UNIT 4

STRUCTURAL GEOLOGY AND GEOPHYSICAL METHOD

1. Define Dip?

The inclination of the bedding planes, with the horizontal, is called dip and is always expressed in degrees.

2. Explain true dip?

It is the maximum inclination of bedding planes with the horizontal, or in other wards it is the inclination of the direction of which water would flow, if poured on the upper surface of the bed.

3. Explain apparent dip?

- The inclination of the bedding planes, with the horizontal, in any other direction, other than the direction of the true dip, is known as the apparent dip.
- The value of apparent dip is always less than the true dip.

4. Define strike?

- It is the direction, measured on a Horizontal surface, of a line formed by the intersection of dipping bed with the horizontal plan.
- It is always expressed in terms of main direction i.e., is North, South, East or West.

5. What is meant by folds?

- The earth's crust is tilted out of the horizontal and is bent into folds. Such a fold may ranges from a microscopic crinkle to great arches and troughs even up to 100 kms across.
- A set of such arches and troughs is called a fold.

6. What is meant by Anticline and Syncline?

- When the beds are unfolded in an arch-like structure, it is called an anticline.

- When the beds are down folded in trough like structure, it is called a Syncline.
- It may be noted that in an anticline the oldest rock is in the centre, where as in a syncline the youngest rocks is in the centre.

7. Explain Causes of folding?

- The interior of the earth is getting cooler and cooler day by day, which is sure to cause some shrinkage in the earth's crust.
- This stink age is responsible for the compressive and shearing stress to be developed within the earth's crust.
- Some time these stresses are small in magnitudes but go on exerting pressure for a sufficient length of time and result in buckling or folding of the layers of the earth's crust.

8. What are the types of folds?

a) Symmetrical fold,

b) Asymmetrical fold,

c) Overturned fold,

d) Isoclinals fold,

e) Recumbent fold,

f) Plunging fold,

g) Open fold,

h) Closed fold,

i) Anticlinorium,

j) Synclinorium,

k) Dome,

l) Basin and m) Monoclinal fold.

9. Define Faults?

- Faults are fractures, along which the movement of one block with respect to other, has taken place.
- This movement may vary from a few centimeters to many kilometers depending upon the magnitude of the stresses, and the resistance offered by the rocks.

10. Explain the Causes of Faulting?

- The interior of the earth becoming cooler day by day, which is sure to cause some shrinkage in the earth's crust. This stink age is responsible for the stress to be developed within the earth's crust.
- These stresses, when greater in magnitudes exert so much pressure that the layers of the earth's crust are fold due to compressive stresses and afterwards when the stresses are released, fractures are formed.
- If the stresses still continue, the blocks move up or down along the fault plane depending upon the direction of stresses and their intensity. Such a fracture, along which a movement has taken place, is called a fault.

11. What are the classifications of faults?

Faults are classified on the basis of their apparent displacement, i.e., the direction of movement, of one block, with respect to the other along the fault plane.

12. What are the criteria for the recognition of a fault?

1) Discontinuity of strata

2) Repetition and omission of strata

3) Physiographic features

4) General.

13. What is meant by Joints?

When sufficient tensile stress in developed between two successive points, a crack is developed at right angle to the direction of the stress, such cracks are called joints.

14. What is meant by Master joints?

- The joints always occur in sets and groups. A set of joints means, joint occurring in the same dip or strike.
- A group of joints means a few sets of joints having almost the same trend. If a few sets or groups of joints appear for a considerable length in a rock, such joints are called major joints or master joints.

15. Define out crop?

- A little consideration will show that the out crop of a rock is affected by the angle of dip also.
- If a rock has a vertical dip then the outcrop will be less, than that when the same rock is dipping at some angles.

16. What are the different forms of out crops?

a) Out lier,

b) In lier,

c) Unconformity,

d) Overlap and e) Cross bedding.

17. Define over lap?

An overlap is particular type of an unconformity, in which the overlying strata extends so as to overlap the underlying strata.

18. Define cross bedding?

Sedimentary beds or layers are generally parallel to one another. But, sometimes, it has been observed that the beds lie slightly oblique to the major bedding planes.

19. What are the classifications of joints?

a) Geometrical classification

- Strike joints,
- Dip joints,
- Oblique joints

b) Genetic classification

- Tension joints,
- Shear joints

20. What are the methods of Geophysical Exploration?

Depending upon the type of energy field used, the following methods may be used.

- Seismic method,
- Electrical method,
- Gravitational method,
- Magnetic method,
- Radiometric method,
- Geothermal method.

Part – B

16 MARKS

1. What is a fault? Discuss the various types of faults and write about the engineering applications.

2. What is a fold? Discuss the various types of faults and write about the engineering applications.

3. What is a joint? Discuss the various types of faults and write about the engineering applications.

4. Explain in detail the role of electrical methods of subsurface investigation in civil engineering practice.

5. Describe seismic refraction survey to de conducted for determining the depth of bed rock.

6. Discuss in detail electrical method of investigation for ground water exploration.

7. Classify folds and faults in rocks and explain how they influence the design of dams.

8. Classify and describe joint structures with neat sketches and also write their role in dam and tunnel construction.

9. Give a detailed account of the various geological structures and their role in selection of sites for Engineering projects.

10. Describe fault structures with neat sketches and also write their role in dam and tunnel construction.