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ID No : 16317

Section : A

Subject : Engineering Geology

Q1: What causes earthquakes? if the Richter magnitude at 8 or above what will be the conservence? Differeniate Primary and Secondary waves?

Ans: An earthquake is caused by a sudden slip on a fault.

The tectonic Plates are always slowly moving, but they get stuck at their edges due to friction. when the stress on the edge overcomes the friction, there is an earthquake that relase energy in wave that travel through the earth crust and cause the shaking that we feel. if the Richter magnitude at 8 or above great earthquake comes can totally destory communities near the epicenter.

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Primary waves	Secondary waves
Primary waves, are first waves to arrive at a seismograph.	Secondary waves, are the second waves to arrive during an earthquake.
Primary waves are the fastest seismic waves and can move through solid, liquid or gas.	Secondary waves are much slower than P waves and can travel only solid.
They travel through the earth interior and can pass through both solid and molten rock. They shake the ground back and forth.	S-waves lag behind P-waves are they travel 1.7 times slower. However they do more damage because they bigger and shake the ground vertically and horizontally.

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Q2: Describe the role of geology in selection of sites for damsand reservoirs?

:Selection of sites:

Selection of sites is based on following basis.

:TOPOgraphically:

Most suitable Place must be choser for construction. Ideally it must be a narrow garge or a small valley with enough catchment area available behind so that calculated the amount of water can be easily stored in the reservoir created upstream.

Location of SPillway: All dam should have an adequate spillways for passing flood flows. if a river garge is narrow, then there may not be sufficent SPillway width available and a suitable location on the periphery of the reservoir has tobe found to locate a spillway.

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Possibility of river diversion during construction:

The way, river can be diverted at a particular site for making way for construction of the dam may effect the design of the dam and also the construction schedule

:Sedimentation Possibilities:

The average quantity of sediment carried by the river has to be known as precisely as possible, which would give an idea of the rate at which a proposed reservoir way get filled up

:Technically:

The site must be sound as possible: strong, impermeable and stable strong rock make the job of designer easy, impermeable sites ensure better storage inventories, site must be stable with respect to seismic shocks slope failure around dam.

:Constructionally:

The site should be far from the

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material which will be used for the construction. Their 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 the destruction or failure.

Q3: What are the different types of mass wasting? Also explain the protective measures of landslides?

:Types of Mass Wasting:

- Fast movement
  - Slumps.
  - Rock and Debris fall.
  - Rock and Debris slides.
  - flow.
- Slow movement
  - Creep.
  - Solifluction.
  - Permafrost.

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:Rock and Debris Slides:

Happen when rocks or debris slides down a preexisting surface.

:Rock and Debris falls:

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

:Slumps:

A type of slides wherein down ward rotation of rock or regolith occures along a curved surface due to overstepening.

:Flow:

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

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:Creep:

The gradual downhill movement of soil and regolith.

:Solifluction:

Is flow of saturated soil down slope at a rate of a few milli meters or a few centimeters per day or per year.

:Permafrost:

Slow landslide due to slowly melting of permanently frozen ground

Protective measures of landslide are:

:Reducing Risk of landslide:

→ Draining water from slopes.
→ Revegetation with plant that have deep root.

→ Terracing redistributes mass along a slope and reduce the slope angle.

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→ Retaining wall can catch debris or stabize regalith.

→ Rock bolts can be used to stabilize coherent masses.

Q4: Differenate fault, joint and fold?

Fault	fold	joint
It is caused generally due to verticle movement.	folding is caused due to horizontal movement	A joint is a fracture along which no movement has taken place, usually caused by tension.
force moves away from common centre	force moves toward common centre.	
Due to tension fault occour along which displacement of rock take place	Due to compression, different types of folds are formed.	
They are generally common in igneous or Metamorphic rock etc.	They are generally common sedimentory rocks.	

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(a) what do the normal fault caus es to the crust of the earth?

Ans: Faults are cracks in the earth crust along there is movem ent. These can be massive (the boundaries b/w the tectonic plates themselves) or very small. if the tension build up along a fault and then is suddenly released, the result is an earthquake.

b) fold develop in which type of rocks?

Ans: Fold develops sedimentary types of rocks.

C) what is the effect of flauting on outcrop?

Faulting is essentially a process of rupturing and displacement along the plane of rupture. it effect may involve- changes in the elevation of the ground, omission of some strata where they are normally expected repetition of some strata in a given

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direction and displacement and shifts in the continuity of the same rocks in certain regions.

(d) where should a site for a civil engineering project be located?

Ans:- Must be avoided to possible extent to be built on all three.

Q5: Describe tunneling on the basis of geology? Also determine geological investigation for tunnels?

:Tunnels:

Tunnels may be defined as underground routes or passages driven through the ground without disturbing the overlying soil or rock cover.

:Types of Tunnels:

1) Hard rock tunnels.

2) Soft rock tunnels.

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Soft Soft Ground (Earth) workers dig soft-ground tunnels through clay, silt, sand, gravel or mud.

Hard rock. Tunneling through hard rock almost always involves blasting.

: Geological investigation for tunnels:

a) Selection of tunnel Route:

There might be available may alterate alignments that could connect two points through a tunnel However, the final choice would be greatly dependent on the geological constitution along and around different alternatives: the alignments having least geologically negative factor would be the obvious choice.

b) Selection of Excavation Method:

Tunneling is a complicated process in any situation and involves huge cost which would multiply manifolds

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if Proper Planning is not exercised before starting the actual excavation. And the excavation methods are intimately linked with the type of rock to be excavated. Choic the right method will, therefore, be possible only when the nature of the rock and the ground all along the alignment is fully known. This is one of the most important aim and object of geological investigation.

c) selection of Design for the tunnel:

The ultimate dimensions and design parameters of a proposed tunnel are controlled, beside other factor by geological constitution of the area along the alignment. whether the tunnel is to be circular, D-shap horse-shoe shaped or rectangular or combination of one or more of these outlines. D-Shape or horse-shoe shape may be conveniently adopted but these shape would be partically unstable in soft ground. in those cases circular outline may be choice first.

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d) Assessment of cost and stability:

These aspects of the tunneling project also closely interlinked with the first three consideration. Since geological investigation will determine the line of actual excatvation, the method of excavation and the dimensions of excavation as also the supporting system (lining) of the excavation, all estimates about the cost of the project would depend on the geological details.

e) Assessment of Environmental Hazard:

The Process of tunneling, whether through rock or through soft ground and for whatsoever purpose, involves disturbing the environment of an area in more than one way. The tunnling method might involve vibration induced through blasting or ground cutting and drilling, Producing abnormal quantities of dust and last but not the least interference with water supply system of the nearby areas.