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Your Roll No. :

Sl. No. of Q. Paper : 1818 GC-4

Unique Paper Code : 32191202

Name of the Course : **B.Sc.(Hons.) Geology**

Name of the Paper : Structural Geology
(Paper-IV)

Semester : II

Time : 3 Hours **Maximum Marks : 75**

Instructions for Candidates :

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Question **NO.1** is compulsory.
- (c) Attempt any **four** from the rest.
- (d) Draw suitable sketches for better illustration of your answer.

1. Answer any five questions :

- (a) Define *Strike* and *dip* of a bed.
- (b) Define *pitch* of a lination. Can you expect *pitch* and *plunge* of a lination to be equal ?
- (c) What are *congruous folds* ? Describe their importance in the study of regional folds.
- (d) What is the difference between *Disconformity* and *Paraconformty* ?

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- (e) What will be the apparent dip of a bed towards the direction of strike? If you have a bed with orientation $350/30^\circ$ NE, what would be the true dip direction?
- (f) What is difference between *dip-separation* and *dip-slip* of a strata disrupted by a fault?
- (g) What is the difference between *transform fault* and *transcurrent fault*?
- (h) In view of the cleavage bedding relationship of a fold, answer the following question in a word :
- (i) Where would you find axial planer cleavage as perpendicular to bedding?
- (ii) What would you infer about the fold if you find cleavage and bedding plane are dipping in the same direction but dip of the cleavage is gentler than the bedding? $5 \times 3 = 15$
2. (a) Define 3-Dimensional stress at a point. 6
- (b) What are Normal Stress and Shear Stress? 2
- (c) What is deviatoric stress? 3
- (d) What are the characteristics of Principal axes of stress? 3
- (e) What will be the shape of a stress ellipsoid under hydrostatic stress condition? 1

3. (a) Define *elongation*, *stretch* and *quadratic elongation* with respect to deformation. 3
- (b) Define *Pure Shear*, *Simple Shear* and *Sub-simple Shear* strain with suitable diagram. 6
- (c) What is meant by *co-axial* and *non-coaxial* deformation? 3
- (d) What is *Finite strain* and *Infinitesimal strain*? 3
4. (a) Distinguish between *Homogeneous* and *Heterogeneous deformation*. 3
- (b) Write a short note on Flinn diagram. 8
- (c) Finite positive extension of a line does not necessary mean that the line has been extending throughout the deformation history - justify the statement. 4
5. (a) Differentiate between the followings : $4 \times 2 = 8$
- (i) *Throw* and *Heave* of a fault
- (ii) *Dip fault* and *dip - slip fault*
- (iii) *Strike fault* and *Strike-slip fault*
- (iv) *Normal fault* and *Reverse fault*
- (b) Discuss the criteria for recognition of fault in field. 7

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6. (a) Discuss Anderson's theory of faulting. 6
(b) Compare between a *Tectonic Window* and a *Klippe*? 5
(c) Demonstrate write suitable sketches how repetition of strata occurs by a normal fault, where disrupted beds dip against the fault plane. 4
7. (a) Define the following terminologies with suitable sketches : $5 \times 2 = 10$
(i) *Hinge line*
(ii) *Cylindrical fold*
(iii) *Axial plane*
(iv) *Inflection point*
(v) *Interlimb angle*
- (b) Draw and describe *Antiformal Syncline* and *Synformal Anticline*. 5
8. (a) Draw and describe the geometry of a *Reclined fold* and a *recumbent fold*. 4
(b) Differentiate Between the followings : $2.5 \times 2 = 5$
(i) *Buckle fold* and *Bending fold*.
(ii) *Flexure fold* and *shear fold*.
- (c) Describe the *orthogonal thickness*, *axial plane thickness* and *dip isogons* of a folded layer, with suitable sketches. 6

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