



SCIENCE OLYMPIAD
— AT THE —
UNIVERSITY OF FLORIDA

Northern Regional: January 19th, 2019

Geological Mapping C Test

Name(s): _____

Team Name: _____

School Name: _____

Team Number: _____

Rank: _____

Score: _____

Remember to only write on the answer sheet. Points will be deducted if you write on the test.

Multiple Choice: Please select ALL answers that apply. No partial credit will be awarded (+3 pt. each)

1. Which of the following geologic time periods is represented by the map symbol Q?
 - a. Quaternary
 - b. Holocene
 - c. Pleistocene
 - d. Oligocene
 - e. Cretaceous
2. Which of the following types of fault are formed from extensional forces?
 - a. Listric
 - b. Reverse
 - c. Thrust
 - d. Dip-Slip
 - e. Normal
3. Where is the Tropic of Capricorn currently located?
 - a. 23.43687° above the equator
 - b. 23.43686° below the equator
 - c. $23^\circ 26' 12.7''$ above the equator
 - d. $23^\circ 26' 12.7''$ below the equator
 - e. None of the above
4. Which of the following elements would be found at subduction zones?
 - a. Copper
 - b. Lead
 - c. Zinc
 - d. Sulfur
 - e. Platinum
5. Which of the following is true about the Juan de Fuca Plate?
 - a. It is subducting under the South American plate.
 - b. It is 250,000 sq. km.
 - c. It is moving northwest.
 - d. It is moving southeast.
 - e. It moves at a speed of approximately one inch a year.

6. Which of the following are quadrant bearings?
 - a. N60W
 - b. N30W
 - c. 330°
 - d. 60°
 - e. S135E
7. Which of the following **incorrectly** describes the UTM Coordinate System?
 - a. It divides the Earth into 50 sections.
 - b. Each zone has a central meridian.
 - c. Each zone covers a span of 6°.
 - d. UTM stands for Universal Transverse Mapping.
 - e. Alaska spans from Zone 2 to Zone 10.
8. Which of the following is **NOT** considered a category of continental deposits?
 - a. Deltaic
 - b. Continental Slope
 - c. Alluvial
 - d. Fluvial
 - e. Beach
9. Which of the following are subsets of the Cambrian Period?
 - a. Terreneuvian
 - b. Series 2
 - c. Miaolingian
 - d. Wenlock
 - e. Furongian
10. Which of the following is **NOT** a type of magnetometer to study magnetic anomalies?
 - a. Electron Eccentricity
 - b. Infrared
 - c. Fluxgate
 - d. Metal Vibrating
 - e. Proton Precession

Multiple Choice: Please Select One Answer (+2 pt. each).

11. About how much of the equator lies on water?
 - a. 15%
 - b. 49%
 - c. 79%
 - d. 85%
 - e. 94%

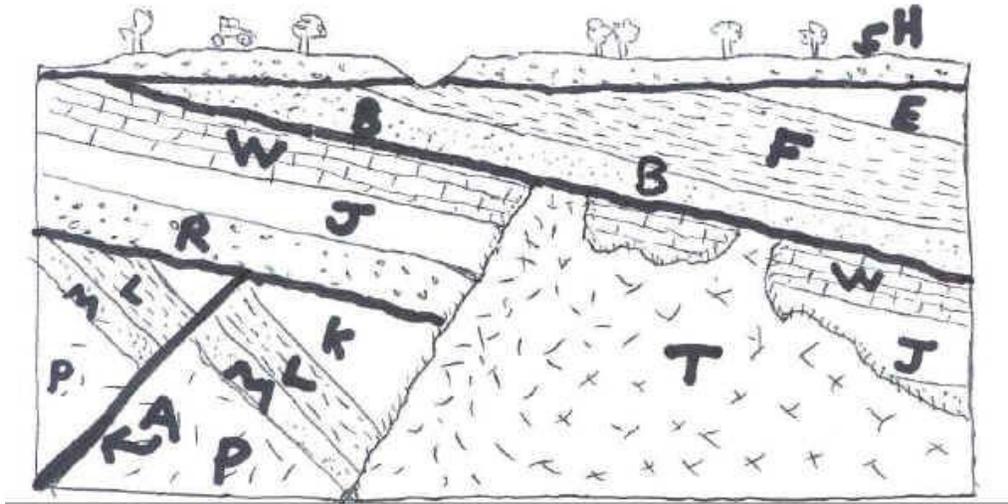
12. Convergent plate boundaries experience what type of stress?
- Tensional
 - Shear
 - Compressional
 - Frictional
 - Dip-Slip
13. All of the following statements are true for the Mollweide map projection EXCEPT
- It's meridians are shown as ellipses.
 - It features equal-area proportions.
 - It was created to moderate the behavior of the conformal sinusoidal projection.
 - It is classified as a pseudocylindrical projection.
 - It features a central meridian that is perpendicular and one-half the length of the equator.
14. What is the correct strike and dip orientation of the symbol shown to the right? (1)
- N10E; 45NW
 - N60E; 45SE
 - N40W; 45SW
 - N55W; 45NE
 - N20E; 45SW
- 
15. At which location does the Prime Meridian run through?
- Bristol, England
 - Nuuk, Greenland
 - Greenwich, Ireland
 - Greenwich, England
 - Ardennes, Luxembourg
- 
16. Which of the following is a name for a small igneous stock?
- Batholith
 - Laccolith
 - Sill
 - Cupola
 - Boss
17. Which of the following is a name for a short paraconformity in the geologic record?
- Diastem
 - Misaligned Unconformity
 - Skewed Stratum
 - Outcrop
 - Strata Gap

18. A blended unconformity falls under which category of unconformities?
- Angular Unconformity
 - Nonconformity
 - Buttress Unconformity
 - Paraconformity
 - Pseudoconformity
19. A magnitude of 8 on the Moment Magnitude Scale releases how much more energy than a magnitude of 7?
- 10
 - 30
 - 90
 - 100
 - 1000
20. What is the correction definition of liquefaction?
- A fast-moving current of hot gas and volcanic matter (collectively known as tephra) that moves away from a volcano.
 - A spring characterized by intermittent discharge of water ejected turbulently and accompanied by steam.
 - The sudden sinking or gradual downward settling of the ground's surface with little or no horizontal motion.
 - A form of mass wasting that occurs when a coherent mass of loosely consolidated materials or rock layers moves a short distance down a slope.
 - A process that generates a liquid from a solid or a gas or that generates a non-liquid phase which behaves in accordance with fluid dynamics.

Rock Layers:

21. Order the rock layers from youngest to oldest. Partial credit may be awarded (+13 pt.).

[TIEBREAKER #4]



Math: Partial credit may be awarded. (+5 pt. each).

22. A fault has a vertical displacement of 17 feet and dip angle of 35° . What is its slope?
23. Gator Stream flows from the peak of Crocodile Mountain to the top of Aardvark Hill. Crocodile Mountain has a height of 1500 ft, and Aardvark Hill has a height of 700 ft. The distance between these two points is 2 miles. What is the stream gradient in ft/mi?
24. A rock stratum has an apparent dip of 23° and an offset angle of 15° . What is the angle of its true dip?
25. An oblique normal fault has a strike-slip distance of 5 meters, a dip-slip distance of 3 meters, and a vertical inclination of 23° . Calculate the vertical throw of the fault displacement in meters.
26. Using the same numbers from the question above, what would be the horizontal throw of the fault with a stratigraphic heave of 4.5 meters. [TIEBREAKER #1]

Written Response: Partial credit may be awarded.

27. What is a dip isogon? Distinguish between the three classes of dip isogons in fold geometry. (+ 5 pt.)

28. Distinguish between true dip and apparent dip. Supplement your answer with a sketched diagram. (+4 pt.)

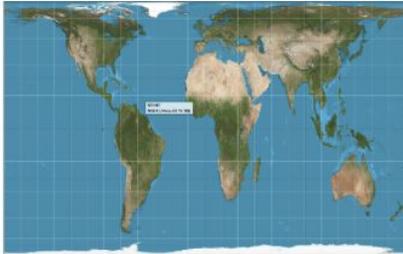
29. Contrast the three different types of unconformities. Supplement each description with a sketched diagram. (+6 pt.)

30. Name and explain three factors that affect how a material behaves throughout the stages of deformation. (+6 pt.) [**TIEBREAKER #3**]

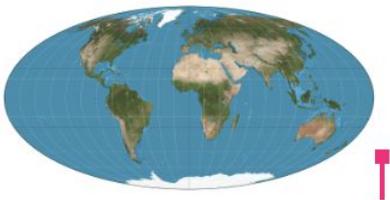
Matching: Match each map projection with the corresponding letter. (+2 for each correct answer).

A. Mollweide Projection
B. Mercator Projection
C. Gall-Peters Projection
D. Sinusoidal Projection
E. Stereographic Projection
F. Loximuthal Projection
G. Goode Homolosine Projection
H. Robinson Projection

31.



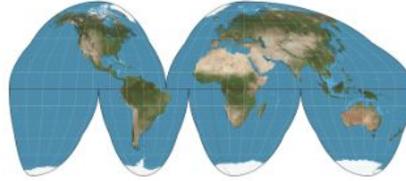
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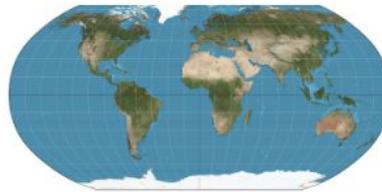
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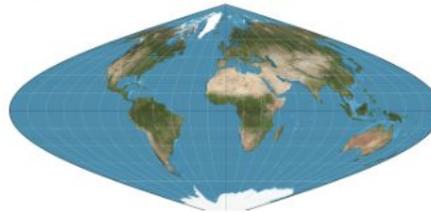
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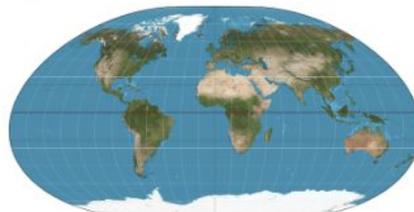
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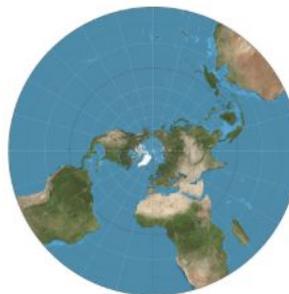
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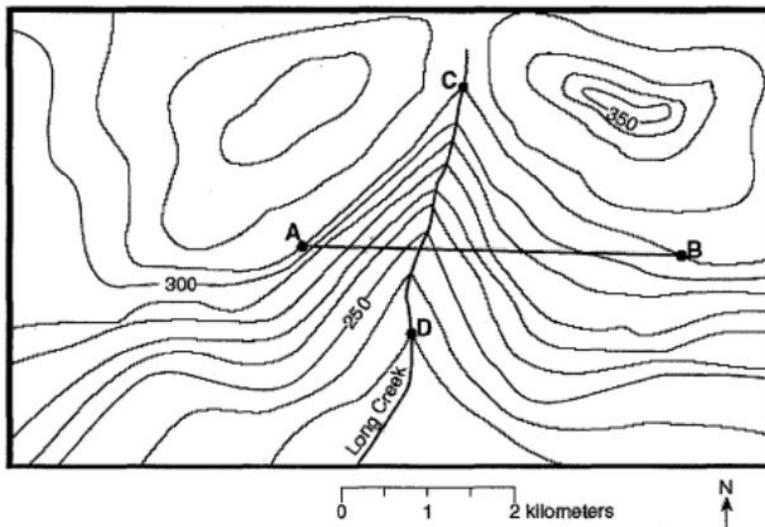
Stereonet:

For simplicity, all answers for this section can be put on one piece of tracing paper as long as the information is ordered neatly and the answers are labeled with their corresponding question number. Remember to also put your answers to question 2 and 3 on your answer sheet.

39. Mark a plane with an attitude of 45-E13. (+3 pt.)
40. Find the rake of the lineation. (+5 pt.)
41. Find the corresponding plunge of this lineation. (+5 pt.) [TIEBREAKER #2]

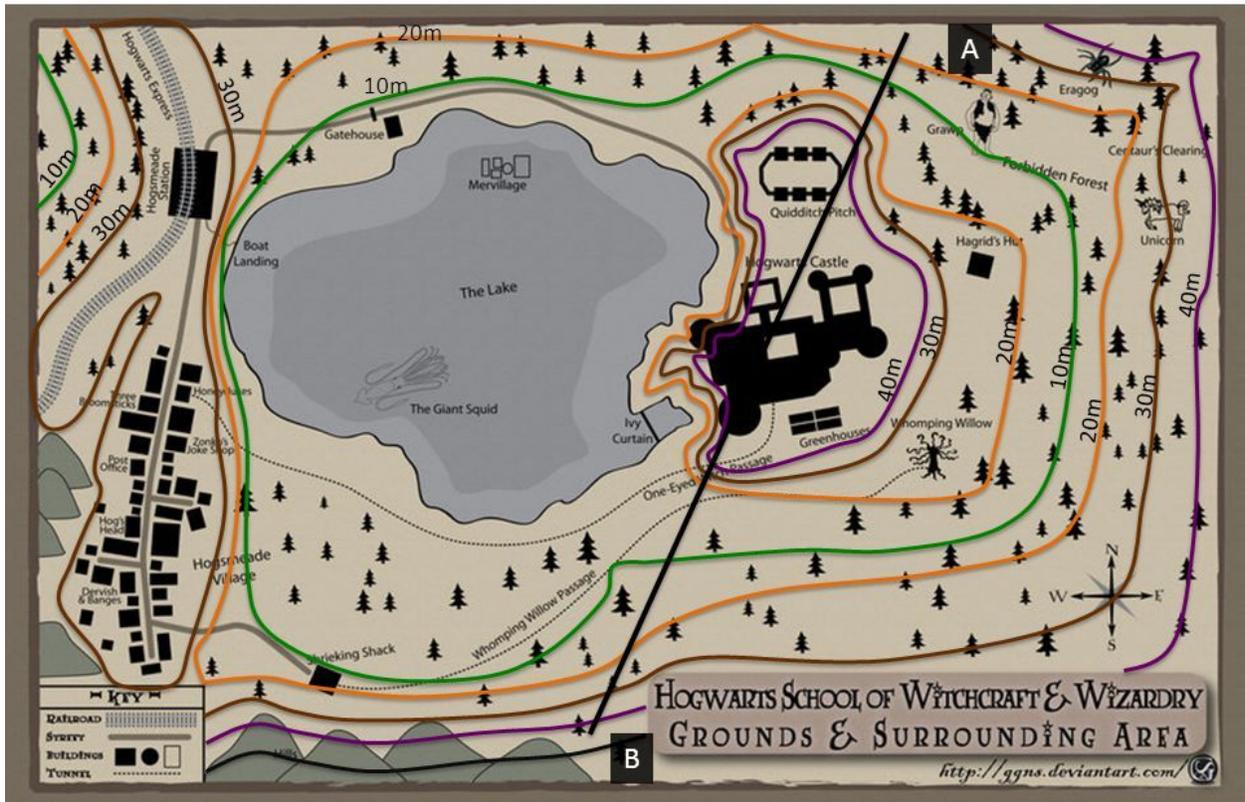
Topographic Map Interpretation: Partial credit may be awarded. For questions #42-44, refer to Image A. For questions # 45-50, refer to Image B.

Image A: (Elevation = Meters)



42. What is the contour interval of Image A? (+2 pt.)
43. Calculate the gradient between Location C and Location D. (+3 pt)
44. Construct a topographic profile along line *AB* on the grid provided on your answer sheet. (+5 pt.) [TIEBREAKER #6]

Image B:



45. What is the contour interval of Image B? (+2 pt.)

46. Order the following places from highest elevation to lowest elevation: Unicorn, Boat Landing, Shrieking Shack, Whomping Willow, Eragog, Hogsmeade Station, Quidditch Pitch, and Grawp. (+8 pt.)

47. The map is a kilometer long on its uppermost edge. What is the scale of the map? (Answer: 1 centimeter: ___ meters) (+3 pt.)

48. Using the above scale, what is the approximate length of the section of the Hogwarts Express railroad seen on the map in meters? (+5 pt.)

49. Estimate the area of The Lake in square meters. (+5 pt.) **[TIEBREAKER #5]**

50. Construct a topographic profile along line *AB* on the grid provided on your answer sheet. (+5 pt.)

Fill in the Blank: (+1 pt. for each blank)

51. _____ is the angle on a horizontal plane between magnetic north and true north.

52. _____ occurs when water and other volatile components are added to hot solid rock.

53. P-waves are _____ waves while S-waves are _____ waves.

54. A _____ - _____ strike-slip fault is one on which the displacement of the far block is to the left when viewed from either side.

55. A _____ a structural feature characterized by repeated well behaved folded beds with straight limbs and sharp hinges.

56. When an igneous intrusion occurs, the rock that was intruded is often heated around the intrusion to the point that it becomes contact metamorphosed. This describes the principle of _____.

57. The map symbol K denotes the _____ Period.

58. A _____ is a relatively narrow tabular discordant body, often nearly vertical that cuts across the strata.

59. Unconformities were first described by _____.

60. _____ deposits are deposited in an environment showing influence of both fresh water or air and marine water

Labeling:

Label the missing parts of the compass (+3 pt. each component).

