

## Structures and Forces Practice Quiz

### Topic 6 - Designing With Forces

1. Designers generally use three key methods to help structures withstand forces. They include all of the methods below, **EXCEPT** for ...

**distribute the load evenly**

**direct the forces along angled components**

**shape the parts for the forces they are likely to face**

**place lighter materials above heavier materials**

2. Construction of a roof truss utilizes an important principle. Certain shapes will determine greater strength. Because roofs need to be very strong, roof trusses are shaped in ...

**rectangles**

**squares**

**triangles**

**parallelograms**

3. A frame structure can support a very heavy roof because of one of the principles of design. This principle is visibly demonstrated by the verticle supporting posts in the structure. The principle followed is ...

**distribute the load evenly**

**direct the forces along angled components**

**shape the parts for the forces they are likely to face**

**place lighter materials above heavier materials**

4. When a structure has a single horizontal load bearing beam, supported by two columns - one at each end, the beam will likely bend in the middle (A box and girder bridge spanning a river is a good example). This bending exerts pressure outward on the vertical supporting beams. To strengthen this bridge, so that heavy vehicle can cross it, you should ...

**reinforce the columns at both ends with braces**

**place additional columns in the middle**

**use a double cantilever design**

**utilize flying buttresses**

5. Science fiction often gives us exciting ideas about materials that can withstand almost any force. In reality, the perfect material has not been discovered yet. One material (if it could be made the thickness of a pencil - could stop a 747 jet). It is currently being synthetically developed and will have widespread use because of its strength. The material is known as ...

**Kelvar®**

**spider silk**

**industrial bamboo**

**rice grain**

6. Remember when you put your hands on your desk and put all your weight on them - then tried to move them forward? This demonstration was used to identify that your hand (much like a structure) resists movement forward because of ...

**static forces**

**kinetic forces**

**external forces**

**frictional forces**

**Check your Answers**

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### **Topic 6 - Designing With Forces**

1. Designers generally use three key methods to help structures withstand forces. They include all of the methods below, **EXCEPT** for ...

**distribute the load evenly**

**direct the forces along angled components**

**shape the parts for the forces they are likely to face**

**place lighter materials above heavier materials (Text p. 321) This might make sense, but it is not one of the three principles which guide structural design.**

2. Construction of a roof truss utilizes an important principle. Certain shapes will determine greater strength. Because roofs need to be very strong, roof trusses are shaped in ...

**rectangles**

**squares**

**triangles (Text p. 321) Triangular shapes are much stronger than any of the other shapes**

**parallelograms**

3. A frame structure can support a very heavy roof because of one of the principles of design. This principle is visibly demonstrated by the verticle supporting posts in the structure. The principle followed is ...

**distribute the load evenly (Text p. 321) Figure 4.50 Share the Load**

**direct the forces along angled components**

**shape the parts for the forces they are likely to face**

**place lighter materials above heavier materials**

4. When a structure has a single horizontal load bearing beam, supported by two columns - one at each end, the beam will likely bend in the middle (A box and girder bridge spanning a river is a good example). This bending exerts pressure outward on the vertical supporting beams. To strengthen this bridge, so that heavy vehicle can cross it, you should ...

**reinforce the columns at both ends with braces**

**place additional columns in the middle**

**use a double cantilever design (Text p. 322) Figure 4.52 B**

**utilize flying buttresses**

5. Science fiction often gives us exciting ideas about materials that can withstand almost any force. In reality, the perfect material has not been discovered yet. One material (if it could be made the thickness of a pencil - could stop a 747 jet). It is currently being synthetically developed and will have widespread use because of its strength. The material is known as ...

**Kelvar®**

**spider silk (Text p. 313) Check out the Did You Know**

**industrial bamboo**

**rice grain**

6. Remember when you put your hands on your desk and put all your weight on them - then tried to move them forward? This demonstration was used to identify that your hand (much like a structure) resists movement forward because of ...

**static forces**

**kinetic forces**

## **external forces**

**frictional forces (Text p. 326) You are feeling the force of friction, which resists movement between two surfaces that rub together.**