

## KEY – Physical Geology 102

### Ordering Geologic Events II and Interpreting Geologic History.

1. a)
    - i) quartz, muscovite, feldspar
    - ii) P€v: Vishnu Schist  
P€g: granites, granite pegmatites  
€t: Tapeats sandstone  
€ba: Bright Angel Shale
    - iii) yes, especially the granite (P€g) and schist (P€v) because they are likely to contain quartz, muscovite, and feldspar
  - b)
    - i) Ph: shale  
Pc: quartz sandstone  
P€n: conglomerate
    - ii) shale: quiet water, low energy  
quartz sandstone: moderate energy  
conglomerate: high energy
  - c)
    - i) quartzite
    - ii) yes, Shinumo quartzite (P€s)
    - iii) P€n is younger than the quartzite
  - d)
    - i) I-A: granite  
I-E: rhyolite
    - ii) they have the same mineral composition (quartz, K-feldspar, etc.)
    - iii) rhyolite is a porphyritic rock that formed extrusively. Granite is a phaneritic rock that formed intrusively.
2.
    - i) 7053 ft.
    - ii) Chinle formation, Moenkopi formation
    - iii) Triassic (not Mesozoic- Mesozoic is an era, not a period)
    - iv) 248 million years
    - v) 206 million years
    - vi) it is an erosional remnant (i.e. rest of surrounding rock is eroded away)
  3. The river flows west: the elevation of the river on the east side of map (~2800ft), is higher than the elevation of the river on the west side of the map (~2000 ft).
  4. Ranger station: 8340 feet  
Colorado river: about 2640 feet (near Phantom Ranch)  
8340-2640 = 5700 feet (more than a mile!)
  5. angular unconformity
  6. disconformity
  7. nonconformity

8. *i)* Ph is older  
*ii)* law of superposition
9. Permian rocks are older than the faults (you can tell because the faults cut across the Permian rocks)
10. *i)* p€v is older  
*ii)* law of cross-cutting relationships (the granite (an igneous rock) intruded into the schist. Therefore, the schist had to be there 1<sup>st</sup> in order for the granite to intrude into it.)
11. YOUNGEST erosion  
 Mr  
 Dtb  
 €m  
 faulting (most likely faulting occurred after all sedimentary rocks, but evidence of this has eroded away)  
 €ba  
 €t  
 erosion  
 tilting  
 P€d  
 P€s  
 P€i (sill)  
 P€h  
 P€b  
 erosion  
 OLDEST Pp€g
12. *i)* 12.5% parent; 87.5% decayed  
 therefore: 3 half lives have elapsed  
*ii)* (713 million years) x 3 half lives = 2139 million years old (or 2.1 billion years old)  
*iii)* the oldest the Tapeats sandstone could be is 2,139 million years old
13. *i)* elevation = 3600 feet  
*ii)* elevation = 3200 feet  
*ii)* 3600-3200= 400 foot change in elevation  
 this change in elevation could be due to tilting of the Redwall Limestone