

# Geotechnical Engineering Assessment



Marking Instructions	
<ul style="list-style-type: none"><li>• Use a No. 2 pencil or a blue or black ink pen only.</li><li>• Do not use pens with ink that soaks through the paper.</li><li>• Make solid marks that fill the response completely.</li><li>• Make no stray marks on this form.</li></ul>	<p><b>CORRECT:</b> ●</p> <p><b>INCORRECT:</b> ○ ⊗ ⊙ ⊖</p>

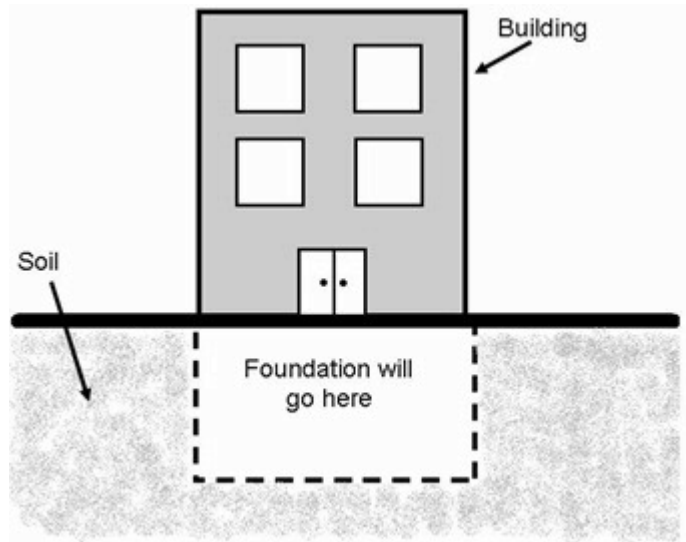
Name: \_\_\_\_\_ Date: \_\_\_\_\_

For each question, mark the **BEST** answer.

**Some people are designing a building in an area that has a lot of earthquakes.**

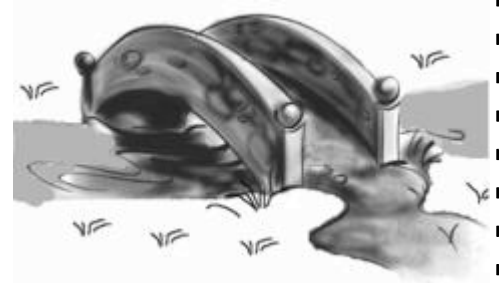
1. What is LEAST important for them to consider when designing the building?

- Ⓐ the type of soil in the area
- Ⓑ how old the soil is in the area
- Ⓒ how thick the soil layers are in the area
- Ⓓ how packed down the soil is in the area



2. A fifty-year-old bridge crosses a river in the woods. Every five years people come to check on the bridge to make sure it's in good shape. How could the river damage the bridge?

- Ⓐ The river could flood and damage the bridge.
- Ⓑ The river could change course so it flows around the bridge.
- Ⓒ The river could wear away the supports holding up the bridge.
- Ⓓ All of the above.



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[SERIAL]

3. A building was damaged by an earthquake and tipped over. What might be a reason the building tipped?

- Ⓐ The foundation was not deep enough.
- Ⓑ The foundation was too weak and broke.
- Ⓒ The soil around the foundation was shaken and became loose.
- Ⓓ Any of these could be a reason that the building tipped over.

4. When building a very tall office tower, what is LEAST important to consider when designing the foundation?

- Ⓐ the depth of the foundation
- Ⓑ what materials the tower is made from
- Ⓒ whether the tower is in an earthquake zone
- Ⓓ how many doors and windows the tower will have

5. When planning how deep to make the foundation of a new apartment building, what is MOST important to consider?

- Ⓐ the type of soil in the area
- Ⓑ where the exits and entrances will be
- Ⓒ how cold it gets in the winter in the area
- Ⓓ how close to the supermarket the building will be

Some students are deciding where to put a bird feeder on a tall post. The post will need to be set in the ground so it will not fall over. It will need to be close by the school so the students can fill it with bird seed every week.

6. What are some things the students should think about before they decide on a place to put their bird feeder post into the ground?

- Ⓐ If the place is easy for students to get to.
- Ⓑ What the soil is made from in that place.
- Ⓒ If the soil in that place will wash away in the rain.
- Ⓓ All of these things are important to think about.

7. The students chose three places that might work. One has sandy soil, one has rocky soil, and one has organic soil with lots of bits of dead plants. Which place would be BEST to put the bird feeder post into the ground so it stays firmly upright?

- Ⓐ the place with rocky soil
- Ⓑ the place with sandy soil
- Ⓒ the place with organic soil
- Ⓓ any of these places would work equally well

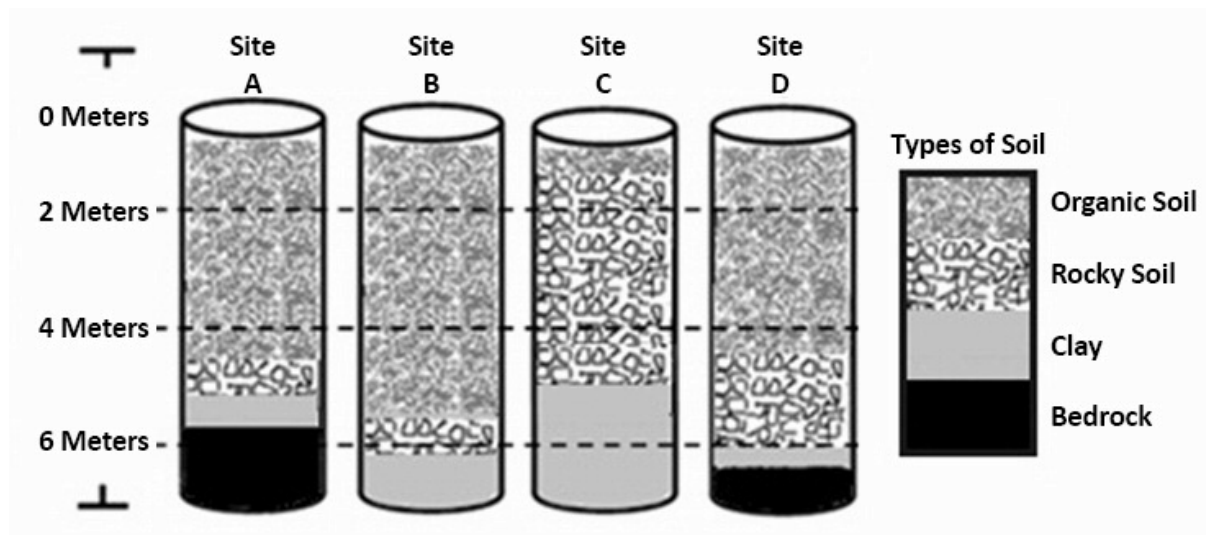
8. The students put up their bird feeder post, but it keeps falling over. What would help to fix it?

- Ⓐ Pack down the soil around the post.
- Ⓑ Use a longer post and dig it in deeper.
- Ⓒ Mix rocks into the dirt around the post.
- Ⓓ Any of the above would help to fix the post.



The diagram below shows four core samples from four different sites where a bridge might be built. On the right side of the diagram the types of soil are labeled. The left of the diagram shows the depth (in meters) of the different layers.

Look at the core samples for each site and answer the following questions.



9. At which site would a bridge foundation built 6 meters deep be the **STRONGEST**?

- A Site A       B Site B       C Site C       D Site D

10. At which site would a bridge foundation built 4 meters deep be the **STRONGEST**?

- A Site A       B Site B       C Site C       D Site D

11. At which site would a bridge foundation built 2 meters deep be the **STRONGEST**?

- A Site A       B Site B       C Site C       D Site D

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