Forces on Structures Test Review Answers

1. What is a Newton?

   A Newton (N) is used to measure force. An orange held in your hand is about 1N. A spring scale can be used to measure the force of an object.

2. Explain the following terms:
   a. Tension: **Is a pulling force; two connected structures/objects trying to separate from one another**

   b. Compression: **is a pushing force (squeezing); structure has to resist being squeezed together**

   c. Difference between flexible and rigid:

      A flexible structure/object bends easily. A structure/object that does not bend easily under a force is said to be rigid.

   d. Force: **a push or pull on an object**

   e. Gravity: **the force by which objects are attracted to the centre of the Earth; the greater the mass of the object, the more it is attracted to the Earth.**

   f. Energy: **is the ability to do work/ the power to exert a force**

3. What is a balancing act?

   A balancing act occurs when both the push and pull forces are equal – like a balance scale when both sides are of the same mass or weight.

4. Name and describe 3 different types of bridges.

   Arch Bridge – It has an arch in it; the arch spreads the load from the deck of the abutments and into the ground; creates a lot of compression

   Suspension Bridge – uses a combination of tension and compression; the cables carry the tension and by stretching across the towers, they

pull down and create compression in the towers. The cables are secured by land anchors, and the deck hangs from the cables. The load pulls down on the cables and this is weight is transferred to the towers and anchors.

Truss Bridge – they carry a combination of compression and tension forces; it is a beam bridge with triangular trusses to add extra support

Beam Bridge – it is the simplest type of bridge where a beam and the load is supported at both ends.

5. Name 4 different kinds of natural forces that can affect structures.

Tornadoes
Hurricanes
Avalanches
Landslides
Tsunamis
Floods
Ice storms
Snowstorms
Cyclones
Earthquake
Volcano

6. What are the similarities and difference between pyramids and Stonehenge?

Similarities:
- **made of stone**
- **made by humans**
- **took a long time to build**
- **old**

Differences:
- **pyramids are one structure; Stonehenge are multiple detached structures**
- **pyramids are built in Egypt; Stonehenge are built in England**
- **pyramids are square-based tombs with triangular sides; Stonehenge are rings of giant stone**
- **pyramids were built by 20,000 workers; unknown how many people built Stonehenge**

7. What are the differences between tornadoes and hurricanes?

   Hurricanes: happen near ocean regions or near the equator; most happen between August and October; measured by the Saffir-Simpson scale; wind speeds for each category are different than tornadoes scale for wind speeds (stronger wind); can last days or weeks

   Tornadoes: tornadoes can occur anywhere and are more common in some areas (i.e. in Canada – Ontario, Saskatchewan, and Manitoba); Canadian tornadoes usually occur between May and August; lasts only minutes; measured using the Fujita Scale (less wind speed than hurricanes)

8. How are landslides and avalanches destructive to structures?

   When large masses of snow, mud, or rock fall down the side of mountains or large hills usually because of vibrations in the ground, it can cause lots of damage to structures. Large avalanches and landslides can destroy a village or flatten a forest. Medium-sized events can destroy or severely damage cars and houses. Small events could bury, injury, or kill a person.

9. What is a mechanical system and what do they have to do with force?

   A system that uses one or more simple machines is a mechanical machine. They can reduce the amount of force needed to lift or move a load.

10. What do gears and pulleys have to do with a mechanical system?

    Changing the number or position of pulleys in a mechanical system can change the force needed to lift a load

    Gears apply a turning force, (torque), to a mechanical system. Gears can change the force needed to make it easier to move a load.