



SHEKHAWATI INST. OF ENG. & TECHNOLOGY COLLEGE
SIKAR, RAJASTHAN

1st MID TERM EXAMINATION 2017-18 (B.TECH 4th year - MI)

Subject Code & Name: 8MI2 MINE PLANNING AND DESIGN

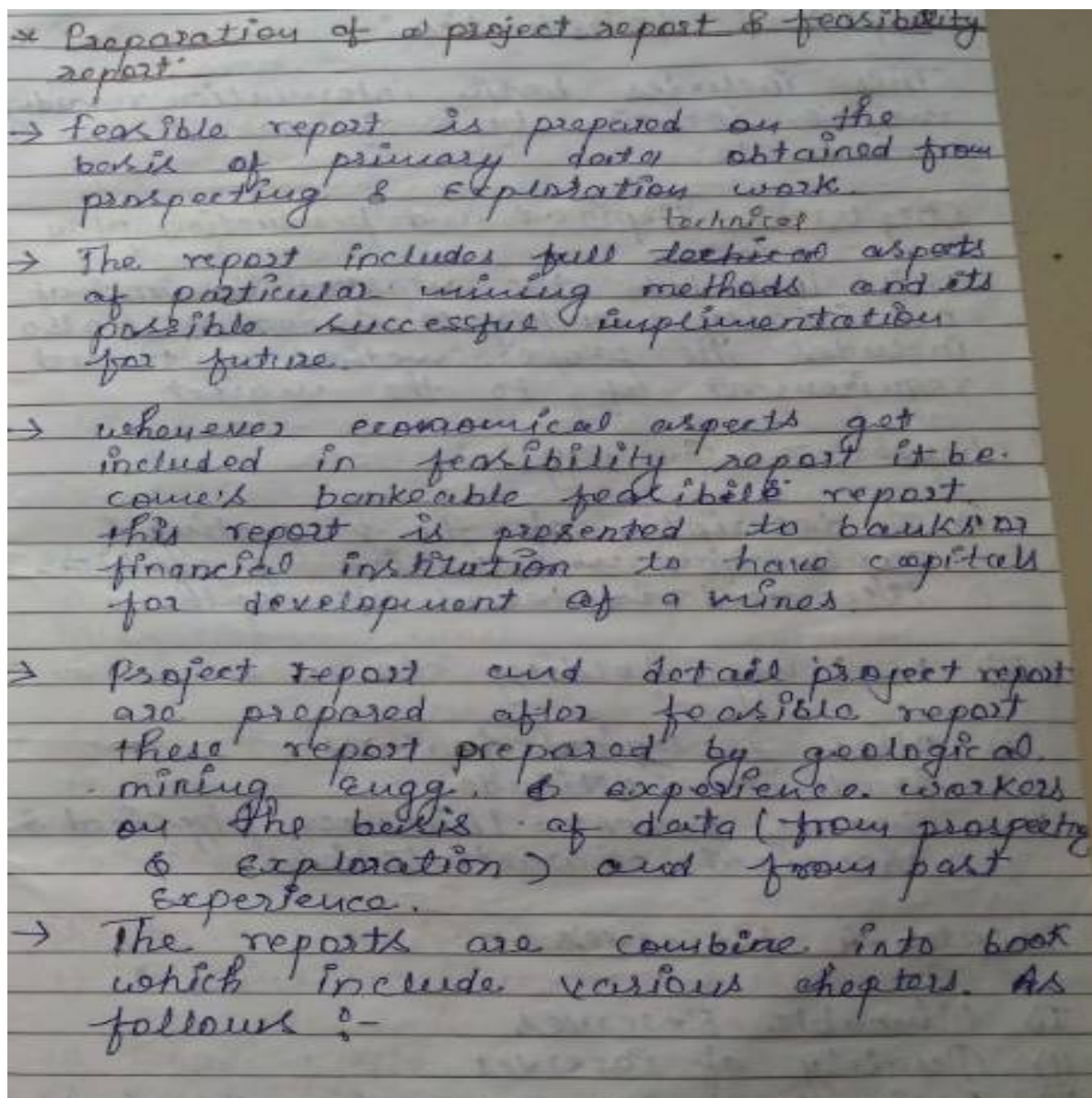
MM: 20

Time: 1.5hrs

MODEL ANSWER PAPER

Q1. Write down the function and preparation of feasibility report.

Ans:-



Q2. Explain Division of mine area in ascending and descending order.

Ans:-

Division of mine area:

Whenever a mineral deposit is ready to be extracted the mining area under which the deposit lie is divided into unit or sub-units depending upon geology, Topography, technology & administrative basis.

The purpose of dividing mining area is to isolate the various fragments of whole working & to locate in a proper place in such a way that they do not disturb one-another during work.

There are two modes of division of mining area.

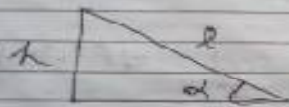
1. Level division.
2. Panel division.

1. Level division:-

- It is prepared where gradient whose the of the deposit is sufficiently large & there is the sufficient extension of deposit along the dip this is practiced in metalliferous mining where working is carried out in level.
- In level division the whole mines is interconnected.

- In level division the whole property is usually divided into two more or less equal parts & a roadway is driven towards the main dip of the deposit for intervals another roadway is driven (parallel) to one-another along the strike from rectangular shape (projected)

- If l is the inclined length of level & α is the dip of deposit then vertical distance between the two levels will be $l \sin \alpha$



$\alpha = \text{dip}$
 $l = \text{inclined length of level}$
 $h = l \sin \alpha$

- In panel division:-

The deposit is divided into such a way that the workings are independent from one-another. Such type of division is preferred in coal mines

- Panel is independent & isolated part of a mine. It is developed in coal mines where independent working becomes an integral part of the mine working

- Every panel in coal mines is separated from one-another & communication therefrom is made only in case of emergency (e.g. fire explosion etc).

- Length of panel along dip is generally 500 to 1000m & that along strike it is 1000 to 1500m

- The pillars are developed and two roadways at extreme boundary of the panel is driven for ventilation as well as transportation purposes. The coal is extracted in retreat manner.

Q3. Explain life of mine and capacity of mine.

Ans:-

* Life of mine / full term of life of mine

$$T = t_1 + t_2 + t_3$$

t_1 = Period of reaching the planned output (Exploitation + development period)
 t_2 = Period of liquidation of the mine.
 t_3 = Periods other than t_1 & t_2
(includes periods related with accident, fires, explosion or other activities).

But the actual life of the mine depends upon some other constraints within or outside of the mine and the period may either be shorter or longer than the planned life of the mine.

Capacity of mine:

Production capacity of mine depends upon

- 1- Method Selected.

- ii) Degree of mechanisation.
- iii) Managerial skill.
- iv) Availability of other facilities.
- v) Capital Investment.
- vi) Skilled Labour available.
- vii) Strategic planning.
- viii) Socio Economic environment.

* Lifecapacity of mines: -
 Let
 T - Term of the life of the mine (years)
 M = Commercial (Minerale) coal reserves of the property (tons)
 A - Daily production rate (te/day)
 Ay = Yearly production rate (te/year)

$$T = \frac{M}{Ay}$$

Q4. How the size of mine is determined .

Ans:-

Optimum size of mine:-
 The size (along dip & strike) of a mine is dependant upon the extent of workable seam free from geological abnormalities

In case of unlimited or large coal reserve it becomes difficult to calculate the dimensions of the mines. However the optimum dimension of a mine is decided by taken into consideration the following factors:-

- i) Extent of deposit.
- ii) Overlying strata
- iii) Boundary (Brazier pillar)
- iv) Geop Geological disturbance

Size of mines also affected by the required production capacity of the mine if targeted product is large it becomes essential to extend the mine regarding roadway and panels. Hence

Size will increase

If L is the length along dip.
• B is the length along strike
then

$$\frac{B}{L} = [7\sqrt{\sin\alpha} + 1] \quad \text{--- (i)}$$

α = Angle of dip

$$B.L = \frac{T \cdot A_y}{C \cdot \epsilon_p} \quad \text{--- (ii)}$$

T = Life of mine

A_y = Annual production. (t/y)

C = Recovery.

ϵ_p = Total workable content of the seam (t/m³)

From (i) & (ii)

$$B = \sqrt{[7\sqrt{\sin\alpha} + 1]} \cdot \frac{T \cdot A_y}{C \cdot \epsilon_p}$$

$$L = \frac{T \cdot A_y}{\sqrt{C \cdot \epsilon_p} [7\sqrt{\sin\alpha} + 1]}$$

Q5. Difference between level and panel division.

Ans:-

Level division	Panel division.
1- It is preferred for inclined deposit	1- It is preferred for a deposit for moderate deposit to flat deposit
2- It is suitable for less intensive deposit	2- It is suitable for more extensive deposit
3- Every level is inter-connected with one another	3- Every panel is independent & isolated one-another. The necessary inspection or communication are made only in case of emergency.

4-Ventilation System
Some times becomes
difficult as each has to
be separately venti-
lated.

5- In case of fire
explosion whole mine
get affected.

6- It is preferred in
metalliferous deposit

7- Extraction is prefe-
red in descending
order

4-Ventilation is more
efficient as there is
separately roadways
for both intake &
return

5- In that case only
particular panel
gets affected keeping
rest of the mine safe

6- It is preferred in
coal mining

7- Extraction is carried
out in ascending or
1- from rise to
dip ; from boundary
2- main roadway surf

