Aviation Weather – Part 1

Fundamentals of Aviation Meteorology

1. What is the primary driving force (principle source of energy) for weather?
2. What are the four basic cloud types (three shape types and one precipitation characteristic type)? Note that there are many combinations of these four types but we are looking for the basic ones.
3. There are five principle types of fog – what are they?
4. What is the difference between a cloud and fog?
5. What are the characteristic directions of circulation, lateral and vertical motion of:
    a. a low pressure system?
    b. a high pressure system?
6. Fronts:
    a. What are the four basic types of frontal systems?
    b. What are the two most notable non-visible changes that occur when crossing a frontal boundary?
7. Turbulence:
    a. What are the three principle causes of turbulence?
    b. One of these causes includes one that creates mountain waves. What is a visible indication that mountain waves may be present?
    c. One of these causes of turbulence can exist in, among other conditions, association with a temperature inversion or in clear air. Describe why this turbulence form can exist under those two conditions.
8. Icing:
    a. What are the three types of ice that can form on an aircraft? Which type is the most hazardous with respect to aircraft flight?
    b. What condition(s) are required for ice to form?
    c. Albeit relatively unusual, airframe icing may occur in the absence of the condition / one of the conditions given in 6.b., above. What is the condition that does not need to be present and how does ice form on an airframe in the absence of this condition?
9. Thunderstorms:
    a. What conditions are required for thunderstorm formation>
    b. What are the stages of a thunderstorm and what are the characteristics of each stage?
    c. A microburst is particularly hazardous if encountered in flight (especially when landing). What is the usual maximum duration of a microburst and what is the maximum wind speed that might be encountered at the peak of a microburst?
10. Clouds that produce significant precipitation (including those that produce thunderstorms) form due vertical motion – rising currents of air. There are four common sources of vertical motion – what are they?