JHARKHAND Rai University RANCHI

PRACTICE SET
End Semester Examination, December 2025

Program: B.TECH (MINING)
Semester: V
Subject: Mine Ventilation & Climate Control
Subject Code: 8PCCMiE310

Course Outcomes	Description
CO1	Classify mine gases & summaries various ventilation instruments.
CO2	Illustrate the technical knowledge on origin, occurrence, effects, and detection of various mine gases, air conditioning of surface and underground mining.
CO3	Explain & differentiate between natural ventilation & mechanical ventilation.
CO4	Design ventilation plan & layout considering various parameters.

UNIT I

Section I (5 marks)

1. Brief about mine air composition. CO1 (Remember)
2. Briefly explain different types of damps found in mines. CO1 (Understand)
3. Discuss the physiological effects of white damp (CO) on miners. CO1 (Understand)
4. Define degree of gassiness of seam and classify it. CO1 (Remember)
5. Discuss the properties of oxygen? Also give method to ascertain the percentage of Oxygen in mine? CO1 (understand)
6. List different parts of flame safety lamp used in underground coal mine. CO1 (Remember)

Section II (10 marks)

7. Discuss in detail the mine air composition. How methane gas is produced in underground working? (10 marks). CO1 (understand)
8. Can you be able to explain different method of detecting carbon-mono-oxide in an underground mine. CO1 (Apply)
9. Discuss the physiological effect of white damp and deficiency of oxygen on miner. CO1 (Understand)
10. List the different types of flame safety lamp used in an underground coal mine and also differentiate GL-7 and GL-50. CO1 (Remember)

Section III (20 marks)

11. The percentage of oxygen & carbon dioxide is important for underground atmosphere. Discuss the physiological effect if percentage of oxygen decrease and carbon dioxide increase on human body in underground coal mines. CO1 (Apply)
12. Compare the flame Safety lamp and the Methanometer used in mines in term of their working principles, uses and limitations for gas detection? CO1 (Apply)

UNIT II

Section I (5 marks)

13. List any four effects of heat and humidity on mine workers. CO2(Remember)
14. Define flow control devices and mention two examples. CO2 (Remember)
15. Define geothermal gradient and list sources of heat in underground mines.? CO2 (Remember)
16. In the context of mine ventilation, define equivalent orifice CO2 (Understand)
17. Illustrate two methods used to control heat and humidity in underground coal mine. CO2 (Understand)

Section II (10 marks)

18. An anemometer gave reading of 300m in 5 minutes. The gallery was 4.2m wide and 2.5m high. Calculate the quantity of air flowing. CO2 (Evaluate)
19. Explain in detail about the sources of heat and humidity in underground coal mines? Discuss the effects of heat & humidity on miners. CO1 (understand)
20. What is the minimum quantity of air required to ventilate an underground district producing 180 tone of coal per shift employing a maximum of 120 person in a shift. CO2 (Evaluate)
21. 350 cubic meter / minutes of air entering a district but in the last ventilation connection air is found to be only 300 cubic meter / minutes. Calculate ventilation efficiency quotient (VEQ) of the district. CO2 (Evaluate)

Section III (20 marks)

22. Talk about the air velocity standards in various underground mining locations in accordance with DGMS circular and CMR2017 regulation no. 160.CO2 (Apply)

UNIT III

Section I (5 marks)

23. Define Natural ventilation. Write causes of natural ventilation. CO3 (Remember)
24. What is the function of fan drifts and evasees in a ventilation system?.CO3 (Remember)
25. Compare the forcing fan with exhaust fan. CO3 (Analyze)
26. Define the terms:
    a) Theoretical depression
    b) Effective depression
    c) Manometric efficiency
    d) H.P. of ventilation
    e) Mechanical efficiency CO3 (Remember)
27. State the effect of seasonal variation on natural ventilation. CO3 (Remember)

Section II (10 marks)

28. What do you understand by motive column. Mean air temp in a D.C shaft 500m deep is 28 degree Celsius and in the U.C shaft is 38 degree Celsius. Calculate (i) the motive column, and (ii) the N.V.P assuming average barometric pressure in D.C shaft to be 750 mm of hg. CO3 (Evaluate)
29. Describe accessional and descensional ventilation with a neat sketch. Discuss why accessional ventilation is preferable? CO3 (Understand)
30. Explain the principle and constructional features of axial flow fan. CO3 (Understand)
31. Write a short notes on- a) Homotropal ventilation.
    b) Antitropal ventilation CO3 (Understand)

Section III (20 marks)

32. Can you illustrate about auxiliary ventilation system and classify different types of auxiliary ventilation used in underground mines with neat sketch CO3 (Apply)
33. In a main airway a quantity of 950 cubicmeter/ min of air is flowing. At a point 700m inbye the velocity of air is 65 m per minute, and the height and width at that point are 2m and 4m respectively. How much air is leaking through the stopping and door between the two points? CO3 (Evaluate)

UNIT IV

Section I (5 marks)

34. Describe the need of ventilation planning for any UG mine. CO4 (Understand)
35. What do you understand by ventilation survey, explain briefly? CO4 (Remember)
36. Define mine head and list the factors affecting total mine head.CO4 (Remember)
37. State the basic requirements for ventilation planning in coal mines.CO4 (Remember)
38. Write the formula for calculating air quantity needed in a mine and explain each term.C04 (Remember)

Section II (10 marks)

39. List the different equipment's used in ventilation survey, explain any one of them. CO4 (Remember)

Section III (20 marks)

40. Talk about how ventilation planning is essential to safe and effective mining operations.CO4 (Apply)

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Summary Sheet:

CO Wise

CO	Q. No	Marks
CO1	1,2,3,4,5,6,7,8,9,10, 11,12,	110
CO2	13,14,15,16,17,18,19,20, 21,22	85
CO3	23,24,25,26,27,28,29,30, 31,32,33	105
CO4	34,35,36,37,38,39,40	55
Total		**355**

Unit Wise

Unit	Q. No	Marks
Unit 1	1,2,3,4,5,6,7,8,9,10, 11,12	110
Unit 2	13,14,15,16,17,18,19,20, 21,22	85
Unit 3	23,24,25,26,27,28,29,30,31,32,33	105
Unit 4	34,35,36,37,38,39,40	55
Total		**355**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1,2,3,4,5,6,7,9,10,13,14,15,16,17,19,23,24,25,26,27,29,30,31,34,35,36,37,38	**185**
HOT	8,11,12,18,20,21,22,32,33,39,40	**170**
Total		**350**

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Prepared by –Kamakhya Narayan

Disclaimer: - This is a Practice set. The Question in the End term examination will differ from the Practice set. This Practice set is meant for practice only.