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Q1

Answer:

### Earthquakes:-

An Earthquake is an intense shaking of Earth's surface. The shaking is caused by movements in Earth's outermost layers.

### Causes of Earthquakes:-

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

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an Earthquake that releases Energy in which waves that travel through the Earth's crust and cause the shaking that we feel.

(2)  $\Rightarrow$  if the Richter magnitude reaches at 8 or above the consequences is the total destruction of buildings, bridges and roads. great earthquake can totally destroy communities near the epicenter.

(3)

Differences between primary and Secondary waves are following:

(1) Primary waves:

travel faster, move in a push-pull pattern, travel through solids, liquids and gases, and cause less damage due to their smaller size.

(2) Secondary waves:

(1) Travel faster

(2) move in an up-and-down pattern,

(3) travel only through solids,

(4) cause more damage due to their greater size.

Q<sub>2</sub>

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(4)

Answer:

A dam is an Engineering structure constructed across a valley or natural depression to create a water storage reservoir. Such reservoirs are required for three main purposes.

- (1) provision of a dependable water supply for domestic and or irrigation use
  - (2) flood mitigation.
  - (3) generation of Electric power.
- In providing a water supply, the reservoir storage is filled during the periods of above average streamflow, thus

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ensuring a steady supply of water during periods of little or no streamflow. For flood mitigation, the storage reservoir is kept nearly empty during drought and periods of low rainfall, so that when the flood generating rainfall, so that occur, the storage volume available in the reservoir provide a buffer against severe flooding of the dam. For power generation, the storage reservoir provides a head of water upstream of the dam.

Q3

3-

Answer::

Different types of mass wasting:

(1) slumps

(2) Rock and Debris fall

(3) Rock and Debris slides

(4) flow

(5) Creep

(6) Solifluction

(7) Permafrost

Each with its

own characteristic

features, and taking

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taking place over timescales from seconds to hundreds of years. Mass wasting occurs on both terrestrial and submarine slopes, and has been observed on Earth, Mars, Venus, and Jupiter's moon Io.

The protective measure of landslids.

(1) Afforestation should be promoted and intensive grazing by domestic animals should be avoided.

(2) Construction of roads and dams should be restricted to fragile areas.



(3) people should be aware of the cause of the landslide.

(4) Terrace farming on the hills slows down the rate of landslides.

(5) Expansive anchor bolts

Q5

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Answer:-

Tunnels:-

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

Types of Tunnels.

On the basis of Use.

- i) Traffic Tunnels.
- ii) Hydropower Tunnels.
- iii) Public utility Tunnels.

Traffic Tunnels.

Vehicular Tunnels road traffic or rail traffic.

# Hydropower Tunnels.

Diversion tunnel purpose of conveying water under gravity from one point to another, as for example to cross a hill. In such cases they are called discharge tunnels.

Pressure tunnels are those which feed water under great pressure to turbines and is distinguished as pressure tunnels.

## Public utility tunnels.

This group include a variety of underground excavation made for specific purposes such as for disposal

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of urban water (sewage tunnels), for carrying pipes, cables and supplies of oil, water etc.

## Types of Tunnels.

On the basis of Geology.

- 1.) Hard Rock Tunnels.
- 2.) Soft Rock Tunnels.

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

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

# Geological Investigation of tunnels.

• These determine to a large extent solutions to following engineering problems connected with tunneling.

## a) Selection of tunnel route (Alignment):

There might be available many ~~un~~ alternate 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 alignment having least

geologically negative factors would be the obvious choice.

b) Selection of Excavation

Method:

Tunneling is a complicated process in many situation and involves

huge costs which would multiply manifold if

proper planning is not exercised before starting the actual excavation.

And the excavation methods are intimately linked with the type of rocks to be excavated. Choice of the right method will,

therefore, be possible only when the nature of the rocks and the ground all along the alignment is fully known.

C) Selection of design for the tunnels:

The ultimate dimensions and design parameters of a proposed tunnel are controlled, besides other factors, by geological constitution of the area along the alignment. Whether the tunnel is to be circular, D-shaped, horse-shoe shaped or rectangular or combination of one

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of these outlines, is more often dictated by the geology of the alignment than by any other single factor.

d) Assessment of cost or stability:

These aspects of the tunneling projects are also closely interlinked with the first three considerations. Since geological investigations will determine the line of actual excavation, the method 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 Hazards:

The process of tunneling, whether through rocks or through soft ground, and for whatsoever purpose, involves disturbing the environment of an area in more than one way.

The tunneling methods might involve vibrations 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.

Q4

Answer:

Joint:-

A joint is a break (fracture) of natural origin in the continuity of either a layer or body of rock that lacks any visible or measurable movement point parallel to the surface (plane) of the fracture. Although they can occur singly, they most frequently occur as joint sets and systems. A joint set is a family of parallel, evenly spaced

joints that can be identified through mapping and analysis of orientations, spacing, and physical properties. A joint system consists of two or more intersecting joint sets.

Fold:

In Response to compression force the strata may bent and buckle these are called folds.

Fault:

Fracturing and displacement of rock strata

Part B.

19)

Answer:

Fold develop  
in sedimentary strata

Part C

Answer:

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 horizontal  
shift between the two  
parts of the outcrop.

Part A

Answer:

A normal fault

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is a fault in which  
The hanging wall moves  
down relative to the  
footwall. ... A normal  
fault is a result of  
the earth's crust spread-  
ing apart. This often  
occurs at plate boundaries,  
but it can happen at  
faults middle of plates  
also.