

# IIT JAM 2026 GEOLOGY

## Answer Sheet



## GEOLOGY

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1. The rake (pitch) of slickenlines exposed on a moderately dipping fault plane is the angle between
  - a. the trend and the plunge directions of slickenlines measured on the fault plane
  - b. the strike of the fault plane and the slickenlines measured on a vertical plane
  - c. the strike of the fault plane and the slickenlines measured on the fault plane**
  - d. the magnetic north and strike of the fault plane measured on a horizontal surface
2. Which one of the following observations is consistent with the solid nature of the Earth's mantle?
  - a. P waves are refracted in the mantle
  - b. P waves propagate through the mantle
  - c. S waves propagate through the mantle**
  - d. S waves do not propagate through the mantle
3. Choose the material on which  $^{14}\text{C}$  dating technique can be correctly applied.
  - a. Organic matter in carbonaceous chondrites
  - b. Diamonds from the Earth's interior
  - c. Charred food grains from the Indus Valley civilization**
  - d. Graphite from Proterozoic sedimentary basins
4. Match the geographic locations listed in Column 1 to the geodynamic features listed in Column 2.

Column 1	Column 2
P. Iceland	i. Triple junction
Q. Afar	ii. Plume-ridge interaction
R. Hawaii	iii. Subduction zone
S. Aleutian Islands	iv. Plume

- a. P-ii; Q-iv; R-i; S-iii
  - b. P-ii; Q-i; R-iii; S-iv
  - c. P-i; Q-ii; R-iv; S-iii
  - d. P-ii; Q-i; R-iv; S-iii**
5. Tsunamis are frequently caused by earthquakes at
    - a. slow-spreading ridges
    - b. transform faults
    - c. fast-spreading ridges
    - d. subduction zones**
  6. Which one of the following rock combinations is characteristic of volcanic arc?
    - a. Basalt-andesite-dacite**
    - b. Trachybasalt-basaltic andesite-andesite
    - c. Basalt-trachyte-rhyolite
    - d. Andesite-syenite-dacite
  7. Which one of the following is characteristic of a point bar succession?
    - a. Thick homogenous sandstone
    - b. Upward gradation from sandstone to shale**
    - c. Upward gradation from shale to sandstone
    - d. Thick laminated shale
  8. Which one of the following is a nekctic bivalve?
    - a. *Gryphaea*
    - b. *Mytilus***
    - c. *Trigonia*
    - d. *Solen*
  9. Which one of the following primary structures can be used for paleocurrent measurement?
    - a. Load and flame structures

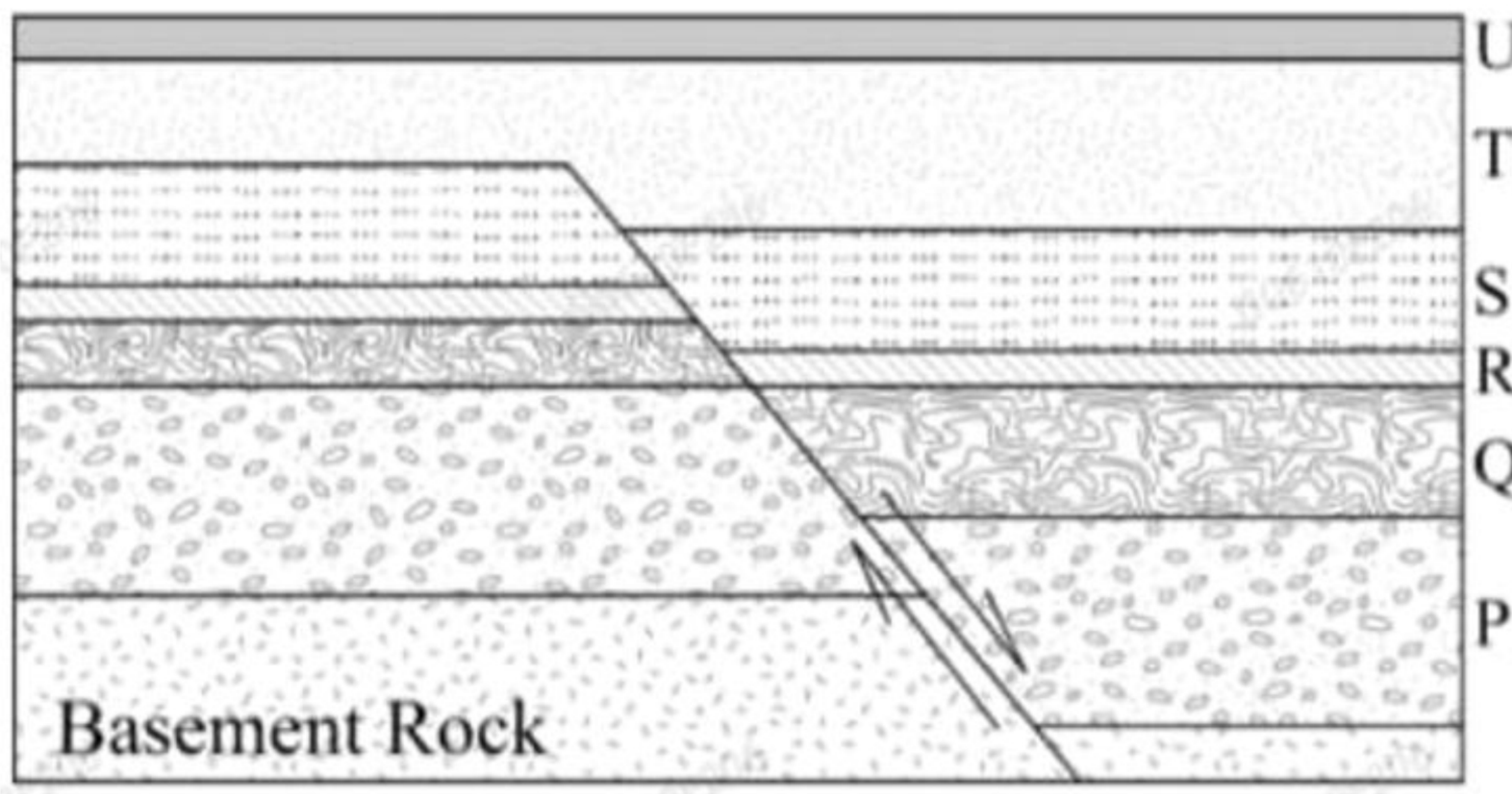


- b. Hummocky cross-strata
  - c. **Flute cast**
  - d. Oscillation ripple
10. Which one of the following minerals does NOT show changes in optical properties upon exposure to UV light?
- a. Calcite
  - b. Fluorite
  - c. Scheelite
  - d. **Apatite**
11. If P, Q, R, and S refer to Rainfall induced landslide, Bolide impact, Milankovitch cycle, and Supercontinent cycle, respectively, then which one of the following correctly represents the decreasing order of their duration?
- a. **S, R, P, Q**
  - b. S, P, Q, R
  - c. S, Q, P, R
  - d. Q, P, R, S
12. The S wave velocity  $V_s$  is given by  $V_s = \sqrt{\mu/\rho}$ , where  $\mu$  is shear modulus and  $\rho$  is density of the medium.  $V_s$  is lower in mantle plumes than in the ambient mantle because of
- a. higher density of mantle plumes
  - b. lower temperature of mantle plumes
  - c. lower density of mantle plumes
  - d. **lower shear modulus of mantle plumes**
13. In a single layer of an anticline, the dip isogons converge towards the inner surface (core). Which one of the following statements is correct for the curvature of the inner surface of this folded layer?
- a. Curvature of the inner surface = Curvature of the outer surface
  - b. Curvature of the inner surface < Curvature of the outer surface
  - c. Curvature of the inner surface = Curvature of the median surface
  - d. **Curvature of the inner surface > Curvature of the outer surface**
14. Which one of the following environments best characterizes the natural habitat of boring bivalves, green algae, and herbivorous snails?
- a. Outer shelf
  - b. Deep marine
  - c. **Rocky intertidal coast**
  - d. Estuary
15. In the  $^{87}\text{Rb}$ - $^{87}\text{Sr}$  isotopic systematics applied to terrestrial rocks, the slope of the isochron ( $e^{\lambda t} - 1$ ) can be approximated as  $\lambda t$ , where  $\lambda$  is the decay constant and  $t$  is time. Choose the correct option that justifies this approximation.
- a.  $^{87}\text{Rb}$  decays to  $^{87}\text{Sr}$  following a linear law
  - b.  **$\lambda$  is very small for  $^{87}\text{Rb}$**
  - c. Age of the Earth > half-life of  $^{87}\text{Rb}$
  - d. The Rb/Sr ratio is susceptible to alteration in terrestrial rocks
16. Which one of the following features is used to define the K-Pg boundary globally?
- a. End of Deccan volcanism
  - b. Absence of dinosaur fossils
  - c. **Presence of iridium anomaly in sediments**
  - d. Presence of high mercury content in sediments
17. Which one of the following mineral associations is diagnostic of the highly-oxidized zone of a weathered primary base metal vein?
- a. Calcite, Fluorite, Pyrite
  - b. Limonite, Realgar, Chalcocite
  - c. Goethite, Orpiment, Boehmite

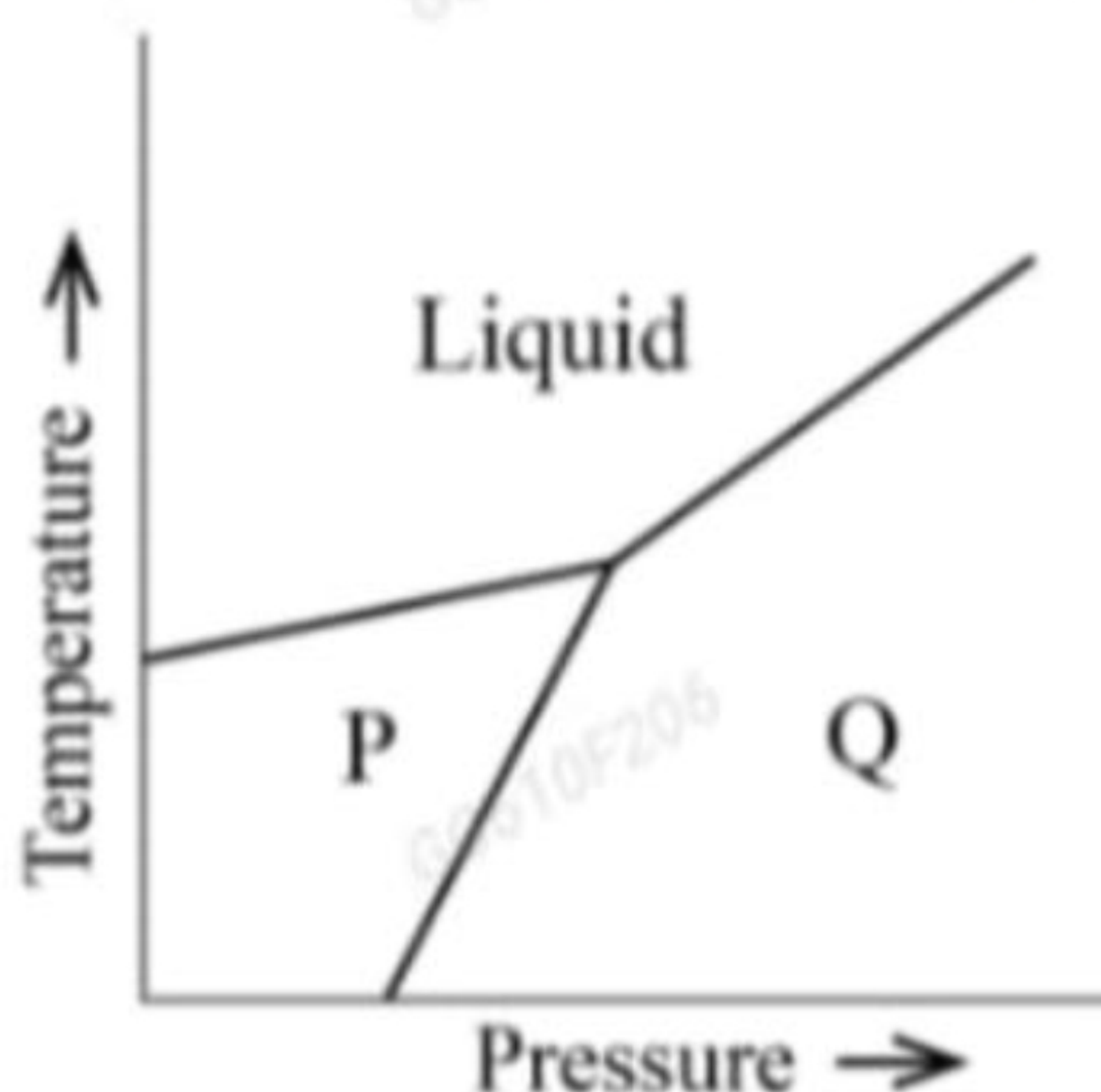


**d. Smithsonite, Malachite, Anglesite**

18. The schematic shows a geological cross-section of a faulted region of sedimentary rocks (beds P to U). Assuming continuous sedimentation, select the beds that record the earliest activation and latest reactivation of the fault. (Basement Rock with beds U, T, S, R, Q, P above it)



- a. Q, R
  - b. Q, U
  - c. **P, T**
  - d. Q, T
19. A halide with octahedral cleavage can scratch calcite and can be scratched by quartz. Identify the halide.
- a. Sylvite
  - b. Apatite
  - c. Halite
  - d. **Fluorite**
20. Choose the correct statement about Moho.
- a. Seismic Moho lies at shallower depths relative to the petrologic Moho
  - b. Seismic and petrologic Moho coincide
  - c. **Petrologic Moho lies at shallower depths relative to the seismic Moho**
  - d. Petrologic Moho lies above the layered gabbro in ophiolites
21. The figure depicts stability fields of minerals P and Q. Which one of the following statements is INCORRECT?



- a. A reaction forming Q from P at constant pressure will require an input of heat.
- b. P and Q can coexist with liquid only at one pressure and temperature.
- c. P and Q can coexist at different temperatures only if pressures are different.
- d. Q has a higher melting temperature at higher pressures than at lower pressures.

**May be all answers are correct. Wait till the official answer sheets are out**



22. Match the magma series in Column 1 to the geological settings in Column 2.

Column 1	Column 2
P. Alkaline Series	i. Divergent oceanic margin
Q. Shoshonite Series	ii. Oceanic intraplate
R. Calc-alkaline Series	iii. Convergent plate margin
S. Tholeiitic Series	iv. Convergent plate margin close to back arc

- a. P-iv; R-ii; Q-i; S-iii
- b. P-ii; Q-iv; R-iii; S-i**
- c. P-i; Q-iv; R-iii; S-ii
- d. P-ii; Q-i; R-iii; S-iv

23. In an arid environment, winds of similar intensity blow in nearly opposite directions in alternate seasons. Which dune type is most likely to form in such an environment?

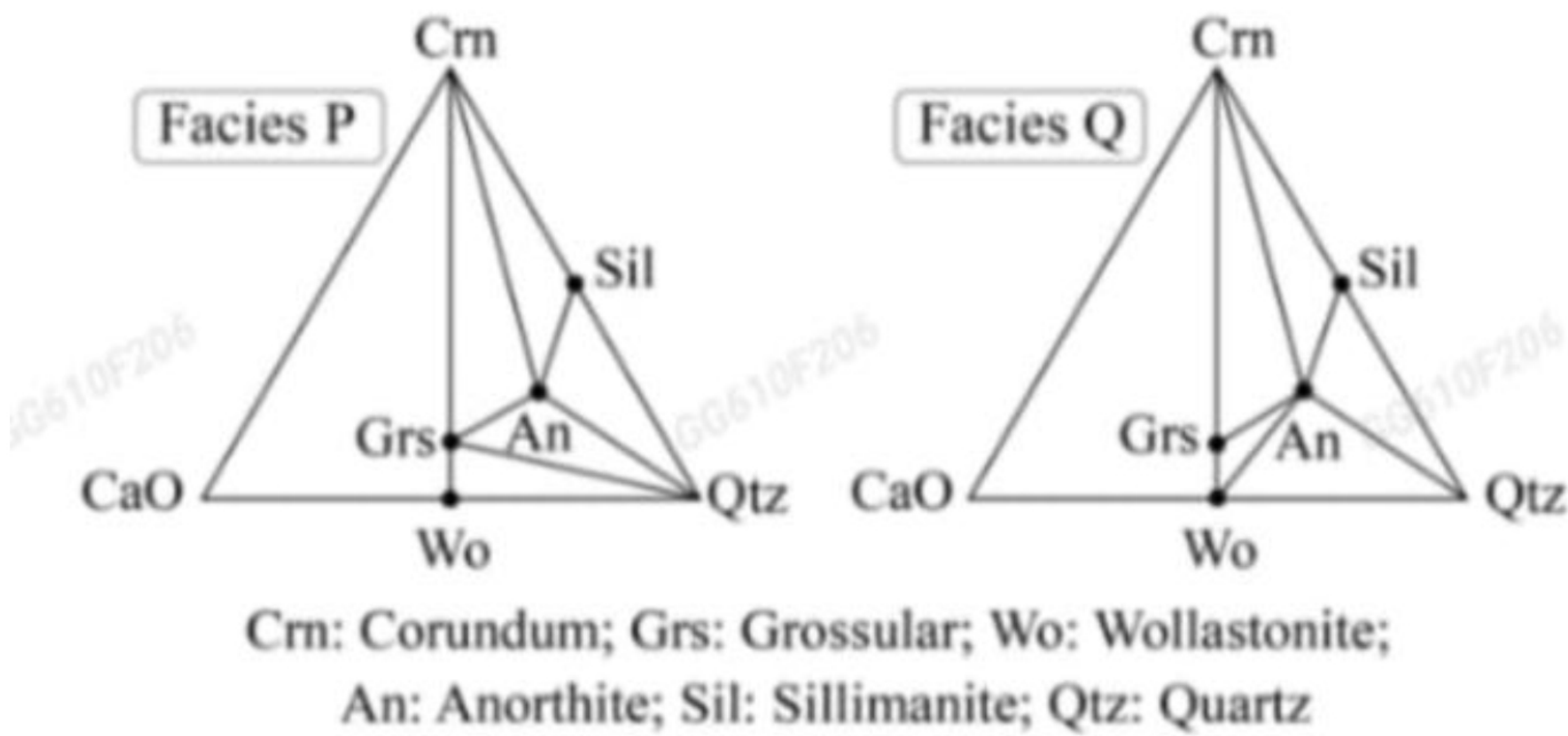
- a. Lunate
- b. Barkhan
- c. Transverse dunes
- d. Seif**

24. Match the minerals in Column 1 to their characteristic optical properties in Column 2.

Column 1	Column 2
P. Zircon	i. Pink to green pleochroism
Q. Orthopyroxene	ii. Very high positive relief
R. Muscovite	iii. Cyclic twinning
S. Cordierite	iv. Third order birefringence

- a. P-ii; Q-i; R-iv; S-iii**
- b. P-i; Q-ii; R-iv; S-iii
- c. P-ii; Q-i; R-iii; S-iv
- d. P-ii; Q-iv; R-i; S-iii

25. The figure shows chemogenic mineral projections for Facies P and Facies Q (mineral abbreviations: Crm: Corundum; Grs: Grossular; Wo: Wollastonite; An: Anorthite; Sil: Sillimanite; Qz: Quartz). Which one of the following reactions best represents change from Facies P to Facies Q?



- a.  $Wo + Crm = Grs$
- b.  $Wo + An = Sil + Qtz$
- c.  $An + Sil = Wo$



d. **Grs + Qz = Wo + An**

26. Match the plant fossils in Column 1 to the corresponding geological ages in Column 2.

Column 1	Column 2
P. Glossopteris	i. Triassic
Q. Ptilophyllum	ii. Devonian
R. Dicordium-Thinnfeldia	iii. Triassic to Lower Cretaceous
S. Psilophyton	iv. Permian

- a. P-iii; Q-iv; R-i; S-ii
- b. **P-iv; Q-iii; R-i; S-ii**
- c. P-iv; Q-iii; R-ii; S-i
- d. P-iv; Q-i; R-iii; S-ii

27. Match the features in Column 1 to the most appropriate description in Column 2.

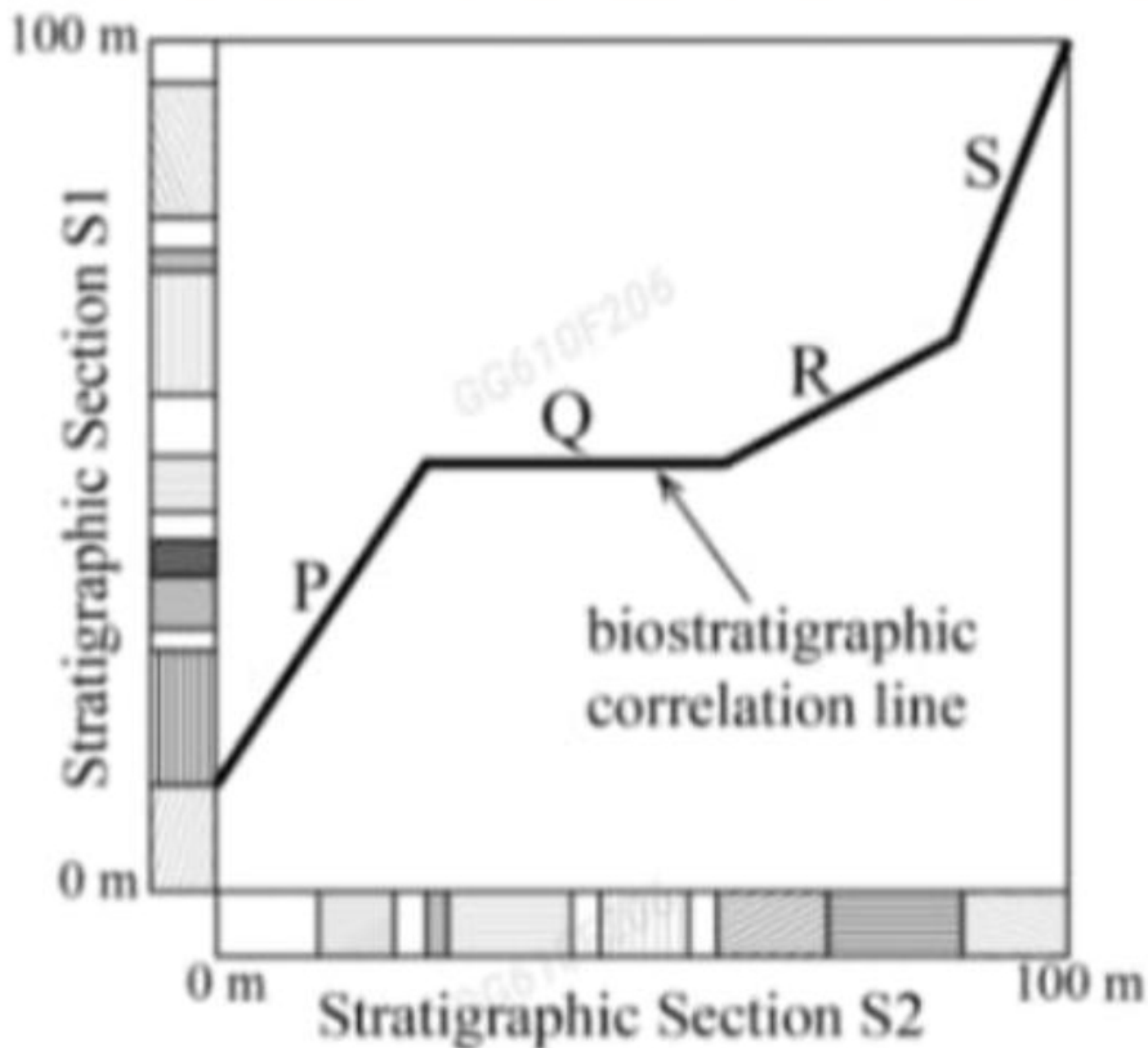
Column 1	Column 2
P. Ash layer	i. Part of a turbidite sequence
Q. Graded bedding	ii. Subaerial episode in the sedimentary record
R. Hiatus	iii. Dating of sedimentary rocks
S. Soil profile	iv. Missing faunal zone

- a. **P-iii; Q-i; R-iv; S-ii**
- b. P-iii; Q-iv; R-i; S-ii
- c. P-i; Q-iii; R-iv; S-ii
- d. P-iii; Q-i; R-ii; S-iv

28. Which one of the following reasons best explains the occurrence of large number of earthquakes at the active plate boundaries compared to the plate interiors?

- a. **Strain energy accumulation is higher at the plate boundaries**
- b. Crust is thinner at the plate boundaries
- c. Stiffness is higher at the plate boundaries
- d. Heat flow is lower at the plate boundaries

29. Stratigraphic sections S1 and S2, separated by tens of kilometers, are shown in the schematic. The line segments in this schematic represent biostratigraphic correlation between S1 and S2. Which one of the segments (P, Q, R, S) of this correlation line represents an unconformity?





- a. Q
- b. P
- c. S
- d. R

30. Match the metal associations in Column 1 to corresponding hosts in Column 2.

Column 1	Column 2
P. Cu, Co, Zn	i. Tectonized dunite and harzburgite
Q. Mn, Co, Ni	ii. MORB
R. Cr	iii. I-Type granite in volcanic arc
S. Cu, Mo, Pb	iv. Pelagic sediment

- a. P-ii; Q-i; R-iv; S-iii
- b. P-ii; Q-iv; R-iii; S-i
- c. **P-ii; Q-iv; R-i; S-iii**
- d. P-iv; Q-ii; R-i; S-iii

MSQ SECTION

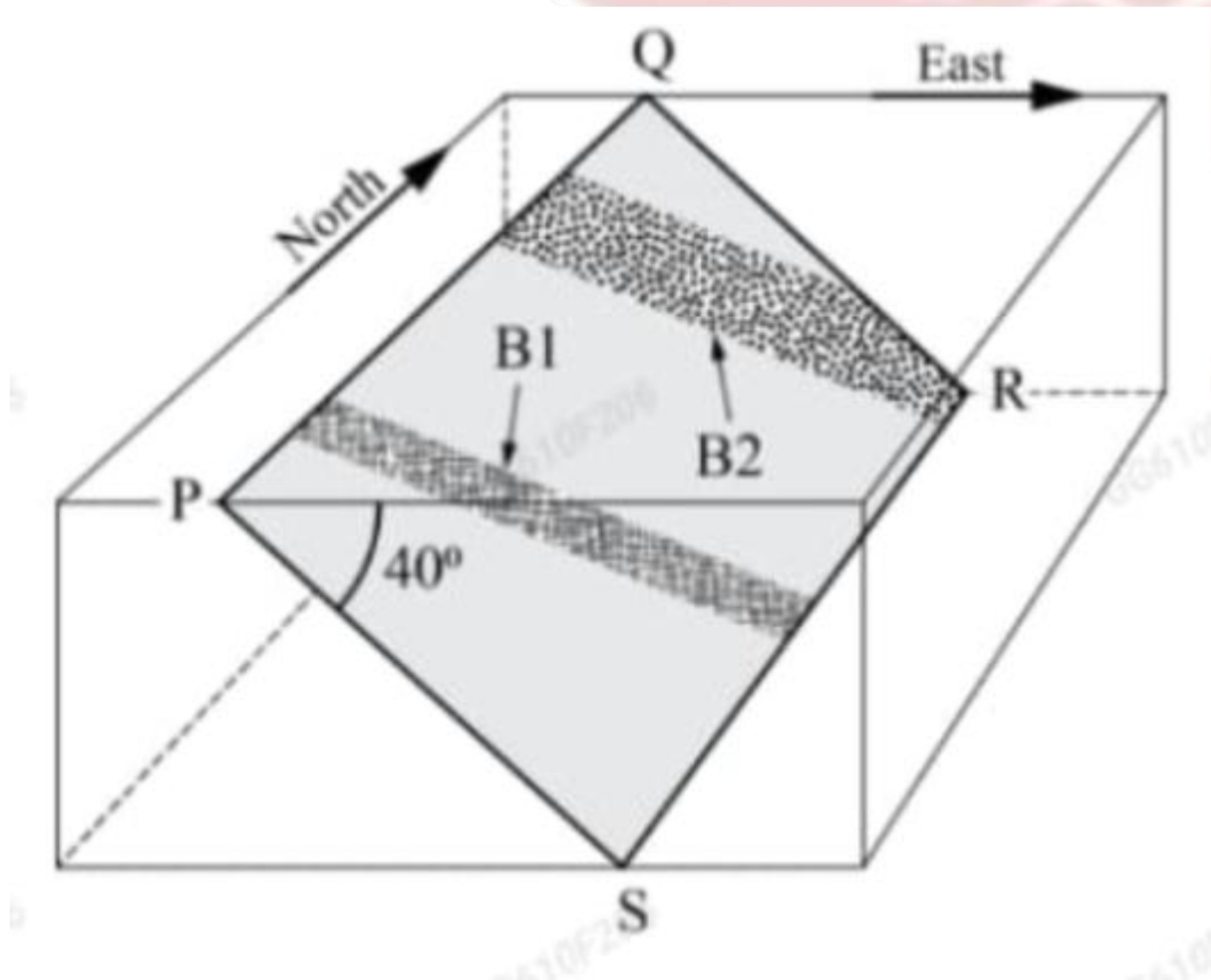
31. Which of the following ore types form(s) by magmatic differentiation?

- a. Gold in quartz vein
- b. **Titaniferous magnetite in anorthosite**
- c. Columbite-Tantalite in pegmatite
- d. **Chromite-Pentlandite in pyroxenite**

32. Which of the following factors affect(s) the intrinsic spatial resolution of remote sensing imagery?

- a. **Sensor pixel size**
- b. Satellite communication bandwidth
- c. **Altitude of the satellite**
- d. Wavelength of the captured electromagnetic radiation

33. In the following illustration, PQRS is an exposed axial planar cleavage, striking north-south and dipping 40° east. B1 and B2 are the traces of two folded bedding planes on this axial planar cleavage. The fold can be classified as



- a. Upright fold
- b. Horizontal fold
- c. **Inclined fold**
- d. **Plunging fold**

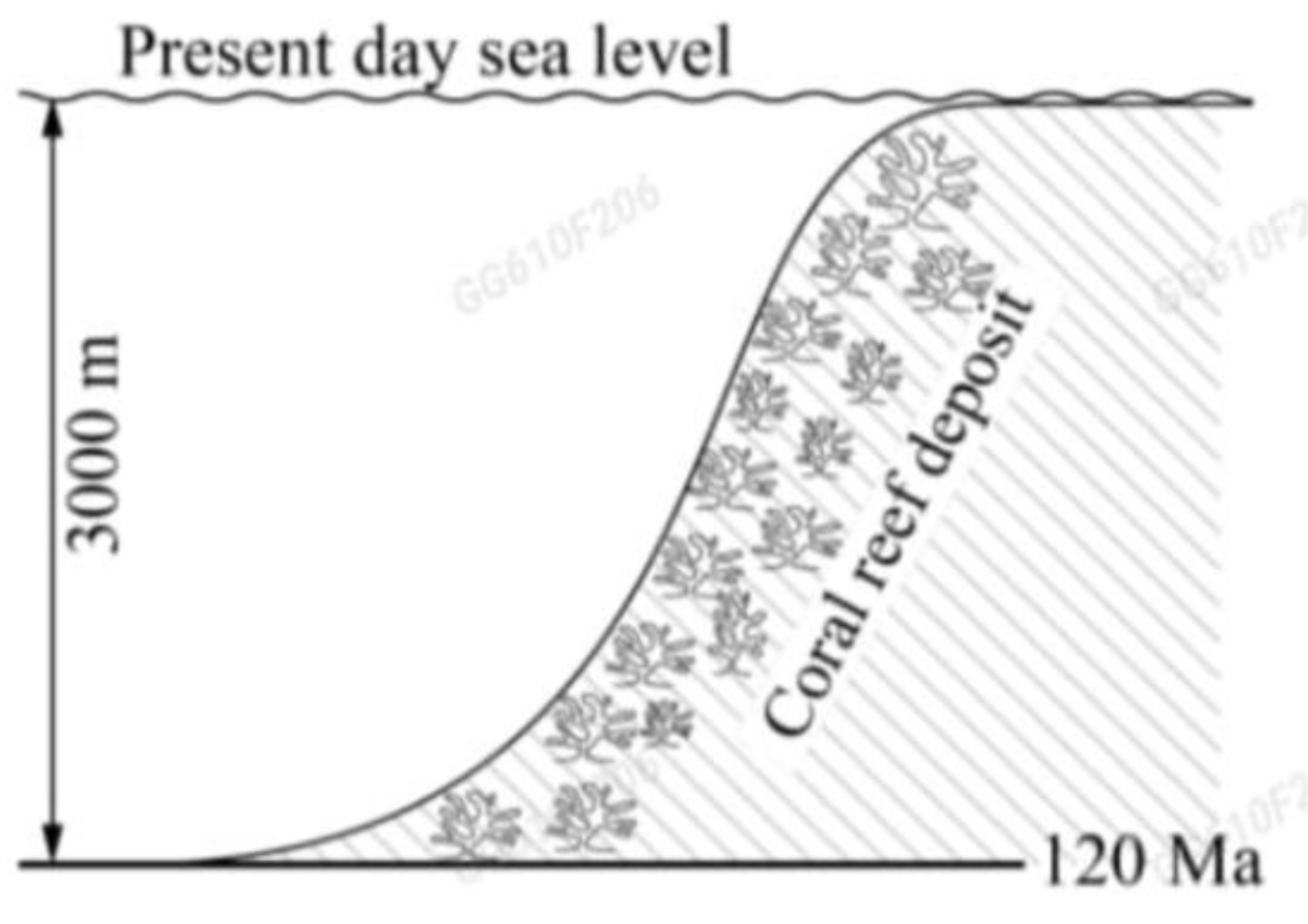


34. Two sandstone reservoir rocks R1 and R2 have 25% porosity each but the permeability of R1 is higher than that of R2. Which of the following can explain this difference in permeability?
- R1 has more angular grains than R2
  - Microfracture density in R1 is higher than that in R2**
  - Clay content in R1 is more than that in R2
  - Sorting in R1 is better than that in R2**
35. Choose the correct statement(s) related to different aspects of volcanism.
- Pillow lavas reflect sub-aerial volcanic eruptions
  - Explosiveness of volcanism depends on viscosity and fluid content of the magma**
  - Shield volcanoes represent one of the largest magmatic vent landforms**
  - Andesites are the most common rock type associated with stratovolcanoes**
36. The Earth's gravitational acceleration is higher at the poles compared to that at the equator due to
- higher topography at the poles
  - higher density rocks at the poles
  - lower centrifugal acceleration at the poles**
  - shorter polar radius**
37. During glacier retreat following the last Ice Age, Scandinavia experienced isostatic rebound. Which of the following resulted due to this rebound?
- Deep earthquakes
  - Raised beaches**
  - Rise in water level in glacial lakes
  - Fall in water level in glacial lakes**
38. Intrusion of a 10-meter thick dolerite dyke into a boron-rich quartz-garnet-biotite-muscovite-chlorite schist developed a visible symmetric baked zone. Which of the following minerals can develop in this baked zone, 2 meters away from the margin of the dyke?
- Amphibole
  - Tourmaline**
  - Clinopyroxene
  - Orthopyroxene
39. Which of the following processes is/are responsible for the alternate bands of magnetic polarity observed in seafloor basalts?
- Convection in the outer core**
  - Seismicity at mid-oceanic ridges
  - Convection in the inner core
  - Convection in the mantle
40. Natural accumulation of hydrocarbons are expected to occur
- along synclinal axial troughs
  - in stratigraphic traps**
  - in an anticline**
  - in ancient delta-mouth bars**



## NAT SECTION IIT JAM 2026

41. The figure shows a coral reef deposit at the continental margin since 120 Ma. Assuming that there was no sea-level change, the average subsidence rate of this continental margin is \_\_\_\_\_ mm/year (Round off to three decimal places)



ANS:-0.025

42. A metallic mineral weighs 44 g and displaces 11 mL of water when fully immersed. The density of the mineral is \_\_\_\_\_ g/cc (In integer)

ANS:-4

43. The lithostatic pressure at the base of a 35 km thick continental crust of average density of 2.8 g/cc is \_\_\_\_\_  $\times 10^8$  Pa (Round off to one decimal place) (Consider the value of acceleration due to gravity as  $9.8 \text{ m/s}^2$ )

ANS:-9.6

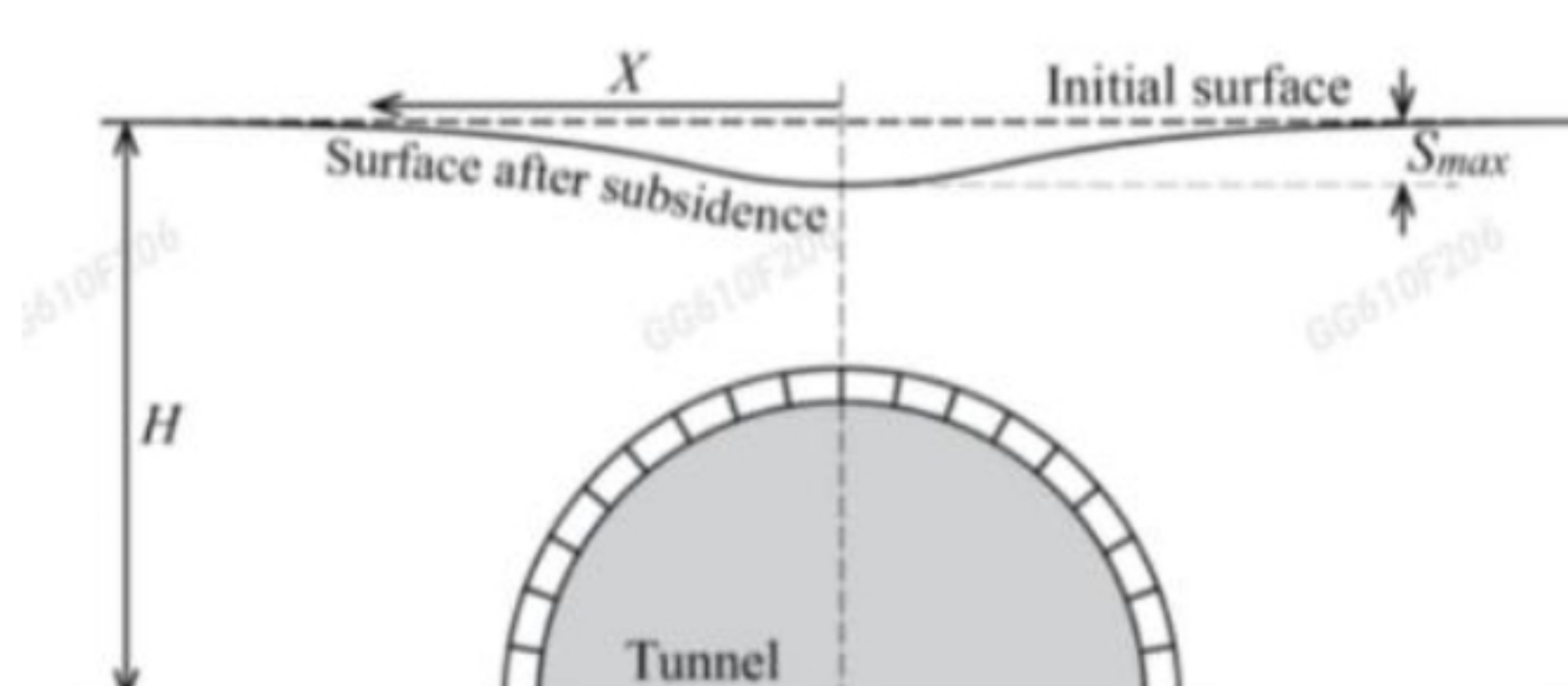
44. A clinopyroxene crystal in a basalt, measured to have a composition of  $\text{Mg}_{1.2}\text{Fe}_{0.4}\text{Ca}_{0.4}\text{Si}_2\text{O}_6$ , will have Mg-number (Mg#) of \_\_\_\_\_ % (In integer)

ANS:-60

45. Sphalerite shows limited isomorphism. Consider a colourless sphalerite having 33% S and 67% Zn. Then, in a black-coloured sphalerite, with a 15% Fe substitution, the ratio of atomic proportions of Zn to that of Fe is \_\_\_\_\_ (Round off to one decimal place) (Given: atomic weight of Zn = 65.37, Fe = 55.85, and S = 32.06)

ANS:-5.7

46. The surface subsidence at a horizontal distance  $X$  from the centerline of a cylindrical tunnel is given by  $S = S_{\max} \times \exp\left(\frac{-X^2}{0.5H^2}\right)$  where  $S_{\max}$  is the maximum subsidence above the tunnel and  $H = 50\text{m}$  is the depth of the tunnel centerline. The ratio of surface subsidence at  $X = 10\text{m}$  to that at  $X = 20\text{m}$  is \_\_\_\_\_. (Round off to one decimal place)



ANS:-1.3



47. One mole of a parent nuclide is undergoing radioactive decay. The fraction of atoms of this nuclide that has decayed after three half-lives is \_\_\_\_\_ (Round off to three decimal places)

**ANS:-0.875**

48. The true dip of a normal limb associated with asymmetric folding is  $20^\circ$  and the angle that this limb makes with the axial planar cleavage is  $35^\circ$ . The true dip of the axial planar cleavage, in degree, is \_\_\_\_\_. (In integer)

**ANS:-55**

49. An aquifer with a hydraulic conductivity of 60 m/day experiences a head loss of 20 m over a length of 1000 m. The flow of water per unit area, in millimeter per minute, is \_\_\_\_\_ (Round off to two decimal places)

**ANS:-0.83**

50. A hypothetical mineral has the formula  $X_7Si_8O_{22}(OH)_2$ , where X is a cation. The valence state of X is \_\_\_\_\_ (In integer)

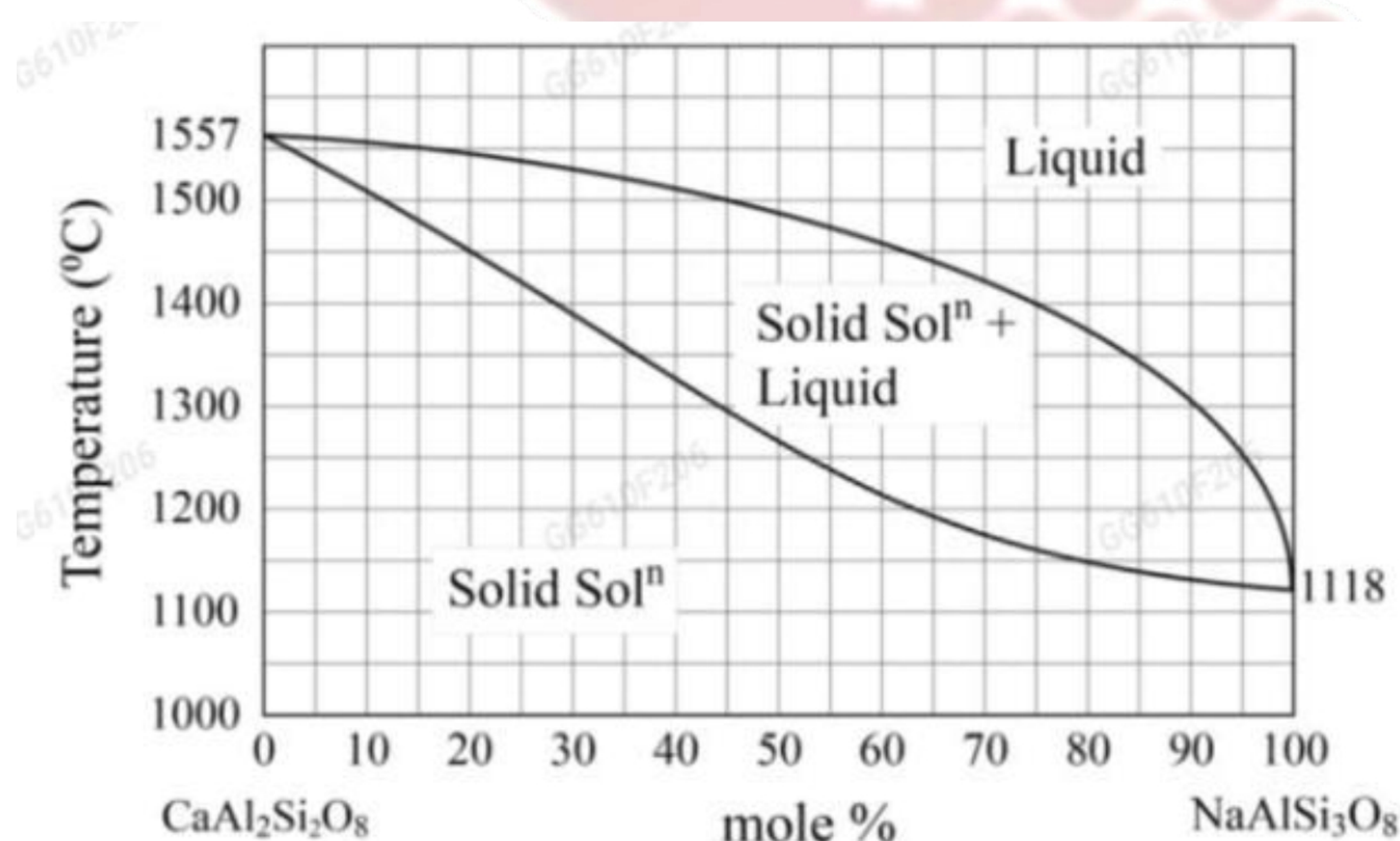
**ANS:-2**

51.  $\epsilon Nd$  is the deviation of  $^{143}Nd/^{144}Nd$  of a sample relative to CHUR in parts per  $10^4$ . For a pyroxenite with measured  $^{143}Nd/^{144}Nd = 0.512838$  and  $^{147}Sm/^{144}Nd = 0.21$ , the initial  $\epsilon Nd$  at 1 Ga is \_\_\_\_\_.

(Given: For CHUR,  $^{143}Nd/^{144}Nd = 0.512638$  and  $^{147}Sm/^{144}Nd = 0.1967$ . The decay constant for  $^{147}Sm$  is  $6.54 \times 10^{-12} \text{ yr}^{-1}$ . Round off only the final answer to one decimal place.)

**ANS:-2.2**

52. Based on the anorthite content of first formed plagioclase crystals from a liquid composition having 50 mole % anorthite is \_\_\_\_\_ mole % (In integer)



**ANS:-85**



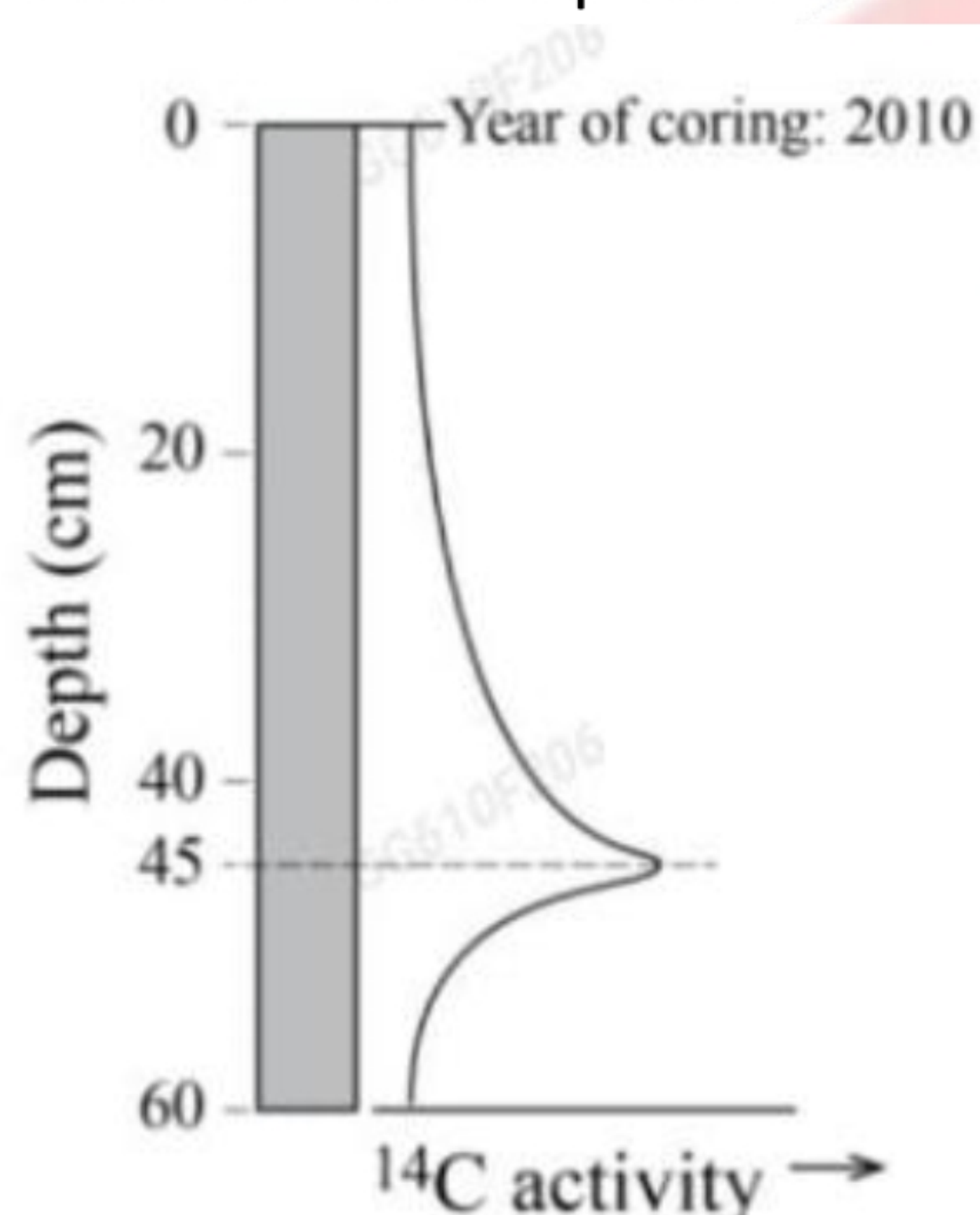
53. Four vertical boreholes are drilled on a flat topography at 50 m intervals along the east-west direction. The boreholes intersect a coal seam at depths of 100 m, 130 m, 160 m and 190 m. The true dip of the coal seam, in degree, is \_\_\_\_\_. (Round off to two decimal places)

**ANS:-30.96**

54. A sandstone sample with 100% quartz has a porosity of 30%. The sample is dry and the density of quartz is 2.65 g/cc. The bulk density of the sandstone sample is \_\_\_\_\_ g/cc (Round off to one decimal place)

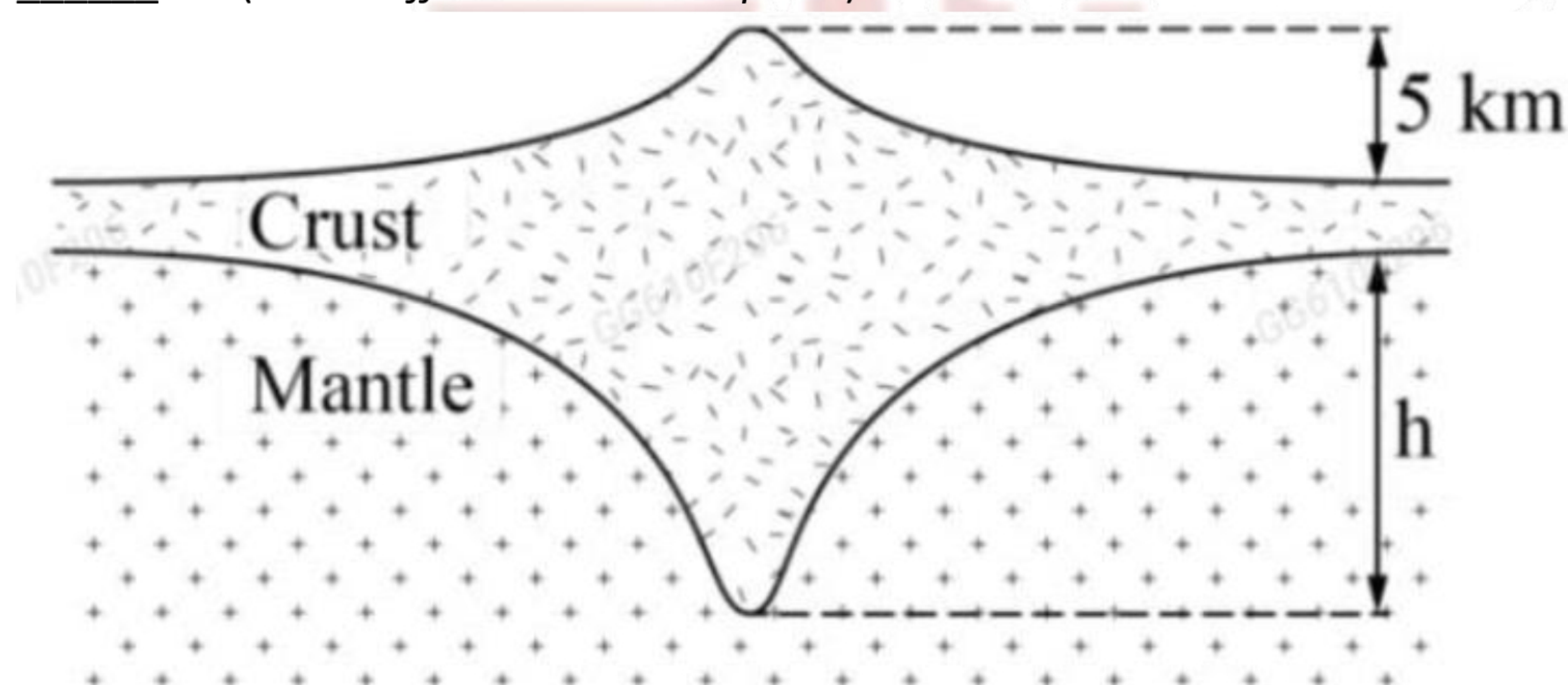
**ANS:-1.9**

55. The figure shows the  $^{14}\text{C}$  activity with depth in a sediment core from a lake, where the sedimentation rate was uniform. The maximum  $^{14}\text{C}$  activity, marking the signature of bomb carbon, was measured at a depth of 45 cm. The rate of sedimentation is \_\_\_\_\_ mm/year (In integer)  
(Given: the core top reflects the year of coring and bomb carbon reached its global maximum in 1965)



**ANS:-10**

56. A mountain of height 5 km is in static equilibrium with a crustal block of zero elevation. If the density of the crust and the mantle are 2700 and 3300 kg/m<sup>3</sup>, respectively, the thickness of the mountain root (h) is \_\_\_\_\_ km (Round off to one decimal place)



**ANS:-22.5**

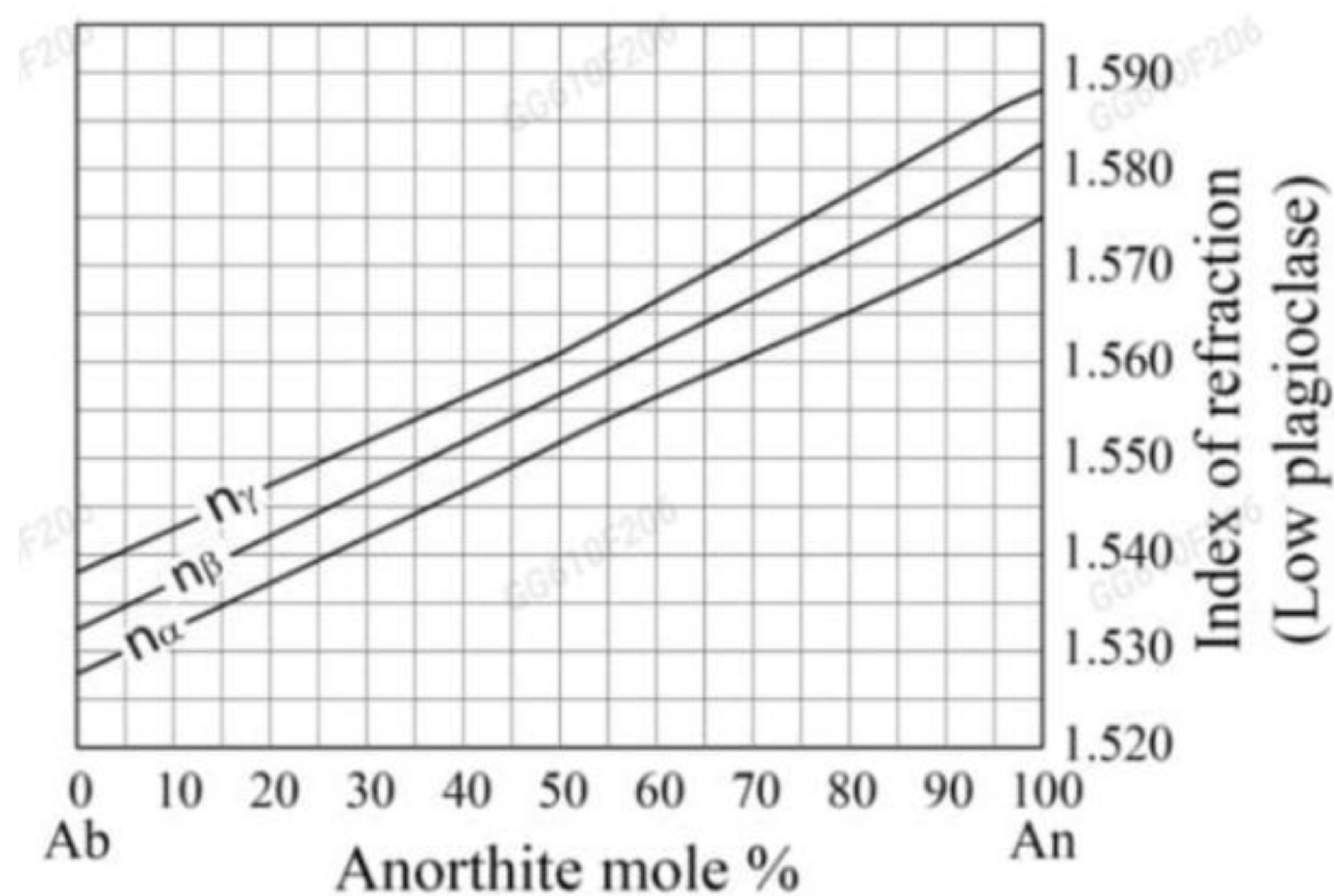
57. In a mineralized staurolite-garnet-biotite schist, the estimated metasomatic sulfide mineralization is 4%, with ore mineral proportions as 30% chalcopyrite, 20% pyrite and the rest being magnetite. The maximum grade of Cu will be \_\_\_\_\_ g/ton (Round off to the nearest integer)

(Given: 1 ton = 1000 kg; atomic weight of Cu = 63.55, Fe = 55.85, O = 16.00 and S = 32.06)

**ANS:-4152-4156**



58. The figure shows variation in optical properties of plagioclase feldspars with composition. A feldspar from a lunar anorthosite, with anorthite mole% of 85, will have a birefringence of \_\_\_\_\_ (Round off to three decimal places)



**ANS:-0.015**

59. In the isometric system, the difference in the number of symmetry planes in class  $\bar{4}3m$  (Hextetrahedral) class and  $\frac{2}{m}\bar{3}$  (Diploidal) is \_\_\_\_\_ (In integer)

**ANS:-3**

60. Consider a perfect Geocentric Axial Dipole model for the geomagnetic field. At a latitude of  $30^\circ$  N, the inclination of a freely suspended magnetic needle, in degree, is \_\_\_\_\_. (Round off to the nearest integer)

**ANS:-49**

**GEOLOGY**