

Name: _____

DISC: _____

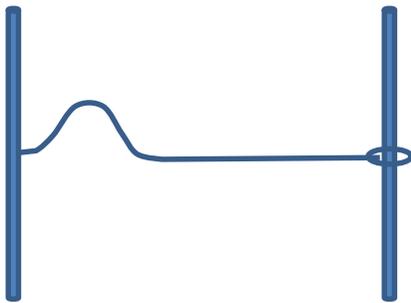
Score: ____ / 20

Instructions:

- Do your own work.
- Answer the questions below in the space provided.
- Make sure you show all your work and any equations that you use.
- Please place a box around your answers.
- Remember to give the correct units with all numerical answers

| | | | |
|----|----|----|----|
| Q1 | Q2 | Q3 | Q4 |
| | | | |
| 10 | 10 | 5 | 5 |

1. A pulse travels down a string fixed at one end and free at the other as shown in the diagram (the ring on the end of the string allows the string end to be free).



| LENGTH OF STRING | M (STRING) | v_{pulse} |
|------------------|------------|-------------|
| 0.35 m | 0.2 kg | 0.75 m/s |

Table 1: Properties of the System

- a. The reflected pulse will be
- Inverted.
 - Upright.

Selection (2 pts):

- b. Given the parameters in the table above, what is the tension T in the string (remember $v = \sqrt{\frac{T}{M/L}}$)?

Tension (2 pts):

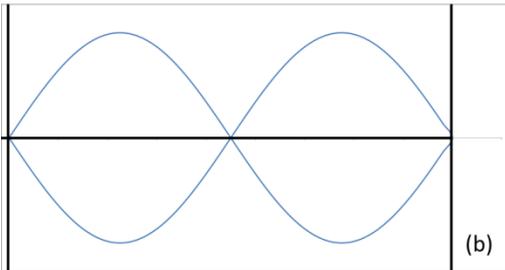
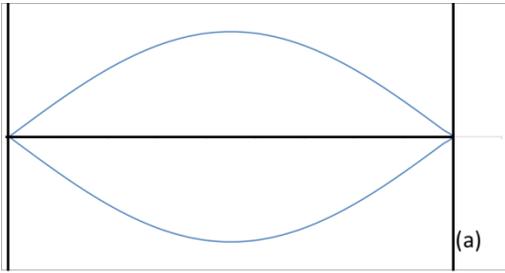
- c. If you double the string tension what is the speed of the pulse?

New speed (3 pts):

- d. At the same time the original pulse is reflected the string is plucked again. This produces a second pulse of the same amplitude. What will happen when the pulses meet?

Meeting of Pulses (3 pts):

2. Consider the standing waves on a string as shown:



| Useful Information | |
|--------------------|----------------|
| Mass of String | 0.25 kg |
| Length of String | 60 cm |
| Tension of String | 100 N |
| Speed of Wave | $v = f\lambda$ |

a. Which image (a) or (b) describes the fundamental harmonic. Explain your reasoning.

First Harmonic (2 pts):

b. What is the wavelength of each wave?

| | Figure (a) | Figure (b) |
|--|------------|------------|
| | | |

Wavelength (3 pts):

c. Using the parameters in the table above, find the speed of a wave on this string.

Interference (2 pts):

d. What are the frequencies of the waves?

| | Figure (a) | Figure (b) |
|--|------------|------------|
| | | |

Frequencies (3 pts):