**Solar System: Answer Key**

**Identification:(1 pt each, unless stated otherwise)**

Image A:

1. What is the name of this object?

**Europa**

1. What is the name of the object in Image J that is found on Image A?

**Conamara Chaos**

1. Where do scientist believe that ocean on Image A exists?

**Underneath the Surface**

Image B:

1. What is the name of this object?

**Mars**

1. What are 2 differences between the poles of this object?

**Possible Differences: South pole is much smaller than north pole, North pole has a layer of frozen carbon dioxide while south pole has a layer of dry ice,**

1. What is the surface composition of this object? (what causes it to appear its particular color)

 **Iron Rust**

1. What year was the first probe sent to this object? What was the name of the probe? What did it find? (3 pts.)

 **1965, Mariner, Found only ice instead of liquid water**

For the following images, just give the name:

Image C:

**Titan**

Image D:

**Triton**

Image E:

**Iapetus**

Image F:

**Ceres**

Image G:

**Kuiper Belt**

Image H:

**Oort Cloud**

Image I:

**Enceladus**

**Given the following information, identify the object: (1 pt each)**

1).\_\_\_\_\_\_\_\_\_\_\_ **Mars**

Diameter: 6,792 km

Length of year: 687 days

Rotation period: 24 hrs 37 mins

Orbital velocity: 24.12 km/sec

Inclination axis: 25.2 degrees

Density: 3.95 grams/cm^3

Distance from sun: 141,900,000 km

2).\_\_\_\_\_\_\_\_\_\_\_\_ **Europa**

Diameter: 3,160 km

Length of year: 4,333 days

Rotational period: 3.5 days

Orbital velocity: 13.7 km/sec

Inclination axis: .47 degrees

Density: 3.03 grams/cm^3

Distance from sun: 778 million km

3).\_\_\_\_\_\_\_\_\_\_\_\_ **Triton**

Diameter: 2,700 km

Length of year: 5.8 days

Rotational Period: 5 days 21 hrs 2 mins

Orbital velocity: 4.39 km/sec

Inclination axis: 129 degrees

Density: 2.061 grams/cm^3

Distance from sun: 4.5 billion km

4).\_\_\_\_\_\_\_\_\_\_\_\_**Iapetus**

Diameter: 1,469 km

Length of year: 79 days

Rotational period: 79 days

Orbital velocity: 3.26 km/sec

Inclination axis: 17.28 degrees

Density: 1.088 grams/cm^3

Distance from sun: approximately1,436,000,000 km

**Multiple Choice Question: (1 pt each)**

What are the moons of Saturn?

1. Titan, Europa, Enceladus,
2. Europa, Triton, Ceres
3. Enceladus, Titan, Iapetus,
4. Ceres, Triton, Iapetus

What moon has the Thrace and Thera Macula

1. Europa
2. Triton
3. Iapetus
4. Enceladus

Where is the Kuiper Belt located in the Solar system?

1. Beyond Pluto
2. Between mars and jupiter
3. Around the sun
4. Between Jupiter and Saturn

What does permafrost found on Mars *best* suggest?

1. That there will never be liquid water on Mars
2. That Mars once had a large liquid ocean
3. That it’s really cold on Mars
4. It’s winter where the the permafrost is

What are the “Tiger Stripes”?

1. An oddly shaped gas cloud in the milky way
2. The gorges left over from rivers on Mars
3. The 4 sub-parallel lines on Enceladus
4. Cloud lines found on Titan

What kind of object is Ceres?

1. Moon
2. Star
3. Comet
4. Dwarf Planet

What is the crust of Triton formed from?

1. Granite and Iron
2. Frozen Nitrogen and frozen Water
3. Liquid water and oxygen
4. Frozen oxygen and frozen nitrogen

Where are comets thought to originate in?

1. The Oort Cloud
2. The asteroid belt
3. The Kuiper Belt
4. Farther inside the Milky way galaxy

What planet did Galileo discover 4 major moons of?

1. Neptune
2. Uranus
3. Saturn
4. Jupiter

What are the Enceladus plumes?

1. Jets of Oxygen
2. Jets of Nitrogen
3. Jets of liquid water and oxygen
4. Jets of water vapor and Ice

What are tails of comet formed from?

1. Sunlight
2. Rock
3. Ice and Dust
4. Oxygen and Nitrogen

In 2020 what object is the *curiosity* planned to visit?

1. Titan
2. Triton
3. Mars
4. Europa

**Short Answer:**

What do the plains and ridges on Europa tell us about the water and other features of the surface? (2 pts)

**The plains on Europa indicate the frozen water underneath and the ridges show volcanic activity on the planet**

What physical evidence is there on Mars that liquid water previously existed on the planet? Give 3 examples. (3pts.)

**Possible Answers: Varying sizes of gravel, formations from water erosion, river valleys, Ice currently existing at poles, permafrost on surface of planet.**

Can liquid water currently exist on mars? Use evidence from a phase diagram to support your answer. (4 pts)

**Yes, but barely. (Get rest of answer from phase diagram, pressure and temperature reading)**

How are the cycloids on Europa Formed? (3 pts)

**Cycloids are formed as tensile cracks responding to the tides on Europa. When the tensile strength of ice is reached, a crack begins to form perpendicular to the local direction of the stress.**

What is the temperature range for habitable life? How far away from the sun must you be to achieve this? What is the habitable also referred to (nickname)? (3 pts.)

**-15C to 100C, about 1 AU, referred to as the Goldilocks zone**

How is the kuiper belt different from the asteroid belt? Name 3 reasons.(3pts)

**The kuiper belt is farther from the sun, it’s larger, and it is made of mostly frozen materials such as frozen water and methane rather than made from rock and metal.**

**Essay Question (25 pts)**

Between Mars, Europa, and Titan, which planet/moon would be the most suitable to support human life in the future. In your answer discuss the physical, chemical, and thermal advantages and disadvantages of the location that you choose. (Question will be scored by evidence given for choice and completeness of question.)

**Rubric:**

**Choosing a location: (5 pts)**

**(All of the below are listed generally, but the answer should relate to the location that the students chose)**

**Thermal properties: Mentioning habitable zone (goldilocks zone), what temperature is likely to have life. (5 pts)**

**Physical properties: atmosphere size would have to be similar to earth, water has to be liquid, (5 pts)**

**Chemical Properties: Oxygen, Carbon Dioxide, Nitrogen, gasses need to be breathable instead of frozen (5 pts)**

**Disadvantages listed for each kind of property (5 pts)**