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Q NO1 What causes earthquake? if the richter magnitude reaches at 8 and above what will be the consequences? Diffrentiate primary and secondary waves.

Ans

CAUSE of Earthquake:

By the sudden slip on faults an earthquak is caused. When the stress on the edge overcome the friction there is an earthquake that releases energy in waves that travel through the earth crust and causes the shaking that we feel.

The two plates are in california the Pacific Plate and the north American Plate.

Richter scale:

A richter magnitude scale measures the amount of seismic energy released by an earthquake. If the Richter Magnitude is 8 or above there will be total destruction of buildings, bridges and roads every thing will destroy.

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PRIMARY AND SECONDARY WAVES:

	PRIMARY WAVES	SECONDARY WAVES.
1	Primary waves are the First waves that hits seismograph	1) Secondary waves are the second waves to hit seismograph
2	Primary waves are compression waves.	2) Secondary waves are shear waves
3	Primary waves can move through solids and liquids	3) Secondary wave can only moves through solids.
4	Shake the medium in direction in which they are propagating	4) Shake the medium in the direction perpendicular to which they are moving
5	P waves $= \alpha^2 = \frac{\lambda + 2\mu}{\rho}$	5) S waves $= \beta^2 = \frac{\mu}{\rho}$

Q No 3 Decribe the role of geology in selection of sites for DAMs and RESERVOIRS?

Ans **ROLE OF SELECTION FOR SELECTION OF SITES FOR DAM:**

Geological investigation for selecting and locating dam sites in one of the most significant studies which should be carried out in different scales and stages before deciding the best location for a dam therefore an adequate assessment of a site geologic and geotechnical conditions is one of the most significant aspects of a damn safety evaluation. Evaluation of a safety of a new damn requires among other things that its site, abutments, foundation and reservior have been adequately, explored and investigated so that the geololigical conditions are fully understood as much possible.

PRELIMINARY GEOLOGICAL INVESTIGATION OF DAM CONSTRUCTION:-

1: Topographical studies
2: Reservior location.
3: Petrology studies.
4: Mineralogy studies
5: structural geological studies.
6: Geological factors like. foundation availability water tightness of reservior, availability of construction material.
7: General examination of rocks.
8: Indirect study methods. for subsurface investigations.
9: Preliminary Drill hole study.

SELETION OF SITES:-

Selection of sites is based on following basis:

TOPOGRAPHICALLY:-

Most suitable place must be chosen for construction. ideally it must be narrow gorge or a small valley with enough catchment area available behind so that calculated amount of water can be easily stored in the reservior created upstream.
location of spillway; all dam should have an adequate spillway for passing flood flows if a riven gorge is narrow then there may not be sufficient spillway width available. and a suitable location on the periphery of the reservior has to be found to locate a spillway. PTO →

TECHNICALLY:
The site must be sound as possible; strong impermeable and stable strong rocks makes the job of designer easy. Impermeable sites ensure better storage inventories site must be stable with respect to siesmic shocks slope failure around dams.

CONSTRUCTIONALLY:-
The site should be far from the materials which which will be use for construction. There non availability will make the cost of project high.

HUMAN WELFARE:
Site selection should be done in such a way that it must cause minimum damage to public in distruction or failure.

Q$_{NO_3}$:- What are the different types of mass wasting? Also explain the protective measures of landslides?

Ans The different types of mass wasting are as follows,

1: Fast movement
SLUMPS
ROCK and Debris fall
Rock and Debric slides
Flow
slow movenment
Creep
Solifluction.

PTO →

Permafrost

SLUMPS :-

A type of slide wherein downward rotation of rock or regolith occurs along a curved surface due to overstepening

ROCK & DEBRIS SLIDES

Happen when rock or debris slides down a preexisting surface.

ROCK & DEBRIS FALL:-

Happens when the piece of rock falls down the slope. Debris fall are similar except they involve the mixture of soil, regolith and rocks. At the base there is an accumulation of fallen material termed talus.

FLOW :-

Flow of soil and regolith containing a large amount of water.

Creep :-

A gradual downhill movement of soil and regolith.

Solifluction :-

Is flow of saturated soil downslope at a rate of few millimeters of a few

PTO →

Centimeters per day or per year.

PERMAFROST:-
Slow landslide due to the slowly melting of permanently frozen ground.

PROTECTIVE MEASURES OF LANDSLIDING:-

1. Draining water from slopes
2. Revegetation with plants that have deep roots
3. Terracing redistributes mass along a slope and reduces the slope angle
4. Retaining wall can catch debris or stabalize regolith
5. Rock bolts can be used to stabalize coherent masses.

Q No4:- Differentiate fault, joint and fold?

Ans:- FOLD:-
Permanent wavelike deformation in layered rock or sediment. In response to compression force the strata may bend and buckle these are called folds.

JOINTS:-
Fractures along with no displacement has occured. A fracture on a rock without noticeable movement.

FAULT:-
Fracturing and displacement of rock strata.

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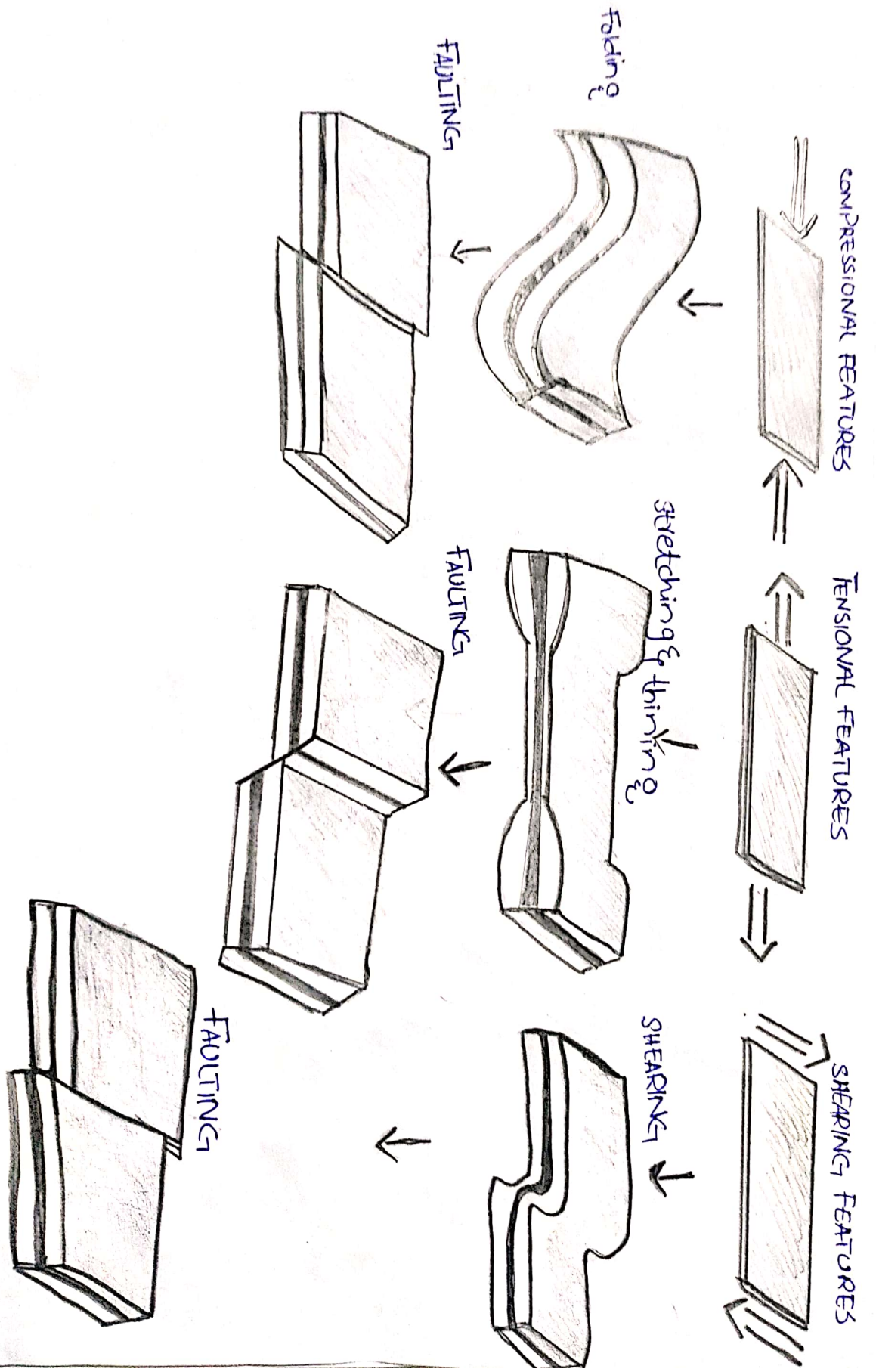
A fracture in bedrock along with rocks on one side have moved relative to the other side.



Q a:- What do the normal faults cause to the crust of earth?

Ans Fault where the hanging walls moves down relative to the footwall. Due to the tensional stress normal faults are created in a series. In such a case the down dropped blocks from grabens and the uplifted blocks from horsts. Half grabens are the geological structures where it is bounded by fault from one side.

Q b:- Fold develop in which type of rocks?

Ans. Fold develop in the following types of rocks; Fold derelop in any type of rock or may be of different shape and Folds form under stressed condition of stress hydrostatic pressure, pore pressure and temperature gradient as evidenced by their presence in soft sediments, the full spectrum of metamorphic rocks, and even as primary flow structures in some igneous rocks.

Q c: What is the effect of faulting on outcrop?

Ans EXPLANATION:-

In dip faults which occur parallel to the dip of the outcrop. The most prominent effect observed after faulting and erosion of the upthrown block is a horizantal shift.

PTO →

between the two parts of the outcrop. Oblique faults with downthrow to the left side result in an offset with an overlap.

Ans 4(d)

FAULT:- This is a fracture in bedrock along which rocks on one side have moved relative to another, so we cannot build structure on it because a fault can start movement at any time.

JOINT:- A fracture on rock without noticeable movement, if a structure is built on joint it may enhance the fracture or fractures which is dangerous.

FOLD Permanent wavelike deformation is layered rock or sediment. so a structure can be located on it as there is no deformation further possible.

Q No 5:- Describe tunelling on the basis of geology Also determine the geological investigation for tunnels?

Ans: GEOLOGICAL INVESTIGATION FOR TUNNELS:-

These determine to large extent solution to following engineering problems connected with tunneling.

1: SELECTION OF TUNNEL ROUTE (ALLIGNMEN):- There might be available many alternate allignment that could connect two points through a tunnel. However the final choice would be greatly dependent on a geological constitution along and around different

PTO →

alternatives the alignment having least geologically negative factors would be the obvious choice.

GEOLOGICAL INVESTIGATION FOR TUNNELS:-

b: SELECTION of EXCAVATION METHOD:-

Tunneling is the complicalid process in any situation and involves huge costs which would multiply manifolds if proper planning is not excercised before starting the actual excavation. And the excavation methods are intmately linked with the type of rocks to be excavated choice of the right method will therefore possible only when the nature of all the rocks and the ground all along the alignment in fully known. This is is one of the most important aim and object of geological investigations.

c:- SELECTION OF DESIGN FOR TUNNEL:-

The ultimate dimension and design parameters of proposed tunnel controlled, besides other factors by geological constitution of area along the alignment whether the tunnel is to be circular. D-shaped, horse shoe shaped or rectangular of combination of one or more of these outlines is more often dictated by the geology of alignment PTO→

by the geology of the alignment than by any other single factor. D shaped and horse shoe shaped may be conviniently adopted but these shapes would be practically unsuitable in soft ground or even in weak rocks in unequal lateral pressure. In those cases circular outline may be the first choice.

d: ASSESSMENT OF COST AND STABILITY:-

These aspects of tunneling projects are also closely interlinked with the first three considerations. Since geological investigation will determine the line of actual excavation the method of excavation and the dimension of excavation as also the supporting system of excavation all estimates about the cost of the project would depend on the geological details.

e: ASSESSMENT OF ENVIROMENT HAZARDS:-

The process of tunneling whether through rocks or through soft ground and for whatever purpose involve disturbing

Purpose involves disturbing the enviroment of an area in more than one way The tunneling methods might involve vibration induced through blasting or ground cutting, drilling producing abnormal quantities of dust and last but not the least interference with water supply system of the nearby areas.

THE

END