

## HOMEWORK #7 – The Outer Moons

### A. The Galilean Satellites: Individual Characteristics (50 points, 10 points each)

1. **Active Moon Io:** What is the source of energy that drives volcanism on Io's surface?

Daily tidal heating due to Jupiter's strong gravitational pull.

2. **Icy Moon Europa:** Does Europa have a liquid ocean? Explain why we think it exists and describe its location and configuration.

1. Cold, brittle ice surface with warm ice underneath, or

2. Cold brittle ice surface with liquid water underneath

3. **Life on Europa?:** Europa has become a prime target in the search for extraterrestrial life. Of all the places in the solar system, explain the lines of evidence that make this distant moon a worthy target of investigation.

Global ocean & internal heat source. (p. 400) or hydrothermal energy (notes)

4. **Cratered Moon Callisto:** Callisto's surface has many impact craters and is often compared to the highland region of Earth's Moon. However, the two surfaces have different compositions that change the appearance of surface craters. Identify the primary surface composition of both Callisto and the Moon. How does this compositional difference contribute to the differences in surface features?

Callisto's surface is made mostly of ice and the Moon's surface is of rock.

Ice isn't as strong as rock – ice tends to flow over time, thus craters smooth out.

5. **Groovy Ganymede:** Ganymede exhibits two distinct surface terrain colors – dark and light. Describe one major type of surface feature found on each terrain (ie., list one feature unique to the dark terrain and one for the light terrain).

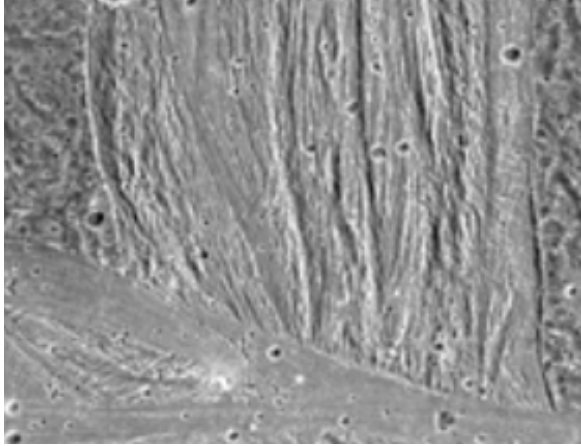
1. Dark terrain (old) – craters (p. 394) or rolling hills (395)

2. Light terrain (young) – parallel mountains and valleys, ridges (p.394)

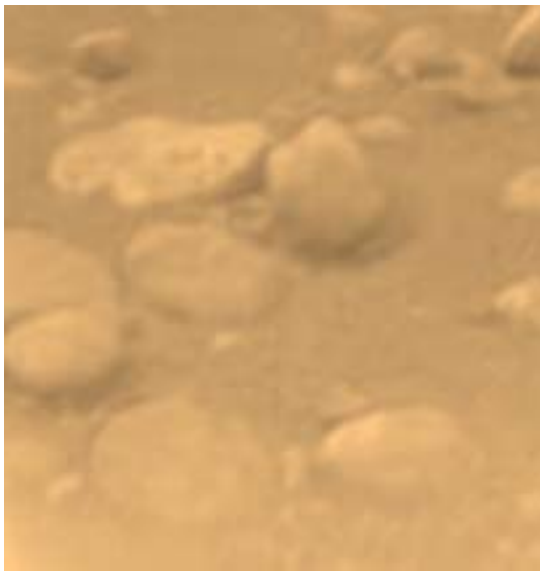
Name \_\_\_\_\_

**B. Surface Features (50 points, 10 points each)**

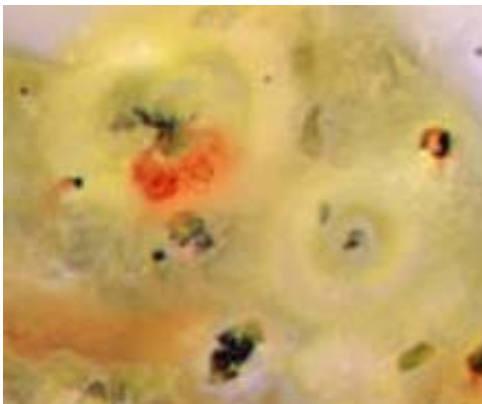
In the spaces provided below, identify the feature/terrain shown in each image and indicate the moon from which the image was taken.



Grooved terrain (Ganymede)



Surface rocks (frozen water +  
hydrocarbons)  
(Titan)



Active volcanism (lava flows, orange =  
sulfur, sulfur dioxide frost) (Io)

Name \_\_\_\_\_



Chaos terrain – icebergs (Europa)



Red spots (lenticulae) (Europa)