

6. (a) Briefly describe various structural elements of a folded surface. (9)
- (b) Flow can repetition and omission of beds caused by faulting be identified from geological map patterns? (9)
7. (a) What are en-echelon gash veins? Explain how their geometry and arrangement provide evidence for brittle—ductile deformation in shear zones. (9)
- (b) Draw a neat diagram of an inclined bed showing its strike, true dip angle, and dip direction. Also show the trend and plunge of a lineation present on the same bed and briefly explain each of these terms. (9)
8. Explain how major geological structures such as folds and faults are related to different types of plate boundary configurations. Describe the characteristic structures formed at divergent, convergent, and transform plate boundaries, and support your answer with suitable global examples and neat diagrams. (18)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1790

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Unique Paper Code : 2192011201

Name of the Paper : Structural Geology

Name of the Course : B.Sc. (Hons.) Geology,
NEP-UGCF – DSC-4

Semester : II

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer any **five** questions.
3. Draw neat and properly annotated sketches wherever necessary.

1. Answer the following questions very briefly :
(3×6=18)

- (a) Give an example of a structural contour and briefly explain it.
- (b) Which planar section of the strain ellipsoid is most suitable for determining shear sense in a deformed rock? Give reason.

- (c) Define elongation in one dimension in a deformed body.
 - (d) Draw the displacement field and particle paths for simple shear.
 - (e) What is differential stress? How is it responsible for causing strain in the rock?
 - (f) What is a recumbent fold? Draw its stereonet plot.
2. Answer the following questions : (6×3=18)
- (a) How contour spacing of a topographic map reflects the slope variations in an undulating terrain.
 - (b) Describe the geological criteria used to distinguish a fault surface from an unconformity surface in the field.
 - (c) Explain the mechanism of rock fracturing under tectonic stress and mention the factors controlling brittle failure of rocks.
3. Differentiate between the following: (6×3=18)
- (a) Normal dip-slip fault and reverse dip-slip fault
 - (b) Window (Fenster) and Klippe
 - (c) Azimuthal bearing and quadrantal bearing system

4. Briefly answer the following questions: (6×3=18)
- (a) Explain the concept of Mohr's Circle in determining the normal and shear stresses acting on a given inclined plane.
 - (b) Define foliation. Describe the different fabric elements that define foliation.
 - (c) Define lineation. Discuss the importance of stretching lineation in interpreting the deformation history and shear sense in tectonically deformed rocks.
5. (a) What is the Rule of V in structure geology? Discuss how the shape of the V-pattern changes when:
- (i) the bed is horizontal,
 - (ii) the bed is vertical, and
 - (iii) the bed dips in the same direction as the valley slope. (9)
- (b) Using Anderson's theory of faulting, describe the three principal faulting regimes. For each regime, illustrate the fault geometry, indicate the orientation of the principal stress axes (σ_1 , σ_2 , σ_3), and show their representation on a stereonet. (9)