PHSC 2105 Uniformitariansim Exercise Name_____

I. Examine the sedimentary rock samples provided for you. For each sample, record texture (including size, sorting, degree of rounding if it applies), mineral composition, sedimentary structures (see additional information), fossils, identify the rock (see Sedimentary Rock Lab). Then, choose the most obvious environment of deposition for each sedimentary rock and explain why you chose this environment

Texture	Mineral Composition	Sedimentary Structures	Fossils	Rock Name	Environment of Deposition
1					
2					
3					
4					
5					

Explanations:

1. _____

2. _____

3. _____

4. _____

5. _____

II. Given the following information, determine how the environments changed in Capitol Reef National Park between about 250 and 65 million years ago (see back page for choices and last page for help with environments)

Mancos Shale:

fine grained gray shale with some buff colored sandstone and beds of coal
fossils in the shale include: shark's teeth, cephalopods (shelled guy related to the octopus); fossils in the sandstone are mainly plants

Environment of deposition:_____

Dakota Sandstone:

medium-grained sandstone and conglomerate that weathers to a brown color
upper unit contains petrified wood fossils
lower unit contains oyster fossils

Environment of deposition: :_____

Morrison Formation:
Brushy Basin Member:

white, purple, green and red shales with bentonite - a clay that forms when volcanic ash is deposited in water
fossils of dinosaurs - many whole skeletons, turtles and fresh-water algae

Environment of deposition:_____

Salt Wash Sandstone:

mostly sandstone, small-scale cross-beds, asymmetric ripples, some gravelly beds
fossils of dinosaurs - mainly larger bones of broken-up skeletons, fossil trees trunks

Environment of deposition: :_____

Summerville Formation:
"chocolate and vanilla" siltstone in thin beds with layers of gypsum

Environment of deposition: : Tidal Flats by a hypersaline sea_____

Curtis Formation:

fine greenish-tan sandstone with symmetric ripple marks

Environment of deposition:__:_____

Entrada Formation:

red sandstone and siltstone with flute casts (formed when currents scour the bottom) and some cross-beds indicating a near-shore marine environment

Environment of deposition:__:_____Tidal Flats_____

Carmel Formation:

varied lithologies such as limestone and gypsum

fossils include clams, and pentacrinus (a relative of the sea lily)

Environment of deposition:_:_____

Navajo Sandstone:

fine-grained, buff colored, well sorted sandstone with large scale cross-beds; fossils are rare

Environment of deposition:_____

Kayenta Formation:

alternating layers of shale and sandstone with small scale cross beds

fossils: reptile tracks

Environment of deposition:_____

Wingate Sandstone:

fine-grained, red, well sorted sandstone with large scale cross-beds

fossils are rare

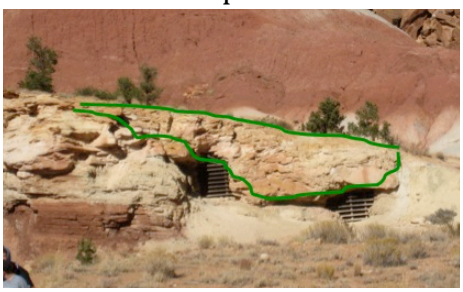
Environment of deposition:_____

Chinle Formation:

soft red, green and white shales with bentonite - a clay that forms when volcanic
ash is deposited in water
fossils of petrified wood and a few small reptiles

Environment of deposition:_____

Shinarump Member of the Chinle Formation:



yellowish to white conglomeratic sandstone
fossils of petrified wood common

Environment of deposition:_____

Moenkopi Formation:

red-brown siltstone and sandstone with small-scale cross-beds and asymmetric
ripples, some beds of gypsum
Environment of deposition:_____

Kaibab Limestone:

- in its type local is a limestone with marine fossils

Environment of deposition:_____

Choices for Capitol Reef N.P. Environments of Deposition:

=Shallow Tropical Sea alternating with Shallow Evaporating Sea
==Sand Dune (use twice)
=Shallow Tropical Sea
=Beach
=Beach and Near Shore Lagoon
=Slow Moving Streams
==Lakes or Slow Moving streams (use twice)
=Slow Moving Streams near evaporating ocean
=Deep Marine and Nearshore/Delta
==High Energy Streams (use twice)
=Shallow Evaporating Ocean

Environment	Mineral Composition	Texture	Rocks	Sedimentary Structures	Fossils
Streams	Quartz, clay, Rock fragments	m.g – f.g for slower streams, c.g for faster	Alternating shale and sandstone for slower streams, conglomerate for faster	Small scale cross beds, asymmetric ripples, mud cracks	Wood (but not leaves), larger bones
Lake (away from shore)	clay	f.g.	Shale	Finely bedded (laminated)	Whole fish, algae, plants – often carbonized
Glacier	Variable	All sizes – unsorted and angular	Tillite (looks like breccia with lots of matrix)	Lacks bedding	few
Swamp	Organic carbon, clay	f.g.	Coal, Shale		Well preserved plants
Sand Dune	Quartz	m.g. (and very well sorted)	Sandstone	Large-scale cross bedding, asymmetric ripples	rare
Beach	Quartz	m.g. (higher energy can be c.g.	Sandstone or Conglomerate	Symmetric ripples	Mollusc shells, possibly wood
Delta	Quartz, clay	m.g. to f.g.	Sandstone alternating with shale and coal	Assymetric ripples can be present	Well preserved plant fossils nearshore, marine organisms further out
Deep Marine	Clay, biogenic calcite or biogenic silica	f.g.	Shale or Chalk or Biogenic Chert	Thinly bedded	Microfossils common, possibly large swimming organisms
Tropical Shallow Sea (Coral Reef)	calcite	variable	LImestones: Micritic, Fossiliferous, Coquina, Oolitic		Abundant coral, shelled organisms
Sabka (Shallow evaporating Sea)	Dolomite or gypsum or rock salt	varies	Dolostone, Gypsum Rock, Rock Salt		rare

Note: Many environments are often next to each other and so can alternate back and forth creating interbedded deposits of both environments.