11 An experiment is carried out to investigate the speed of transverse waves on a stretched string of length L. A vibration generator causes the string to oscillate so that a stationary wave is produced. The frequency of the vibration generator is adjusted until the wave pattern shown in the diagram is produced.
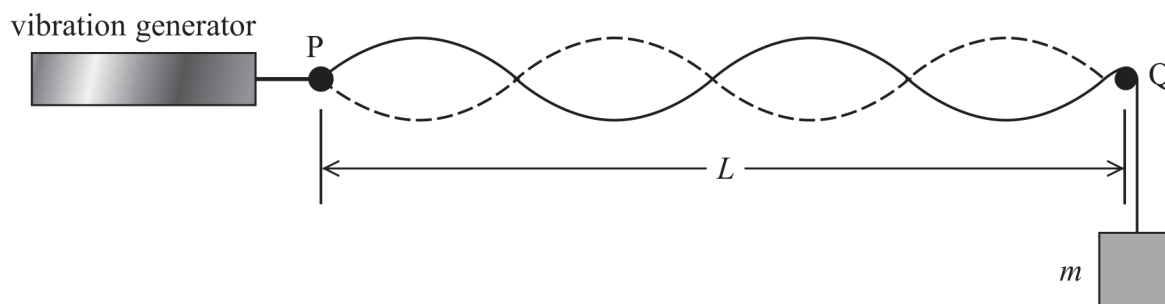
Sourced from: https://people.highline.edu/iglozman/classes/physnotes/media/waves_9.jpg

(a) Determine the wavelength of the waves on the string when vibrating as shown.

length $L = 1.70\,\text{m}$

(2)

....

....

Wavelength = ...

(b) Calculate the speed of waves on the string.

mass $m = 0.20\,\text{kg}$
mass per unit length of string $= 4.5 \times 10^{-3}\,\text{kg}\,\text{m}^{-1}$

(3)

....

....

....

....

Speed = ...

(c) The frequency of the vibration generator is reduced until the wave pattern shown below is produced.

Explain the effect that this would have on the speed of the waves on the string.

(2)

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....

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....

(Total for Question 11 = 7 marks)