GLY 4200C   Name _____
14 points   December 9, 2019
4 students took exam   10:30 a.m.
Numbers to the left of the questions (in red) are the points missed.

LAB FINAL EXAMINATION KEY
Closed Notes

3   _T_   1. (T-F) Carlsbad twinning is common in igneous rocks, but very rare in metamorphic
                rocks.

        2. A student measures the following extinction angles: 12°, 25°, 23°, 17°, 16°, and 21°. What
        value should be reported? __25°__

1   _F_   3. (T-F) The wider the substage iris is open, the more visible grains with low relief will
                be.

1   4. A mineral shows a white interference color. In order to determine if the white is first order
       white or high order white, the polarizer is rotated 90° to achieve a PN arrangement. If the color
       turns reddish, the original interference color was FIRST ORDER WHITE   .

3   _F_   5. (T-F) When examined under crossed nicols isotropic substances remain black as the
                stage is rotated. This condition is known as "opaque."

3   6. Describe how you check the microscope to be sure the polarizer's privileged directions are
       crossed.
         WITH NOTHING ON THE STAGE, INSERT THE ANALYZER AND ROTATE THE
       POLARIZER UNTIL THE MAXIMUM DEGREE OF BLACKNESS IS OBTAINED.
       _____

1   _F_   7. (T-F) Albite twins are always the result of deformation.

1   8. Some plagioclase feldspars will have one composition in the interior of the crystal, and a
       gradually or sharply changing composition toward the outer edge of the crystal. This is called
       ZONING.

3   _F_   9. (T-F) 2° blue is higher than 2° red.

1   10. The combination of albite and pericline twinning is known as _ gridiron twinning _____

2   _T_   11. Inclined extinction is possible only in biaxial crystals.

0   12. The ability of a mineral to show different colors when viewed along differing crystallographic orientations is called ___PLEOCHROISM___.

1   _T_   13. (T-F) When determining the interference figure of a mineral thought to be uniaxial, it is best to choose a grain that stays in extinction or has very low colors

2   14. An optic axis figure is observed to be a line at approximately a right angle. What value of 2V should be reported? __0°__

When finished, check your answers (did you answer every question?), then exchange this sheet for the open notes portion of the exam.

GLY 4200C   Name _____
36 points   December 9, 2019
4 students took exam   10:30 a.m.
Numbers to the left of the questions (in red) are the points missed.

LAB FINAL EXAMINATION KEY
Open Notes

Determine if each of the following grains is isotropic or anisotropic. (2 points)

2   1. Anisotropic

2   2. Isotropic

Estimate the relief (in words and numerically) of each of the following grains. (8 points)

9.5   3. Very High n ≅ 1.90

6   4. Low   n ≅ 1.58
Indicate what technique was used to determine the relief, explain how you used the technique,
and show calculations.
3   Becke line In | 4   Becke line In
                                       |
                                       |
                                       |
                                       |
                                       |
                                       |
                                       |
                                       |
Name the type of twinning seen in each crystal. (3 points)

0.5   5. Carlsbad

0   6. Albite

0.5   7. Gridiron

Name the feature seen in this crystal (zoning, ex-solution) (2 points)

0   8. Ex-solution

Describe the cleavage or fracture (2 points)

4   9.   Basal cleavage

Determine the interference color (color and order) of the grain under the cross-hair.
(6 points)

5   10. 2° Blue-green

4   11. 1° white

Indicate what technique was used to determine the interference color, explain how you used the
technique, and show calculations (if any were used).

10 Use first order red plate	11 Turn polarizer - crystal turns reddish
Addition 3° blue	
Subtraction 1° pink	

Describe the pleochroism or absorption, if any, seen in the following grains. Indicate whether you
are reporting pleochroism or absorption. List the color range associated with each grain(3 points)

8   12.   Pleochroism Tan to Inky blue

Determine if the indicated crystal is length-slow or length-fast. Explain how you made your

determination.

2.5   13. Length-slow - use 1° red - subtraction ⊥ to crystal length

             Addition ∥ to crystal length

3   14.   Length-slow - use 1° red - subtraction ⊥ to crystal length

             Addition ∥ to crystal length

Determine if each of the following grains shows parallel, inclined, symmetric, undulatory, or continuous extinction. Report the extinction angle, τ, if applicable (4 points)

		Type of Extinction		Extinction Angle, τ
4	15.	Symmetric	0	τ ≈ 30°
0	16.	Parallel	1	τ ≈ 0°

Determine the optical class, and sign if appropriate, of each of the following crystals. In the space below, sketch the inference figure you obtained, and describe how the sign was determined. If appropriate, estimate 2V in your description. If not appropriate to estimate 2V, state whether the figure is centered or not. (10 points)

		Optical Class		Sign		2V or Centering
6	17.	Biaxial	6	Positive	3.5	2V ≅ 60°
2	18.	Uniaxial	2	Negative	2	Not centered

17

Blue in I and III
Yellow in II and IV

| 18

| Blue in II and IV
| Yellow in I and III