

# MY SO PRACTICE TEST

DIVISION B - MIDDLE SCHOOL, GRADES 6-9

## PRACTICE TEST

### Instructions

- You have 20 minutes to complete this test.
- You may write your answers directly in the test.
- You may use any notes or resources you have created or collected.
- You may use a calculator and scratch paper if necessary.
- Good Luck!

### Test Questions

Image 1



1. How many total DSO's are there in the image above?
  - a. 0
  - b. 5
  - c. 25
  - d. 30
2. What is the name of the star in the left-most constellation in the image above?
  - a. Antares
  - b. Capella
  - c. Pollux
  - d. Sirius

3. What is the evolutionary stage of the star in the left-most constellation in the image above?
  - a. Giant
  - b. Main Sequence Star
  - c. Red Dwarf
  - d. Super Giant
  
4. What is the next most likely stage in the evolution of Pollux?
  - a. Main Sequence
  - b. Red Dwarf
  - c. Super Giant
  - d. White Dwarf

**Image 2**



5. What most likely is causing Image 2 to move through space at an abnormally high velocity?
  - a. The proximity of a black hole
  - b. It's transitioning from a Main Sequence Star
  - c. The explosion of its binary propelled the star
  - d. Gravitational attraction of a nearby constellation

**Image 3**



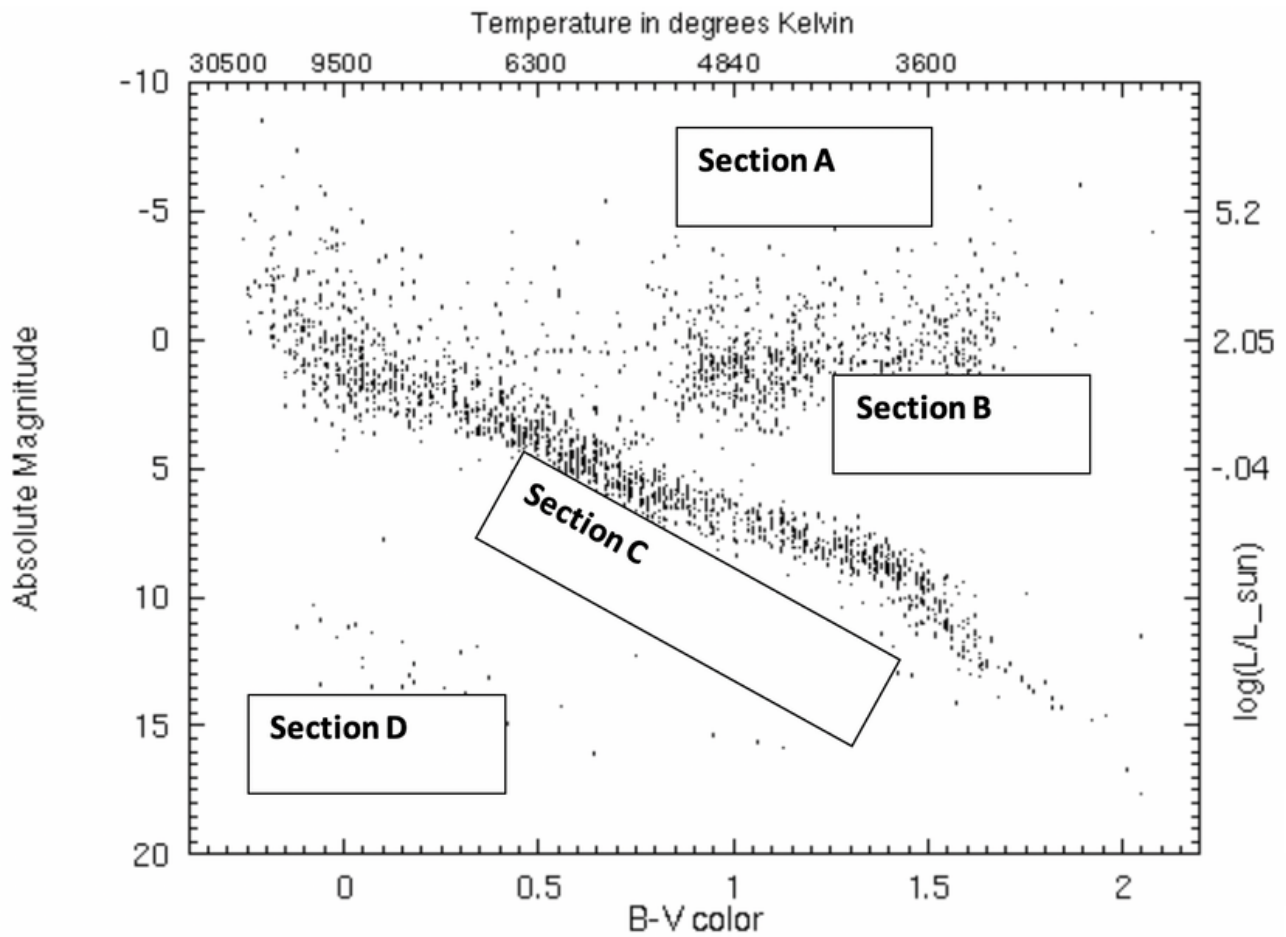
6. What is this constellation shown in Image 3 named after in Greek Mythology?
  - a. Castor
  - b. Medusa
  - c. Orion
  - d. Sphinx

Image 4



7. Which star in image 4 has the greatest brightness as measured from earth?
- a. Arcturus
  - b. Deneb
  - c. Vega
  - d. Procyon

Use the Following Image for Questions #8 through #18



8. How should Section A in the unlabeled H-R diagram shown above be labelled?
  - a. Giants
  - b. Main Sequence
  - c. Supergiants
  - d. White Dwarf
  
9. How should Section B in the unlabeled H-R diagram shown above be labelled?
  - a. Giants
  - b. Main Sequence
  - c. Supergiants
  - d. White Dwarf
  
10. How should Section C in the unlabeled H-R diagram shown above be labelled?
  - a. Giants
  - b. Main Sequence
  - c. Supergiants
  - d. White Dwarf
  
11. How should Section D in the unlabeled H-R diagram shown above be labelled?
  - a. Giants
  - b. Main Sequence
  - c. Supergiants
  - d. White Dwarf
  
12. In what region on the H-R diagram would you find the Sun?
  - a. Giants
  - b. Main Sequence
  - c. Supergiants
  - d. White Dwarf
  
13. Where in a H-R diagram are you more likely to find bluer stars?
  - a. Left Side
  - b. Middle Band
  - c. Right Side
  - d. Top Band
  
14. What is the definition of Absolute Magnitude?
  - a. brightness of an object in space
  - b. how bright the star appears from Earth
  - c. the amount of energy that a star
  - d. emits from its surface
  - e. how bright the star appears at a standard distance of 32.6 light-years
  
15. Where on the diagram would you find Vega?
  - a. Bottom-left
  - b. Bottom-right
  - c. Middle
  - d. Top-left
  - e. Top-right

16. Where on the diagram would you find Spica?
- Bottom-left
  - Bottom-right
  - Middle
  - Top-left
  - Top-right
17. Where on the diagram would you find Altair?
- Bottom-left
  - Bottom-right
  - Middle
  - Top-left
  - Top-right
18. Where on the diagram would you find the companion star of Sirius?
- Bottom-left
  - Bottom-right
  - Middle
  - Top-left
  - Top-right
19. What is the name of a region of interstellar atomic hydrogen where star formation is taking place?
- An Elliptical
  - A H II region
  - The Main Sequence
  - A Stellar Incubator
20. What type of galaxies mainly consist of older stars and have minimal star formation?
- Barred Spiral
  - Elliptical
  - Irregular
  - Spiral
21. What is the part of a galaxy where globular clusters are typically located?
- Galactic Disk
  - Halo
  - Nucleus
  - Spiral Arm
22. Who created the first galaxy classification scheme?
- Galileo Galilei
  - Edwin Hubble
  - Carl Sagan
  - Neil deGrasse Tyson
23. What stars do not get hot enough to reach nuclear fusion in their cores?
- Black Dwarfs
  - Brown Dwarfs
  - Red Dwarfs
  - White Dwarfs

24. What is its apparent magnitude of a galaxy that is 100,000 parsecs away and has an absolute magnitude of 15?
- 15
  - 20
  - 35
  - 45
25. What term describes the relationship between the luminosity and rotational velocity of a spiral galaxy?
- Cepheid Distances
  - Faber-Jackson Concordance
  - Fundamental Plane
  - Tully-Fisher Relation

Use the following information to answer Questions #26 through #30.

**Star A has a luminosity  $L$  and temperature  $T$ . Star B has luminosity  $2L$  and temperature  $2T$ .**

26. Write an expression using these variables and the Stefan-Boltzmann constant  $\sigma$  to solve for the radius of star A.
27. Given that  $L = 4 \times 10^{28} \text{ W}$ ,  $T = 8000 \text{ K}$ , and  $\sigma = 5.67 \times 10^{-8} \text{ W/m}^2/\text{K}^4$ , solve for the radius of star A in meters.
28. At what wavelength in nanometers will star A have peak blackbody radiation?
29. How much larger is the radius of star B than star A (answer should have up to 3 significant figures)?
30. Given that the luminosity of the sun is  $3.83 \times 10^{26} \text{ W}$  and its absolute magnitude is 4.83, what is the absolute magnitude of star B using the  $L$  value given in question 27?

# ANSWER KEY

- |     |          |     |  |     |                           |
|-----|----------|-----|--|-----|---------------------------|
| 1.  | <b>B</b> | 15. | <b>E</b>                               | 29. | <b>0.354 times larger</b> |
| 2.  | <b>A</b> | 16. | <b>D</b>                               | 30. | <b>-0.97</b>              |
| 3.  | <b>D</b> | 17. | <b>C</b>                               |     |                           |
| 4.  | <b>D</b> | 18. | <b>A</b>                               |     |                           |
| 5.  | <b>C</b> | 19. | <b>B</b>                               |     |                           |
| 6.  | <b>C</b> | 20. | <b>B</b>                               |     |                           |
| 7.  | <b>A</b> | 21. | <b>B</b>                               |     |                           |
| 8.  | <b>C</b> | 22. | <b>B</b>                               |     |                           |
| 9.  | <b>A</b> | 23. | <b>B</b>                               |     |                           |
| 10. | <b>B</b> | 24. | <b>C</b>                               |     |                           |
| 11. | <b>D</b> | 25. | <b>D</b>                               |     |                           |
| 12. | <b>B</b> | 26. | $R = \sqrt{L/(4\pi\sigma T^4)}$ (2)    |     |                           |
| 13. | <b>A</b> | 27. | <b><math>3.70 \times 10^9</math> m</b> |     |                           |
| 14. | <b>D</b> | 28. | <b>362 nm</b>                          |     |                           |