a music magazine.

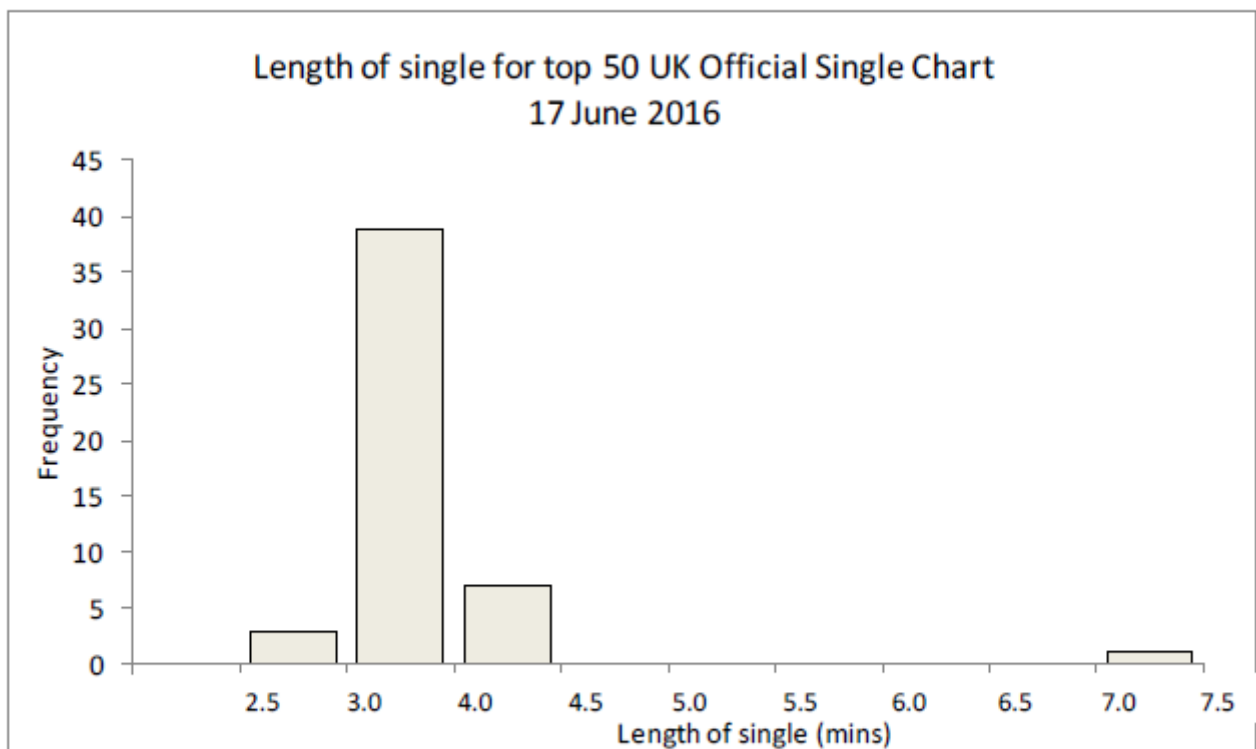
In the pop industry most songs on the radio are not longer than three minutes.

He decided to investigate this claim by recording the lengths of the top 50 singles in the UK Official Singles Chart for the week beginning 17 June 2016. (A 'single' in this context is one digital audio track.)

- (b) Gareth recorded the data in the table below.

Length of singles for top 50 UK Official Chart singles, 17 June 2016									
2.5–(3.0)	3.0–(3.5)	3.5–(4.0)	4.0–(4.5)	4.5–(5.0)	5.0–(5.5)	5.5–(6.0)	6.0–(6.5)	6.5–(7.0)	7.0–(7.5)
3	17	22	7	0	0	0	0	0	1

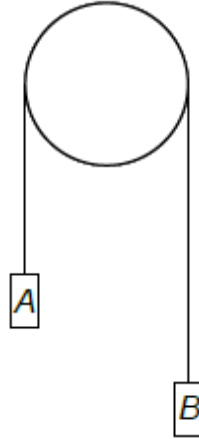
He used these data to produce a graph of the distributions of the lengths of singles



State two corrections that Gareth needs to make to the histogram so that it accurately represents the data in the table.

[2]

7. The diagram below shows two particles A and B , of mass 2 kg and 5 kg respectively, which are connected by a light inextensible string passing over a fixed smooth pulley. Initially, B is held at rest with the string just taut. It is then released.



- (a) Calculate the magnitude of the acceleration of A and the tension in the string. [6]
- (b) What assumption does the word 'light' in the description of the string enable you to make in your solution? [1]