

**NOTE:**

This document contains both the pre- and post- test and the pages are labeled accordingly.

## The Hubble Redshift Distance Relation

### Pre -Test

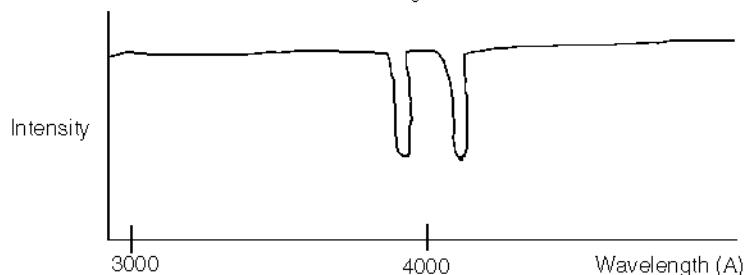
Name \_\_\_\_\_ Major \_\_\_\_\_

Graduation Date \_\_\_\_\_

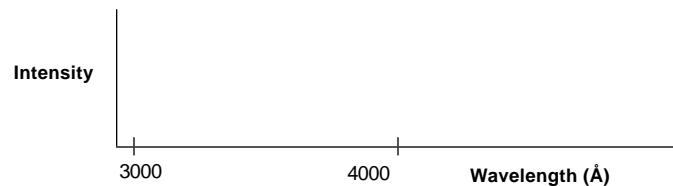
*Circle the correct answer or fill in the blank.*

1. The Universe is (a.) expanding (b.) contracting (c.) static.
2. FIGURE 1 is a spectrum of a galaxy at rest.

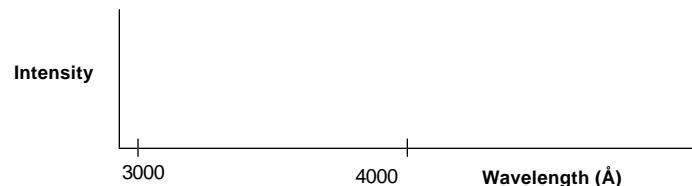
Figure 1



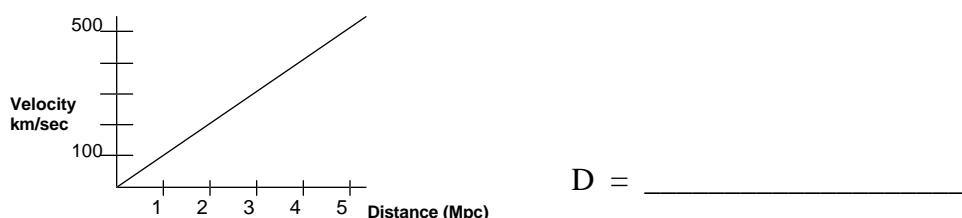
Draw the spectrum of a **NEARBY** galaxy.



3. Draw the spectrum of a **DISTANT** galaxy.



4. How do we measure the red-shift of a galaxy?
- a. We watch the spectral lines in a galaxy's spectrum shift with time. If their wavelengths become longer, then the galaxy is moving away from us.
  - b. We measure the wavelengths of known spectral lines and compare them with the "laboratory" values.
  - c. We use red, yellow, and blue filters to see which gives us the most light.
  - d. We take images of the galaxy at various times to see if it's growing dimmer.
  - e. We plot its position on the HR diagram.
5. Look at the graph below of velocity versus distance for galaxies. At what distance from us will you find a galaxy traveling at 400 km/sec?



6. If the Hubble constant were to be found to be much smaller than we think it is right now, how would this change the measured age of the universe? Justify your answer.
7. What is the advantage of using large telescopes for the measurement of the age of the universe?

## The Hubble Redshift Distance Relation Post -Test

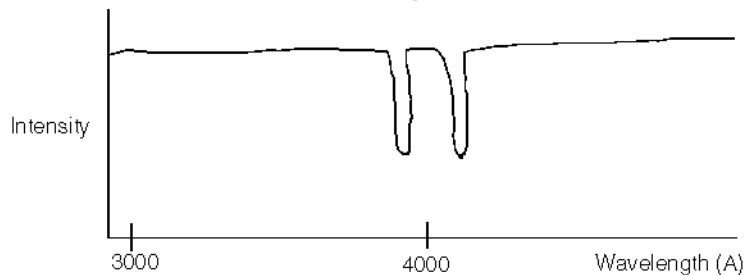
Name \_\_\_\_\_ Major \_\_\_\_\_

Graduation Date \_\_\_\_\_

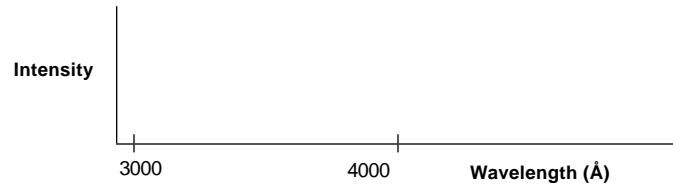
*Circle the correct answer or fill in the blank.*

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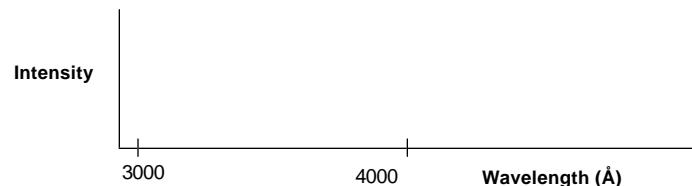
Figure 1



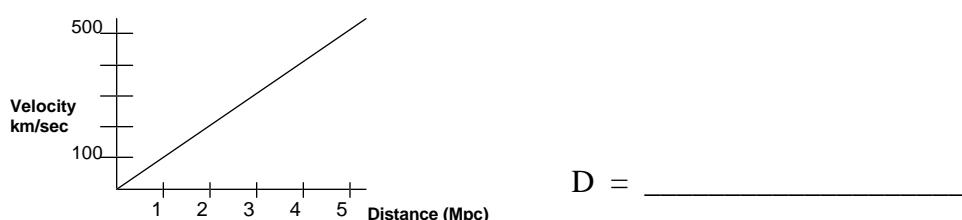
Draw the spectrum of a **NEARBY** galaxy.



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