QUESTION 1

1.1 Define the following Geological features and what will your support recommendation be?

1.1.1 Brows (4)

1.1.2 Domes (3)

1.1.3 Joint (3)

1.1.4 Potholes (2)

1.1.5 Dyke (3)

1.2 You are the Manager at a mine producing 120 000 t/month using a bord and pillar mining method. The underground workings is serviced by a vertical shaft. The TM3 workshop is situated 700m below surface and has the following dimensions: - 20,0m L x 6,0m W x 5,0m H. During the off weekend the workshop and services was severely damaged by a massive fall of ground measuring 15,0m L x 5,0m W x 3,0m T.

Describe how you will attempt to rehabilitate the workshop in the shortest possible time considering the following:-

1.2.1 Risk Assessment (4)

1.2.2 Securing access ways (4)

1.2.3 Ground movement monitoring (3)

1.2.4 Rehabilitation procedure with specific reference to making safe, support type and installation and restoration of services. (14)

[40]

QUESTION 2

2.1 What is your understanding of Boyle's Law? (3)

A certain mass of air occupies a volume of 16m³ when the pressure is 100 Pa. If the temperature of the air remains the same, what volume will the same mass of air occupy at a pressure of 80 kPa? (4)

2.2 What is your understanding of Charles' Law? (3)

8m³/s Of air at 26ºC dry bulb enters an underground hoist room. The pressure of the air remains constant and there is no change in the amount of water vapour in the air. If the air leaves the hoist room at 33ºC dry bulb, what is the volume of air leaving the hoist room? (5)

2.3 What is your understanding of the Universal Gas Law? (2)

A certain mass of air occupies a volume of 15 000m³ at a pressure of 85 kPa and a dry bulb temperature of 12ºC. If the pressure increased to 86,5 kPa and the dry bulb temperature to 40ºC, what would the volume become? (5)

[22]

QUESTION 3

3.1 With the aid of a sketch explain what you understand by "Fan Stall Zone" (4)

3.2 What are the signs when a fan is running in the stall zone? (2)

3.3 What action has to be taken when a fan operates in a stall zone? (2)

3.4 The ventilating pressure required to pass 4m³/s of air through a system

is 150 kPa. If the resistance remains unchanged, what pressure will be required to pass 6m³/s of air through this system? (7)

[15]

QUESTION 4

Write short notes on what your understanding is of the following Ore Reserve Categories:

4.1 Immediately Available Ore Reserves (IMA) (3)

4.2 Developed Ore Reserves (DOR) (3)

4.3 Immediately Stopeable Ore Reserves (IMS) (3)

4.4 Not in Reserve (NIR) (4)

4.5 Calculate the Life of Mine given the following information: -

Size of Reserve	- 2000m x 1300m (On Dip)
Average stoping width	- 120cm
Payability	- 60%
Ore milled	- 100 000 t/month
Sorting	- 15%
Tons mined from ore reserve	- 75%
Density of rock	- 2,70 t/m³

(10)

[23]

Total marks **[100]**