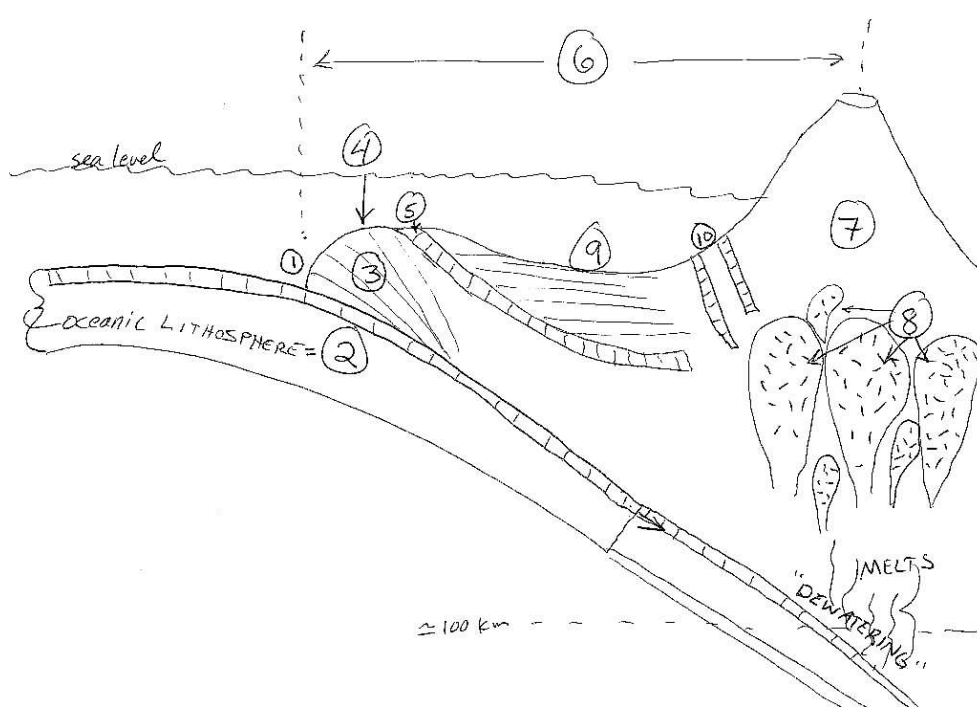


Exam IV: Sierra Nevada



- 1) On the diagram above, where is the Arc-Trench Gap?
 - a. 1 and 3
 - b. 4
 - c. 7 and 8
 - d. 6
 - e. 5 and 10
- 2) On the diagram above, where is the subduction zone Franciscan Formation?
 - a. 4
 - b. 3
 - c. 1
 - d. 10
 - e. 7 and 8
- 3) On the diagram above, where is the Sierra Nevada Magmatic Arc?
 - a. 7 and 8
 - b. 7
 - c. 8
 - d. 10
 - e. 6
- 4) On the diagram above, where is the Farallon Plate?
 - a. 1
 - b. 3
 - c. 2
 - d. 10
 - e. 5
- 5) On the diagram above, where is the trench?
 - a. 3
 - b. 1
 - c. 10
 - d. 6
 - e. 7
- 6) On the diagram above, where is the present position of the Great Valley?
 - a. 6
 - b. 4
 - c. 7
 - d. 8
 - e. 9
- 7) On the diagram above, where is the Coast Range Ophiolite?
 - a. 10
 - b. 4
 - c. 2
 - d. 5
 - e. 1

- 8) On the diagram above, where is the batholith?
- 7
 - 10
 - 3
 - 4
 - 8
- 9) On the diagram above, where is the present Coast Ranges?
- 7 and 8
 - 9
 - 4
 - 5
 - 2
-
- 10) On the diagram above, where is the Paleozoic, Foothills subduction zone?
- 7
 - 10
 - 8
 - 3
 - 5
- 11) On the diagram above, where are the Mesozoic magmatic arc volcanoes or the Sierran Arc?
- 7
 - 8
 - 7 and 8
 - 10
 - 6
- 12) Why is the Sierra Nevada is asymmetrical?
- range front faulting in Basin and Range
 - San Andreas Transform Tectonics
 - mantle upwelling in Basin and Range
 - convergent margin tectonics during the Mesozoic
 - both a and c
- 13) Approximately when was the Sierra Nevada uplifted?
- 16 million years ago
 - 10 to 16 million years ago
 - 5 to 8 million years ago
 - 4 million years ago
 - 20 to 25 million years ago
- 14) What evidence do we have that the Sierra Nevada uplift is young?
- seafloor magnetic anomalies
 - table mountains and Tertiary gravels
 - lode deposits in Sierra
 - roof pendants in high Sierra
- 15) The source area for the Table Mountain lavas was _____.
- west of the present Sierran crest
 - north of the present Sierran crest
 - east of the present Sierran crest
 - the Great Valley
 - the Cascade Range
- 16) What are the two major divisions of rocks in the Sierra Nevada?
- subjacent series and accreted terranes series
 - superjacent series and auriferous gravels series
 - subjacent series and batholith series
 - subjacent series and superjacent series
 - accreted series and exotic series
- 17) The Sierra Nevada Batholith is an example of the _____ series.
- subjacent
 - superjacent
- 18) The Calaveras Complex is an example of the _____ series.
- subjacent
 - superjacent
- 19) The metamorphic roof pendants are examples of the _____ series.
- subjacent
 - superjacent
- 20) The table mountain lavas are examples of the _____ series.
- subjacent
 - superjacent
- 21) The Northern Sierra Terrane is an example of the _____ series.
- subjacent
 - superjacent
- 22) The auriferous gravels are examples of the _____ series.
- subjacent
 - superjacent
- 23) What fault zone in the Foothills Metamorphic Belt represents the Paleozoic to Early Mesozoic subduction zone?
- Golconda Allocthon fault zone
 - Robert's Mountain Allocthon fault zone
 - Yuba Fault zone
 - Melones Fault zone
 - Pine Flat Fault zone

- 24) The Minarets and Ritter Range in the Sierra Nevada are _____ in age.
- Paleozoic
 - Cenozoic
 - Mesozoic
 - Precambrian
 - Archean
- 25) The geological structure formed by the Minarets and Ritter Range is a _____.
- graben
 - caldera
 - horst
 - shield volcano
 - lava dome
- What was the tectonic setting for the volcanic rocks of the Minarets and Ritter Range?
- island arc
 - hot spot
 - divergent
 - passive margin
 - magmatic arc
- 26) How old are the volcanic rocks found in the Minarets and Ritter Range?
- 100 Ma
 - 175 Ma
 - 60 Ma
 - 25 Ma
 - 350 Ma
- 27) Orogeny means _____?
- basin development
 - rifting
 - mountain building
 - Basin and Range extension
- 28) How many orogenies affected California before the formation of the Sierra Nevada Batholith?
- three
 - four
 - five
 - one
- 29) These orogenies were characterized by ____.
- magmatic arc development
 - island arc accretion
 - continent-continent collision
 - rifting and passive margin setting
- 30) The first of these orogenies was the _____.
- Sonoma
 - Antler
 - Sierran
 - Antler
- 31) The second of these orogenies was the _____.
- Sonoma
 - Antler
 - Sierran
 - Nevadan
- 32) The last of these exotic terrane accretion orogenies was the _____.
- Sonoma
 - Antler
 - Sierran
 - Nevadan
- 33) During the oldest or first orogeny, what terrane or terranes were accreted to California?
- Shoo Fly Complex and Sonoma Arcs
 - Nevadan Arcs and Foothills terrane
 - Sonoma Arcs and Calaveras Complex
 - Northern Sierra Terrane and Shoo Fly Complex
 - Nevadan Arcs and Calaveras Complex
- 34) During the second orogeny, what terrane or terranes were accreted to California?
- Shoo Fly Complex and Sonoma Arcs
 - Nevadan Arcs and Foothills terrane
 - Sonoma Arcs and Calaveras Complex
 - Northern Sierra Terrane and Shoo Fly Complex
 - Nevadan Arcs and Calaveras Complex
- 35) During the last terrane accretion orogeny, what terrane or terranes were accreted to California?
- Shoo Fly Complex and Sonoma Arcs
 - Nevadan Arcs and Foothills terrane
 - Sonoma Arcs and Calaveras Complex
 - Northern Sierra Terrane and Shoo Fly Complex
 - Nevadan Arcs and Calaveras Complex
- 36) During the late Precambrian and early Paleozoic, the tectonic setting of California was _____.
- active margin
 - passive margin
 - transform margin
- 37) Nevadan cleavage is a pervasive foliation affecting Sierra Nevada rocks older than ____.
- Triassic, 208 Ma
 - Cretaceous, 65 Ma
 - Jurassic, 150 Ma
 - Cretaceous, 80 Ma
- 38) Nevadan cleavage developed due to the ____.
- Sonoma Orogeny
 - Antler Orogeny
 - Sierran Orogeny
 - Nevadan Orogeny

- 39) Foothills examples of Nevada cleavage are the _____.
- Table Mountains
 - Tombstone Slates
 - Auriferous Gravels
 - Serpentinite Bodies
- 40) Inverted valleys are characterized by ____.
- capping basalt lava flows
 - soft, gravels overlain by lava flows
 - higher, elevated above modern stream
 - all of the above
- 41) Approximately at what depth and temperatures did the Sierra Nevada Batholith form?
- 100 to 500 meters; 1000°C
 - 10 to 15 km; 850°C to 900°C
 - 5 to 10 km; 750°C to 800°C
 - 20 to 25 km; 900°C to 1200°C
- 42) To locate the epicenters of earthquakes, a total of _____ seismic stations are needed.
- two
 - one
 - three
 - none
- 43) The elastic rebound theory goes as follows:
- rocks experience rupture, then are strained, then seismic waves are released
 - rocks experience strain, then seismic waves are released, then rock rupture
 - seismic waves are released, rocks are strained, rocks rupture
 - rocks experience strain, then rupture occurs, then seismic waves are released
- 44) The M_W scale is “better” than the M_L scale because it accurately measures the ___ of an earthquake.
- energy released
 - vibrations
 - ground shaking
 - damage
- 45) Sources of seismic waves are _____.
- earthquakes
 - nuclear detonations
 - chemical phase transitions
 - all of the above
- 46) The P wave is the ____ wave and is known as the _____ wave.
- body, point
 - fastest, primary
 - fastest, point
 - slowest, primary
- 47) The S wave is known as the _____ wave.
- secondary
 - source
 - shear
 - seismic
- 48) Both P and S waves are _____ waves.
- body
 - surface
 - rolling
 - zig-zag
- 49) What is stress?
- force/area
 - force/meters
 - force/inches
 - force/strain
- 50) Does the San Andreas have all three types of stress?
- yes
 - no
- 51) What is strain?
- force/strain
 - the way the rocks behave to stress
 - the way stress behaves to strain
- 52) Which of the following is NOT a strain.
- elastic
 - brittle
 - tensile
 - ductile
- 53) Where is strain energy stored?
- faults
 - rocks/minerals
 - scarps
- Coast Ranges
- 54) What is the tectonic setting of the Franciscan Formation?
- subduction zone
 - arc-trench gap
 - magmatic arc
 - island arc
- 55) What is mélangé?
- forearc basin
 - arc trench gap
 - accretionary wedge
 - magmatic arc

- 56) When was the initial contact between the Pacific Plate (East Pacific Rise) and the North American Plate?
- 45 Ma
 - 28 Ma
 - 10 Ma
 - 2 Ma
- 57) What is the distinction between the San Andreas Fault and the San Andreas Transform?
- transform is stationary in time
 - transform migrates through time
- 58) What does the Salinian Block represent in terms of tectonic setting?
- subduction zone
 - arc-trench gap
 - magmatic arc
 - island arc
- 59) In the word batholith, what does the Greek word *bathos* mean?
- rock
 - flat
 - deep
 - basin
- 60) The oldest plutonic rocks in the Sierra Nevada batholith are about _____ and the youngest are about _____.
- 310 Ma, 100 Ma
 - 410 Ma, 300 Ma
 - 60 Ma, 24 Ma
 - 210 Ma, 80 Ma
- 61) The majority of the plutons in the Sierran batholith are granitic (granite, granodiorite, and tonalite) in composition. Which type is the single most abundant?
- granite
 - granodiorite
 - tonalite
- 62) Geologists refer to the depth at which magma solidifies within the surrounding rocks as _____.
- emplacement depth
 - crystallization depth
 - plutonic depth
 - batholith depth
- 63) This depth varies between ___ km and _ km.
- 5 and 15
 - 10 and 50
 - 20 and 60
 - 25 and 100
- 64) Geologists agree that batholiths throughout the world are formed at plate margins where
- two oceanic plates converge at a subduction zone boundaries
 - an oceanic plates slides by a continental plate
 - oceanic and continental plates converge at subduction zone boundaries
 - two oceanic plates diverge from each other
- 65) Geologists believe that the origin of granitic batholiths is fueled by water. Water trapped in the subducting oceanic plate is driven off as the plate descends. This water “leaks” into the mantle. How does water explain the origin of magmas under volcanic arcs?
- melts the oceanic, subducting plate
 - lowers the melting point of the mantle
 - causes higher temperatures in the mantle
 - reduces friction and facilitates melting
- 66) What is a tectonic stratigraphic terrane?
- exotic block
 - originated in a different area than where found
 - tectonically transported
 - all of the above
- 67) Which unit is characterized by high pressure and low temperature metamorphism?
- Salinian Block
 - Franciscan Formation
- 68) Which of the following best describes a marine terrace?
- old beach sands and gravels
 - ancient sea floor that sits above sea level
 - current, nearly flat surface actively being cut by surf action
 - current sea cliff
- 69) Which of the following best describes a wave-cut platform?
- old beach sands and gravels
 - ancient sea floor that sits above sea level
 - current, nearly flat surface actively being cut by surf action
 - current sea cliff