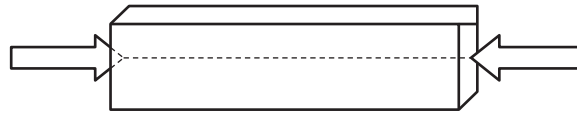

International STEM Tinkering Olympiad
Sample Paper
ISTO Senior

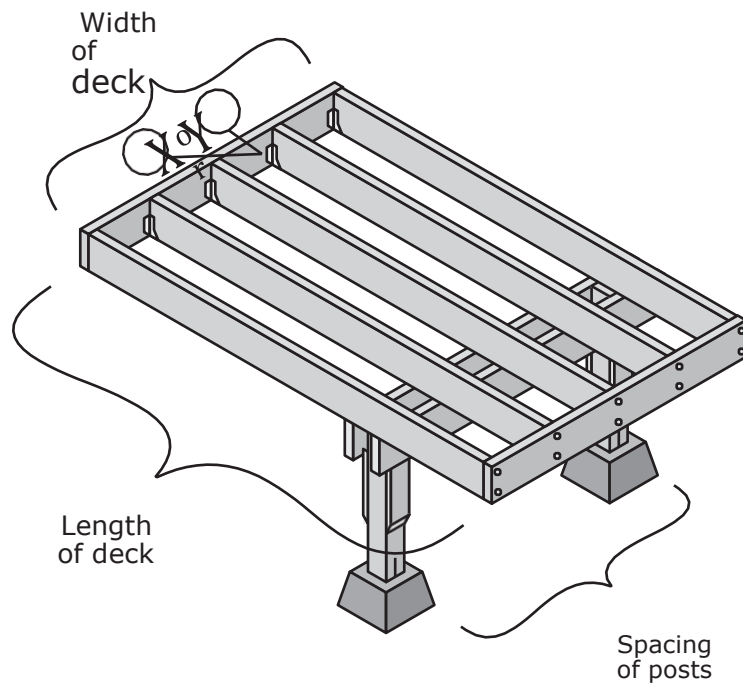
1. The drawing below represents a metal bar subjected to forces at both ends. The dotted line indicates the axis along which the forces are applied.

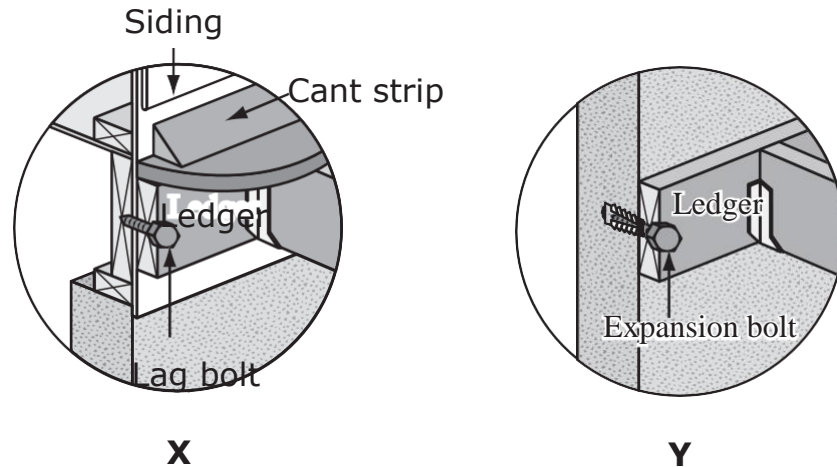


Which of the following is the type of stress being exerted on the bar?

- A. compression
- B. shear
- C. tension
- D. torsion

2. The diagram below shows a basic construction diagram for framing a deck.

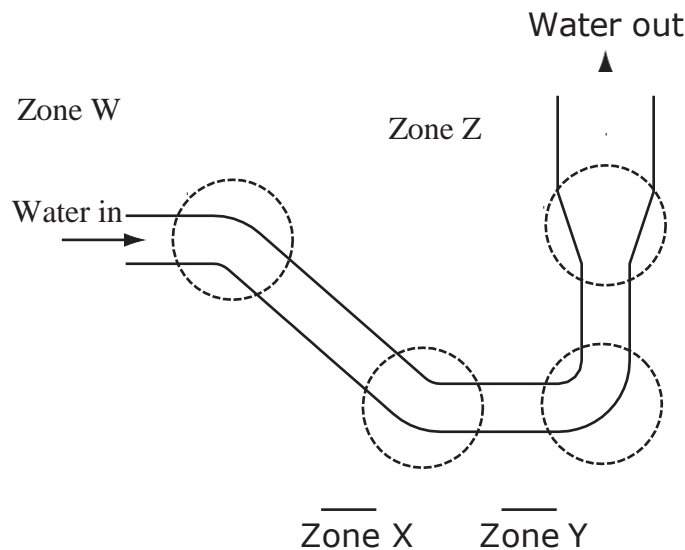




Which of the following statements best explains why the details shown in X and Y are provided?

- A. The length of the deck may vary.
- B. The width of the deck may vary.
- C. The posts may sit on different types of foundations.
- D. The deck may be attached to structures made of different materials.

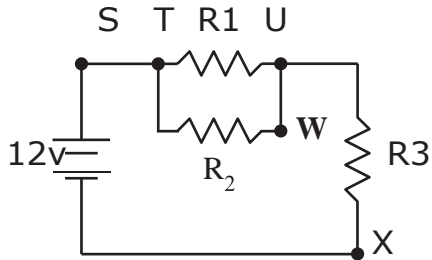
3. The diagram below shows the flow of water in a section of a piping system.



Which zone has the **highest** resistance to the flow of water?

- A. zone W
- B. zone X
- C. zone Y
- D. zone Z

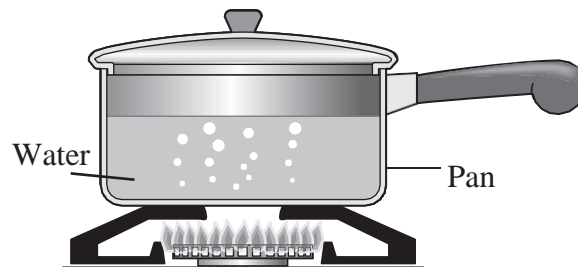
4. Which of the following describes the proper use of a tool?



At which of the following points should the two leads of a voltmeter be placed to measure the voltage across R_1 ?

- A. At points U and W
- B. At points S and X
- C. At points S and T
- D. At points T and U

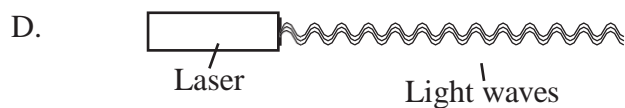
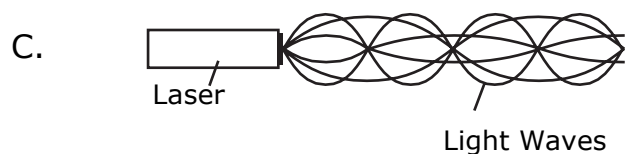
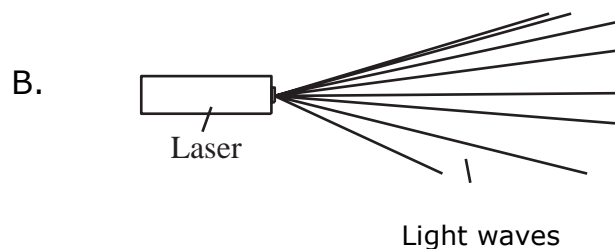
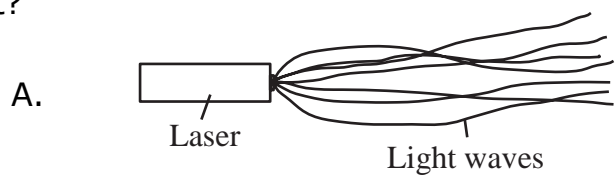
5. The figure below shows water being heated in a pan on a gas burner.



Which of the following identifies a heat transfer primarily due to radiation?

- A. From the wall of the pan to cover
- B. From the pan to the surface of the water
- C. From the flame to the bottom of the pan
- D. From the surface of the water to the handle of the pan.

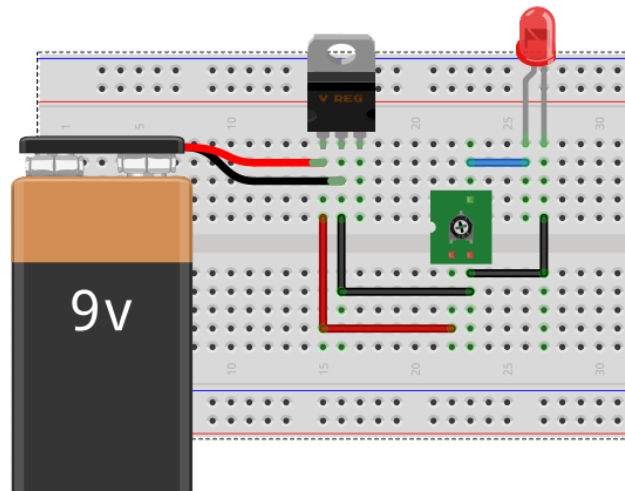
6. Lasers produce coherent light. Which of the drawings best represents coherent light?



7. Since the introduction of the cellular phone, many advances in wireless communication have been made. Which of the following features has been added to cellular phones for the purpose of finding someone who has placed an emergency call?

- A. Caller Identification
- B. Digital Camera
- C. Global Positioning System
- D. Text Messaging

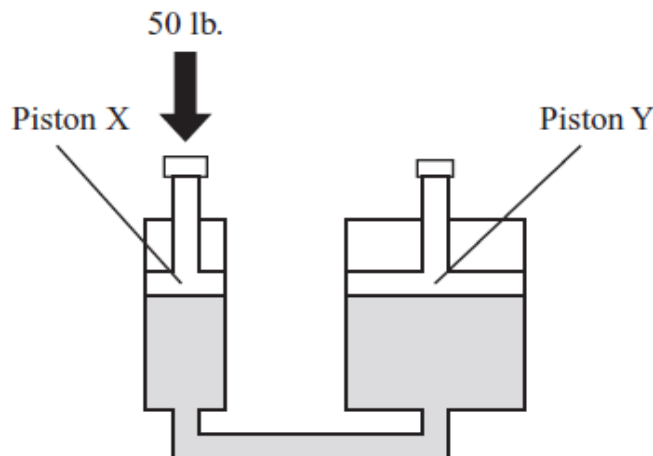
8. The following circuit will have what effect on the LED bulb?



The green colored component in the circuit is a potentiometer.

- A. LED will blink
- B. Brightness of LED can be varied
- C. LED will glow with a constant brightness
- D. LED will not glow.

9. In the hydraulic system shown below, the cross-sectional area of piston Y is 5 times greater than the cross-sectional area of piston X



If a 50 lb. downward force is applied to piston X, what will be the resulting force on piston Y?

- A. 50 lb. down
- B. 50 lb. up
- C. 250 lb. down
- D. 250 lb. up

10. Some small MP3 music players use solid-state memory chips to store music. In which of the following formats is music stored in these MP3 players?

- A. Digital Codes
- B. Magnetic Codes
- C. Photovoltaic Cells
- D. Laser-etched patterns.

