Volcanoes and Volcanism – Chapter Questions

1. **Describe flood basalt formation.
2. What is its effect on global climate and Earth history?
3. Understand the three primary methods for melting mantle rock and learn which three locations on the Earth's surface you find magmas formed through each of those methods.

Geologic setting for volcanism	Magmas produced by:	World example:
Hotpots	Increased heat	Hawaii, Yellowstone, Iceland
Subduction zones	Addition of water causes melting point of mantle to drop.	Cascade Mtns, Andes Mtns, Indonesia, Aleutian Islands, Japan, Philippines
Divergent plate boundaries	Drop in pressure causes melting point of mantle to drop	Iceland, Oceanic ridges everywhere, East African Rift Zone, Long Valley

4. Oceanic volcanism is mostly what igneous composition? Continental volcanism? Why?
5. **List the main gases released in a volcanic eruption. (*Book Error* p. 106 or 105 – depending on edition. *Correction*: Major gases: CO_2, H_2O, SO_2. Minor gases: Cl_2, N_2.)
6. What are the two primary ways to make a volcanic eruption more hazardous? Why?
7. **What does *pyroclastic* mean? Describe all types of pyroclastic material.
8. What do we call a rock composed of compacted pyroclastic material? Why is such a rock usually felsic?
9. Compare and contrast the various hazards and materials that volcanoes produce:

Hazard	Definition	Speed	Distance travelled	Dangers
Dust, ash, and pyroclastic bombs	Material thrown from the vent of a volcano	Ash: as fast as wind (20-80 km/h)	Ash: All over world, potentially	Ash: Roof collapse, asphyxiation, clogged machinery, lost crops, breathing problems increased for asthmatics, Bombs: bodily injury/death
Lahar	Mudflow: ash + water (rain or melted glacier)	Up to 40-50 km/h	100s of km from vent (along river valleys)	Drowning, destruction of all bridges and buildings near water's edge
Pyroclastic flows	Ash, gas, lava, rocks	Up to 200 km/h	10s of km from vent	Death and destruction to any and all in its path.
Lava flows	Flowing molten rock	2-4 km/h	10s of km from vent (if basalt), 1 km if rhyolite	Destruction to property and vegetation. Little hazard to human life.
Gas clouds	High density rolling CO_2 gas.	??	10s of km from vent	Asphyxiation of all life.
Acid rain	SO_2 gas + H_2O creates sulfuric acid.	Same as wind	10s of km from vent	Temporary lull in growth of vegetation and contamination of water.

10. **What is columnar jointing? How does it form?
11. Compare and contrast these main types of volcanic landforms:

	Shield volcano	Stratovolcano or composite cone	Cinder or pyroclastic cone	Volcanic dome
Size	200 km wide 9 km tall	18 km wide 3 km tall	1500 m wide 300 m tall	50 m wide 25 m tall
Shape	Shield	Perfect cone (or composite of many cones)	Perfect cone shape	Dome
Major materials produced	Lavas primarily	Equal: pyroclastics & lavas	Scoria or pumice only (pyroclastics)	Lava only
Magma compositions	Mafic	Intermediate and Felsic	All	Felsic
Eruptive style (relative hazard)	Low	High	Low	Very high
Typical locations	Over hotspots	Subduction zone arcs and continental rifts	Flanks of all volcanoes	Craters of stratovolcanoes