

# Problem-1

## Introduction

Thickness=5.1m

Estimated production = 2.5 m tonn/ year

Inclination of seam=1in5

Degree 2 in gassiness

Depth of seam= 497m

Problem: Propose a method with a demo model to mine out the seam with the given target production.

## Problem -2 Longwall mining

**Longwall mining** is a form of underground [coal mining](#). The longwall *panel* (the block of coal that is being mined) is 1-1.5 km long and 150-175 m wide face.

Miners undercut the coal along the width of the coal face, removing coal as it fell, and used PRS to control the fall of the roof behind the face.

the basic idea remains the same, to remove essentially all of the [coal](#) from a broad coal face and allow the roof and overlying [rock](#) to collapse into the void behind, while maintaining a safe working space along the face for the miners.

*Gate roads* are driven to the back of each panel before longwall mining begins. The gate road along one side of the block is called the *maingate* or *headgate*; the road on the other side is called the *tailgate*. Where the thickness of the coal allows, these gate roads have been previously developed by continuous miner units, as the longwall itself is not capable of the initial development. The layout of Longwall could be either 'advancing' type or of 'retreat' type

Problem: make a model of mechanised longwall top coal caving method and describe all machines layout of mine transport systems.

### **Problem-3**

Problem: Occupational health and safety in Indian mining industry: challenges and opportunity

### **Problem- 4**

#### **Introduction**

**Mine gas**, any of various harmful vapours produced during [mining](#) operations. The gases are frequently called damp . [Firedamp](#) is a gas that occurs naturally in coal seams. The gas is nearly always methane (CH<sub>4</sub>) and is highly inflammable and explosive when present in the air in a proportion of 5 to 14 percent. White damp, or [carbon monoxide](#) (CO), is a particularly toxic gas; as little as 0.1 percent can cause death within a few minutes. It is a product of the incomplete combustion of carbon and is formed in coal mines chiefly by the oxidation of coal, particularly in those mines where [spontaneous combustion](#) occurs. Black damp is an atmosphere in which a flame lamp will not burn, usually because of an excess of [carbon dioxide](#) (CO<sub>2</sub>) and nitrogen in the air. Stinkdamp is the name given by miners to [hydrogen sulfide](#) (H<sub>2</sub>S) because of its characteristic smell of rotten eggs. Afterdamp is the mixture of gases found in a mine after an explosion or fire.

Problem: propose a gas telemonitoring system for Indian Underground coal mines .

### **Problem- 5**

Problem: innovation in mining: the future technologies

### **Problem- 6**

#### **introduction**

**Wastewater treatment** is a process used to convert [wastewater](#) into an [effluent](#) (outflowing of water to a receiving body of water) that can be returned to the [water cycle](#) with minimal impact on the environment or directly reused. The latter is called [water reclamation](#) because treated wastewater can then be used for other purposes. The treatment process takes place in a wastewater treatment plant (WWTP), often referred to as a Water Resource Recovery Facility (WRRF) or a [sewage treatment plant](#). Pollutants in municipal wastewater (households and small industries) are removed or broken down.

The treatment of wastewater is part of the overarching field of [sanitation](#). Sanitation also includes the management of [human waste](#) and [solid waste](#) as well as [stormwater](#) (drainage) management.<sup>[1]</sup> By-products from wastewater treatment plants, such as screenings, grit and [sewage sludge](#) may also be treated in a wastewater treatment plant.

**Problem: make a model on a waste water treatment and utilisation.**

## **Problem -7 highwall mining**

### **Introduction**

**Highwall mining** is a method of [mining](#) that originated from [auger mining](#). The method differs in that [continuous miners](#), rather than [augers](#), are used to bore an entry adjacent to the [coal](#) seam of a [highwall](#) left behind in an [open pit mine](#) after excavation has been completed. [Screw conveyors](#) positioned behind the continuous miner haul the cut [coal](#) from deep within the seam up to an outside stockpiling area where it is then transported away. Another primary difference in a highwall mining operation is that it is carried out by remote control at the surface where an operator located in a cabin uses a television camera to monitor and control the progress of the continuous miner machine.

When the cost of excavating an [open-pit mine](#) is no longer economically feasible, highwall mining may be deployed before the entire operation is taken underground. The economics of open-pit mining are often determined by [stripping ratio](#). When the cost associated with removing overburden surpasses the actual value of the coal exposed in stripping or excavation, a

mine may choose another method of mining the coal, such as highwall mining or taking the mining operation underground.

Highwall mining as a first option presents many advantages to underground mining because it is more cost-effective and involves less lead-time.<sup>[7]</sup> The process of mining a highwall with **continuous miners** is proven to also be much safer since operations are carried out exclusively by remote control and require fewer personnel than underground mining. Highwall mining at the surface produces the same amount of output as mining underground might. With highwall mining, smaller blocks of **coal** can also be accessed and operations are facilitated around geological impediments or structures that otherwise impinge upon coal production.

**Problem:** make a model on highwall mining and describe all machines layout of mine ,transportation systems.

## **Problem – 8 Solar mine illumination**

**Problem:** make a model on an optical fiber based solar illumination of pit bottom and underground mine roadways and working face.

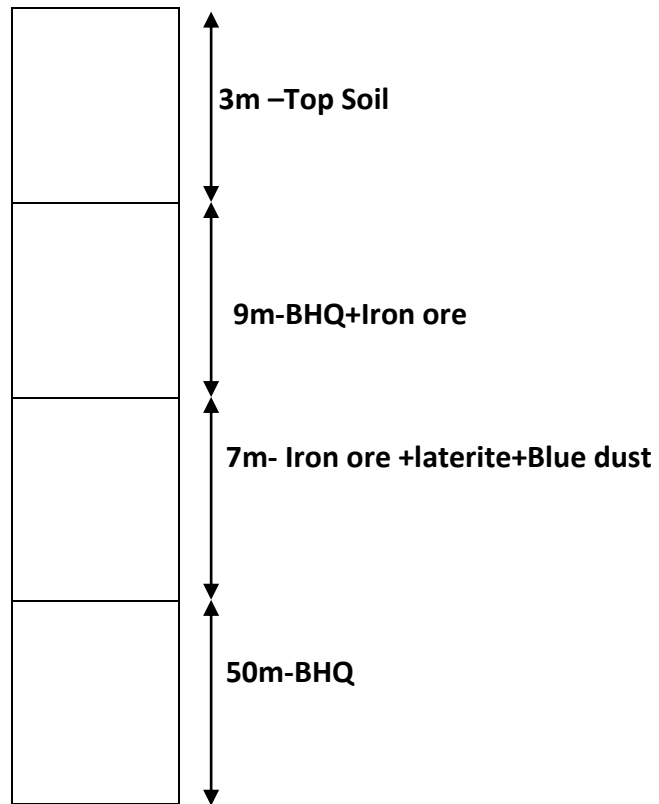
## **Problem -9 design of mine**

### **Introduction**

Design a iron ore mine,their haul road and profit generated by mine if recovery is 69%

Life of mine is 25 years,deposit of iron ore is 11 MT. Iron ore deposit is hilly deposit which is positioned at 450m high hill.It is basically associated with BHQ,laterite and top soil.

### Bore Hole Data



- I. Machine Capacity PC-300-1.8 cubic metre, capacity diesel consumption-25 Lt/hr.
- II. Dozer Capacity -2 Cubic metre diesel , diesel consumption -28Lt/hr.
- III. Dumper Capacity-20te,diesel consumption-6Km/Lt.
- IV. Loader Capacity-3 cubic metre, diesel Consumption-9Lt/hr.
- V. Blasting-DTH-10Lt/hole.
- VI. Dia-350mm,Bore hole length-5m, explosive Bulk –emulsion ,detonator-ED ,cast Booster.

Also find No. of Shovel Required ,no. of dumper required ,Haul road length, design the turnings ,Material Stockyard and dump yard and calculate the cost of production and profit if diesel cost-69rs per lit, man hr charge is 100 ruppes per hour max working hour is 18 hour per shift.