Most Difficult Items from the June 2011 New York State Regents Exam

(1) Question ID: 2011-06-49  Percent Correct: 32.3%

Base your answers to questions 47 through 50 on the calendar below, which shows the month of July of a recent year. The dates of major Moon phases, as seen in New York State, are shown.

![Calendar of July with Moon phases]

49 Eclipses do not occur every month because the Moon's:
(1) rate of rotation is 15° each hour
(2) orbit is inclined to Earth's orbit
(3) period of revolution is 27.3 days
(4) period of rotation and period of revolution are the same

Spatial Concepts: Cn, Mo, Tr, An
Spatial Representations: Cn, Mo, Tr, An
Spatial Skills: MA
Base your answers to questions 70 through 74 on the two maps in your answer booklet. Map 1 shows air temperatures in the United States and Mexico, recorded in °F, at the points shown on the map. Map 2 shows the location of a low-pressure system at the time these air temperatures were measured. An occluded front extends from the center of the low-pressure system (L) to point A. Lines AB and AC are two other frontal boundaries. Two air masses are shown. The storm system later moved toward New York State and produced an ice storm.

72 Describe the general surface wind pattern associated with the low-pressure system shown on map 2. [1]

Spatial Concepts: Cn, Mo
Spatial Representations: Mp
Spatial Skills: D

Student Answer Booklet:

Map 2—Weather Fronts

Teacher’s Grading Booklet Instruction:

72 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
   — Winds are moving counterclockwise.
   — Winds are moving inward toward the low-pressure center.
   — In and counterclockwise
Base your answers to questions 51 and 52 on the block diagram and information below. The diagram is of the Niagara Falls region as viewed from the north.

The Niagara River began to flow over the Niagara Escarpment about 12,000 years ago when the last Pleistocene ice sheet melted and retreated north from the Niagara Escarpment. Since that time, Niagara Falls has eroded upstream, leaving a deep, steep-sided valley that is 11,000 meters long. The top bedrock layer of the escarpment is the Lockport dolostone which lies above the Rochester shale. The shale is more easily weathered than the dolostone. This causes the dolostone to be undercut. As a result, the dolostone breaks off in large blocks that tumble to the base of Niagara Falls.

52 Toward which compass direction is the location of Niagara Falls likely to move in the future?  [1]

Spatial Concepts: Po, Cn, Dr, Mo
Spatial Representations: BD
Spatial Skills: MA

Teacher’s Grading Booklet Instruction:

52  [1] Allow 1 credit. Acceptable responses include, but are not limited to:
— S
— south
— SE
— SW
Base your answers to questions 44 through 46 on the map below, which shows a portion of the continent of North America and outlines the Mississippi River watershed. Points A, B, C, D, and E represent locations on Earth’s surface.

45 Sediments deposited by the river at location B are best described as
(1) sorted and layered     (3) unsorted and layered
(2) sorted and not layered (4) unsorted and not layered

Spatial Concepts: Po, Mo, Sz, Tx
Spatial Representations: Mp
Spatial Skills:
Base your answers to questions 80 through 85 on the passage and map below. The map shows the volcanic island, Krakatau, before and after the 1883 eruption.

**Krakatau**

On August 27, 1883, one of the largest volcanic eruptions ever recorded in history occurred. Krakatau, a volcanic island nearly 800 meters in height, located at 6° S 105.5° E, exploded. Two-thirds of the island was destroyed by the blast. Blocks of pumice produced by the eruption were found floating in the ocean for months afterward.

Tsunamis produced by the eruption reached heights of 40 meters as they came ashore on nearby islands. These destructive waves traveled 6360 kilometers in just 12 hours. Over 36,000 people died and 165 coastal villages were destroyed.

Volcanic ash was blasted into the atmosphere to heights between 36 and 48 kilometers. Global temperatures cooled as the ash traveled on air currents around the world.

85 Describe the texture and density of pumice that allowed the blocks of pumice to float on the ocean. [1]

Spatial Concepts: V1, Tx
Spatial Representations: 
Spatial Skills: D

*Teacher’s Grading Booklet Instruction on Reverse*
(5) Question ID: 2011-06-85 (continued)

Teacher’s Grading Booklet Instruction:

85 [1] Allow 1 credit if the texture and density are correct. Acceptable responses include, but are not limited to:

Texture:
— vesicular
— filled with gas pockets

Note: Do not accept glassy; only.

Density:
— low density
— density less than 1 g/cm³
— less dense than water
Base your answers to questions 70 through 74 on the two maps in your answer booklet. Map 1 shows air temperatures in the United States and Mexico, recorded in °F, at the points shown on the map. Map 2 shows the location of a low-pressure system at the time these air temperatures were measured. An occluded front extends from the center of the low-pressure system (L) to point A. Lines AB and AC are two other frontal boundaries. Two air masses are shown. The storm system later moved toward New York State and produced an ice storm.

71 On map 2 in your answer booklet, draw weather front symbols on the correct sides of both line AB and line AC to show the most probable type and direction of movement of each front. [1]

Spatial Concepts: Cn, Dr, Mo
Spatial Representations: Mp
Spatial Skills:

Student Answer Booklet:

71

Map 2–Weather Fronts

Teacher’s Grading Booklet Instruction on Reverse
Teacher Grading Instructions:

71 [1] Allow 1 credit for the placement of the correct symbol facing in the correct direction for both fronts.

*Note:* Allow credit even if symbols are *not* shaded in.

**Example of a 1-credit response:**
11 A tree in New York State casts a shadow as shown in the diagram below.

What time of day and season are represented by the diagram?

(1) early morning in winter
(2) early morning in summer
(3) late afternoon in winter
(4) late afternoon in summer

Spatial Concepts: Po, Cn, Dr, An
Spatial Representations: O
Spatial Skills: PT
Base your answers to questions 36 through 40 on the diagram below, which represents zones of Earth’s interior, identified by letters A through E. The scale shows depths below Earth’s surface, measured in kilometers.

**Zones of Earth’s Interior**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1000</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
</tr>
</tbody>
</table>

**38** Which zone is characterized by partially melted rock and large-scale convection currents?

(1) zone A  (3) zone C
(2) zone B  (4) zone E

Spatial Concepts: Cn, Ds, Mo
Spatial Representations: Pf, GD
Spatial Skills: RC
57. Explain why Reykjavik has cooler summers and warmer winters than Yakutsk. [1]

Teacher Grading Instruction:

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Reykjavik has a maritime climate.
— The ocean around Iceland moderates Reykjavik's climate.
— Reykjavik is located near a large body of water which heats and cools more slowly than inland locations.
— Yakutsk is located farther inland.
(10) Question ID: 2011-06-73

Base your answers to questions 70 through 74 on the two maps in your answer booklet. Map 1 shows air temperatures in the United States and Mexico, recorded in °F, at the points shown on the map. Map 2 shows the location of a low-pressure system at the time these air temperatures were measured. An occluded front extends from the center of the low-pressure system (L) to point A. Lines AB and AC are two other frontal boundaries. Two air masses are shown. The storm system later moved toward New York State and produced an ice storm.

73 Explain what caused the center of this low-pressure system to move toward New York State. [1]

Spatial Concepts: Po, Cn, Dr, Mo
Spatial Representations: Mp
Spatial Skills: D, RC

Student Answer Booklet:

71

Map 2–Weather Fronts

Teacher Grading Instruction:

73 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
— Prevailing winds blow toward the northeast.
— New York State is located in the southwesterly wind belt.
— The jet stream moved the low-pressure system in that direction.
— prevailing winds
— Winds are moving the system northeast.
Base your answers to questions 80 through 85 on the passage and map below. The map shows the volcanic island, Krakatau, before and after the 1883 eruption.

Karakatau

On August 27, 1883, one of the largest volcanic eruptions ever recorded in history occurred. Krakatau, a volcanic island nearly 900 meters in height, located at 6° S 105.5° E, exploded. Two-thirds of the island was destroyed by the blast. Blocks of pumice produced by the eruption were found floating in the ocean for months afterward. Tsunamis produced by the eruption reached heights of 40 meters as they came ashore on nearby islands. These destructive waves traveled 6360 kilometers in just 12 hours. Over 36,000 people died and 165 coastal villages were destroyed.

Volcanic ash was blasted into the atmosphere to heights between 36 and 48 kilometers. Global temperatures cooled as the ash traveled on air currents around the world.

84 Explain how the volcanic ash from the Krakatau eruption caused global temperatures to decrease. [1]

Spatial Concepts: Cn, Mo, Vl, Tx, GI
Spatial Representations: 
Spatial Skills: MA, D

Teacher Grading Instruction:

84 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The ash particles blocked out the Sun’s rays.
— Dust particles reflect the Sun’s rays.
— Less insolation reached Earth’s surface.
Base your answers to questions 53 through 55 on the diagram below, which represents Earth’s water cycle. The arrows represent some water cycle processes. Letter A indicates a surface location on Earth.

53 Other than evaporation, which water cycle process transfers large amounts of water vapor into the atmosphere from the forest? [1]

Spatial Concepts: Po, Dr, Mo, Vl, Cy
Spatial Representations: BD
Spatial Skills:

Teacher Grading Instruction:

53 [1] Allow 1 credit for transpiration or sublimation.
25 The diagram below shows air movement over a mountain.

Compared to the climate on the windward side of the mountain, the climate on the leeward side of the mountain is
(1) drier and warmer
(2) drier and cooler
(3) more humid and warmer
(4) more humid and cooler

Spatial Concepts: Po, Cn, Dr, Mo, Tr
Spatial Representations: Pf
Spatial Skills:
Base your answers to questions 36 through 40 on the diagram below, which represents zones of Earth's interior, identified by letters A through E. The scale shows depths below Earth's surface, measured in kilometers.

Zones of Earth's Interior

Depth Below Earth's Surface

40 S-waves produced by an earthquake are transmitted through zones

1. A and B, but not zones C, D, and E
2. A, B, and C, but not zones D and E
3. C, D, and E, but not zones A and B
4. A and B, but not zones C, D, and E

Spatial Concepts: Cn, Ds
Spatial Representations: Pf, GD
Spatial Skills: RC
20 The topographic map below shows a stream crossing several contour lines and passing through points X and Y. Elevations are measured in feet.

What is the approximate gradient between point X and point Y?

(1) 10 ft/mi  (3) 40 ft/mi
(2) 20 ft/mi  (4) 80 ft/mi

Spatial Concepts: Po, Ds, Gr
Spatial Representations: Mp
Spatial Skills: