**Chapter 2 Questions for FYS 178 Fall 2020**

It was from Vilhelm’s Stockholm colleages that he first learned that his general circulation theorem was applicable to the study of what types of motions?

Vilhelm’s entry into a particular type of research was largely a consequence of Ekholm’s interest in cyclone theory and ballooning and of Pettersson’s interest in oceanography and fishery. Name the particular type of research.

Ekholm led the Swedish meteorological expedition to what location in 1882-1883?

Why was understanding the weather so important for the balloon expeditions that took place in the late 1800s?

In the late 1800s there were two conflicting ideas on the formation of extratropical cyclones. Describe one of the two ideas at the time that attempted to explain how cyclones form.

What American editor of the *Monthly Weather Review* asked Vilhelm to contribute articles to his meteorological journal and also provided him with a unique set of upper-air data obtained with kites?

Vilhelm’s original circulation theorem neglected two important forcings that he included in updated versions of the theorem. Name the two forcings.

Oceanic surveys that took place during the winters of 1878 and 1879 off the Swedish west coast had been prompted by what event?

Pettersson concluded from Ekman’s finding that understanding and being able to predict the sea’s internal motions could aid what industry?

What was the main task of the 1899 international conference held in Stockholm?

Fridtjof Nansen wrote to Vilhelm in 1898 inquiring whether his circulation theorem could help explain a mysterious ocean phenomenon. Name the phenomenon.

Application by Ekman of Vilhelm’s expanded circulation theorem led to the derivation of the three-dimensional structure of wind-driven currents on a rotating earth. Give the name for this structure.

Ekman, Helland-Hansen, and Sandström, using Vilhelm’s expanded circulation theorem, managed to produce the cornerstones of what twentieth-century scientific discipline?

How was Stockholm, and more generally Scandanavia, crucial to Vilhelm’s involvement with meteorology and oceanography?

In the early 1900s, Vilhelm began to note the disparity in his ability to gain attention and exert authority in the fields of theoretical physics and of geophysics. Contrast the two research fields with respect to the reactions to Vilhelm’s published work in each discipline.

Which field of science, theoretical physics or geophysics, commanded a comparatively healthy amount of research support in Sweden and Norway in the early 1900s?

What was the view of the field of meteorology held by prominent physicists around 1900 and why did they hold this view?

Who generously supported the use of manned balloons to obtain data during the 1880s and 1890s in Germany?

Name a problem encountered in the late 1800s with using kites and with using manned balloons to obtain upper-air observations.

With the use of upper-air observations from unmanned balloons, Teisserenc de Bort discovered what atmospheric layer in the upper atmosphere?

That the age of flight had begun was partly evident when a pilot flew a nonrigid airship around the Eiffel Tower in October 1901. Name the pilot.

Vilhelm formulated a project in 1902 that, on the basis of the eventual attainment of sufficient upper-air data, aimed at establishing an exact mechanical physics of the atmosphere which could provide \_\_\_\_\_\_\_\_? Fill in the blank.

In his book *Principles of Mechanics*, Hertz stated that the highest ideal of mechanics is to be able to do what?

What natural events happened in Sweden late in 1902 and again in 1903 that allowed Vilhelm and Ekholm to secure the funds to expand their network of upper air measurements?

What two conditions were necessary to permit a mathematical solution to the weather forecasting problem and thereby allow Vilhelm to establish “A Rational Method for Weather Prediction”?

According to Vilhelm, what was a first step along “the only path” to an exact science of the atmosphere?

Name a personal misfortune that struck Vilhelm from spring 1903 until summer 1905 that caused him frequent depression and insomnia.

What link did Vilhelm see in January 1904 between aerial navigation associated with heavier-than-air flying machines and meteorology?

Vilhelm announced his intention to devote himself to what task early in 1906?