

Short Answer Questions**A selection of these questions will appear WORD-for-WORD on the Final****Week 9: Air Masses, Fronts and Cyclonic Storms (Lectures 15 & 16)**

1. What are the different general types of air masses? Based on previous information, what type of air mass do you think dominates the Pacific Islands? **Why**?
2. What are the 5 (**FIVE**) different types of fronts? What 2 (**TWO**) types of fronts are associated with a cyclone?
3. How fast does a cold front travel? How fast does a warm front travel? What are the implications of this difference in speed with regard to the life cycle of a mid-latitude cyclone?
4. What time of year (season) do the majority of storms occur in Hawaii? What is the name of the most common type of storm to hit the islands during this season?
5. How are convergence and divergence at the surface, and aloft, related to how mid-latitude cyclones rotate?

Week 10: Thunderstorms and Tornadoes (Lectures 17 & 18)

1. What are the 3 (**THREE**) basic ingredients Thunderstorms need to form? Do the Pacific Islands satisfy these requirements?
2. What are supercells and how are they related to tornadoes? In general, do we see supercells in the Pacific Islands? **Why** or **Why Not**?
3. Who is Hi'iaka? Who sent her on a dangerous journey? What dangers did she face?
4. During which season are thunderstorms likely to occur in Hawaii? What types of weather phenomena are they usually associated with thunderstorms during that season?
5. What is a mesocyclone? How is it formed? What role does the mesocyclone play in tornado formation?

Week 11: Hurricanes (Lectures 19 & 20)

1. What are the 3 (**THREE**) factors must occur in order for a hurricane to form? **Describe** each factor and how they contribute to the formation and structure of a hurricane.
2. **Describe** the general structure of a hurricane? **DRAW** a diagram and label the eye, eyewall, low pressure region, high pressure region and general direction of wind flow at the surface, in the eye and aloft above the storm.
3. What are the 3 (**THREE**) main categories of hurricane damage? For each provide a description of the type of damage expected. What type of damage lasts the longest and can potentially cause the most deaths?
4. Hurricanes can decay for a number of reasons. Describe the 4 (**FOUR**) situations that can result in the weakening of a hurricane (Hint: *this is not a list, you need to describe how the various situations result in a decrease in storm strength*).
5. Why are the Hawaiian Islands lucky with regard to hurricane landfalls? What 2 (**TWO**) main characteristics of the location of the Hawaiian Islands prevents major hurricanes from impacting the islands? How may these change, and what are the implications, as a result of global warming?

Week 12: Air Pollution (Lectures 21 & 22)

1. Which primary air pollutant has the highest risk of causing health issues and death? Is this pollutant prevalent in the Pacific Islands, **why** or **why not**?
2. **Describe** the effects of Acid Rain on natural and urban environments. Can the Hawaiian Islands experience acid rain? What type of pollution would cause acid rain in Hawaii?
3. What 3 (**THREE**) aspects of weather are related to air pollution events? **Explain** how each of the three you identify interacts with pollution.
4. What did Na-maka-o-Kaha'i do to her sister Pele? How does this relate to the geology of the Hawaiian Islands?
5. On what island, and where on the island, did Pele find a safe place to house the sacred fire? Who is Pele's rival? What does their rivalry have to do with Manua Kea?

Week 13: Atmospheric Optical Phenomena (Lectures 23 & 24)

1. **Explain** why the sky is generally blue during the day and why sunsets are red/orange in color. **DRAW** a diagram to help support your explanation.
2. What optical phenomena are the result of light interacting with ice crystals? What optical phenomena are the result of light interacting with water droplets? (Hint: *Provide a **LIST** for each*).
3. Briefly recount the story of Kahalaopuna, the "Rainbow Maiden" of Manoa (5-6 sentences). How is her parentage related to the formation requirements of rainbows?
4. **Describe** how a double rainbow is formed and how it is different than the formation of a single rainbow. **DRAW** a diagram of 2 (**TWO**) cloud drops showing the difference to support your explanation.
5. **Explain** how sundogs are formed. What other optical phenomena are they associated with? Why don't we typically see sundogs here in Hawaii?

Week 14: Nature and Music (Lecture 25)

1. Describe how nature and music are related for traditional Hawaiian music. What is the inspiration for historical Hawaiian music?
2. How did Christian missionaries influence Hawaiian Music? Why were Hawaiians so interested in attending Church?
3. How would you characterize by Queen Lili'uokalani's poetry? What did she typically write about? What is her most famous song (provide the Hawaiian title and the English title)?
4. **Describe** how music has changed from traditional Hawaiian chants to today's modern Hawaiian music? What one aspect of the music has changed the most?
5. What triggered a dramatic change in the use the Hawaiian language on the islands?

Week 15: Climate Vulnerability and Agriculture (Lecture 26 & 27)

1. **Describe** the "Greenhouse Effect" and why it is necessary to keep the earth habitable (4-5 sentences). **DRAW** a diagram to accompany your description.
2. What are the 6 (**SIX**) ways Global Warming can affect Agriculture?
3. Why are coral reefs important with regard to the rest of the island ecosystem?
4. What features of climate change, and their resulting physical effects, may impact reef ecosystems?

5. What are/were the main differences between the Maori in New Zealand and peoples of greater Polynesia with respect to the cultivation of sweet potatoes known as kumara? How is this related to the climate of New Zealand?

Week 16: Sea-Level Rise – Impacts and Mitigation (Lecture 28)

1. What is the difference between “first-order” and “second-order” changes with regard to changes in sea level? (Hint: *Define each term and then discuss the differences*).
2. Why is sea-level rise such a big issue for the small islands of the Pacific?
3. Why is it difficult to detect and attribute changes on small islands to climate change?
4. What are the 3 (**THREE**) basic approaches to sea-level rise adaptation? **Name** and briefly **describe**, in one or two sentences, each one.
5. What are the 4 (**FOUR**) main obstacles to the implementation of long-term adaptations to sea level rise? **Name** and briefly **describe**, in one or two sentences, each one.