

07.10.2016

11am-12 Noon

Minor Exam-II

Marks:20

Answer all questions and provide neat sketches wherever necessary. Your answer should be within the space provided.

Q.1a Define Attitude of a fold?(2)

• Attitude of a fold contains three information about itself:-

① Strike ② Dip amount ③ Dip-direction

① Strike is the direction in horizontal plane in which fold is extended  $\longleftrightarrow$

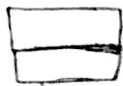
② Dip amount (D) is the angle by which a plane is tilted from horizontal plane

③ Dip direction is direction in horizontal plane in which fold is inclined, perpendicular to the strike.



Q.1b Draw line sketches of i) Box fold, ii) Fan fold, iii) Chevron fold and iv) Drag fold (2)

(i) Box fold



(ii) Fan fold



Q.2 Define Anisotropy in the rocks? How is it effect the strength of a rock?(2)

→ Anisotropy of a rocks is its property to have same specific property in all direction. that is like a plane rock has more strength in one direction and not in others. in igneous rocks  $\rightarrow$  Anisotropy

$\rightarrow$  Anisotropy can be taken as same property in all direction

$\rightarrow$  rocks having Anisotropy are having generally more strength than others.

eg  $\rightarrow$   $\longleftrightarrow$  more strength in this direction

Q.4 Explain the theory of Plate tectonics and raise of the Himalayas <sup>53 900</sup> (2)

- 2
- According to theory of tectonics our present day world is a result of moving plates on asthenosphere. This theory says 8 million yrs ago today's → South America, Africa, India, Australia, Antarctica were a single continent → Pangea and Northern continents were in Laurasia. Due to tectonic force ~~Pangea~~ Pangea got broken. Plate tectonics has concept of plates which are moving crust on a weaker Asthenosphere. These plates keep moving and ~~are~~ like → Convergent, divergent, transform plates.

- According to plate tectonics India was part of Pangea in south. Indian plate started moving toward Eurasia and collided with Tibetan Plateau. → Convergent plate due to large force plates started buckling and resulted elevation was → Himalayas

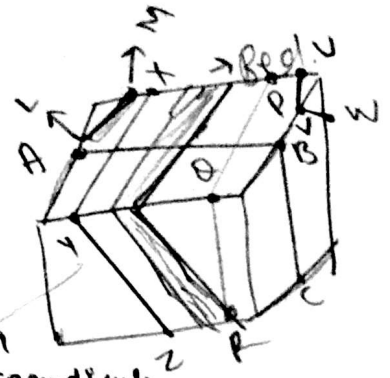


# Q.5a Geometric and Genetic Classification of Joints (1)

- ~~geometric classification~~ → ~~geometric classification~~
- ~~genetic classification~~

① Geometric :- with respect to bed.

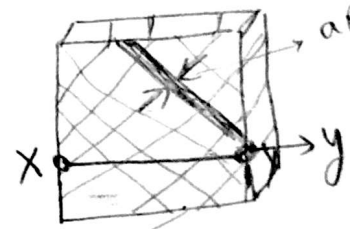
- Strike Joint → PQR
- dip joint → ABC
- Bedding joint → XYZ
- diagonal joint → LM → at the corner, neither parallel nor perpendicular to Bed.



- ② • Genetic - what was reason behind its generation → ① Temp. ② Pressure  
→ compression or tension or shear.

## Q.5b Quantification of Joints through Scan line survey (3)

- In scan line survey we investigate window from rock. Having multiple sets of joints and get quality at different chainage.
- X-Y → scan line  
SN. | chainage | property



- ① • Attitude → dip, dip direction, strike
- ② • roughness → depends upon rock and filling material
- ③ • aperture → gap of joint
- ④ • compressive strength → using schmidt's hammer.
- ⑤ • amount of water

⑥ • Rock quality designation (RQD) =  $\frac{\sum \text{core } (>10\text{cm})}{\text{total length}} \times 100$

- ⑦ persisting strength → extension of joint

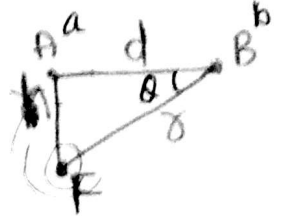
- ⑧ wall-strength → depends upon age & filling material
- ⑨ RMR → Rock mass rating



Q.6a How can you determine the Epicenter and depth of focus of an Earthquake? (2)

① Epicenter: Point on surface just above focus. At three different seismicographic station using P-S time (arrival) and intensity we get distance of source of EQ from these station. draw a circle from the points. wherever these circle intersect  $\rightarrow$  epicentre.

② for depth of focus: (h) we get intensities at point A and B as  $a, b$  respectively.



these intensities  $a, b$  have relation with  $h, \theta$   
 (2)  $\left[ \frac{a}{b} = \left[ \frac{h^2}{r^2} = \sin^2 \theta \right] \right]$  and depth  $\rightarrow$  known distance.  
 so  $\sin \theta = \sqrt{\frac{a}{b}} \rightarrow [h = d \tan \theta] \text{ ms.}$

Q.6b What is base shear force? How do you estimate base shear force for a 10 storey building? (2)

• During earthquake earth-surface also move  $\rightarrow$  horizontally producing shear force at the base of a building, known as base shear force. given as

$$F \rightarrow \left( \frac{4.5}{N} + 4.5 \right) + \frac{\alpha}{g} \cdot W$$

where:  
 $N \rightarrow$  number of storeys.  
 $W \rightarrow$  weight  
 $g \rightarrow$  gravity accn.  
 $\alpha \rightarrow$  horizontal shaking accn.  
 generally,  $1.5, 1.2, 1.0, 0.8$

• For 10 storey ~~store~~ Building base-shear force  $\Rightarrow$

$$F = \left( \frac{4.5}{10} + 4.5 \right) + \frac{\alpha}{g} \times W$$

$$\rightarrow [4.95 + \frac{\alpha}{g} \times W] \rightarrow \text{Ans}$$

(2)

