PRACTICE SET

End Semester Examination, December 2025

Program: B.TECH (MINING)
Semester: VII
Subject: MINE ENVIRONMENTAL ENGINEERING
Subject Code: 8PCCMiE401

Course Outcome:
On the completion of the Course, the students will be able to:

Course Outcomes	**Description**
CO1	Understand the basic concept of mine fire & spontaneous combustion with detection, control, dealing and prevention in underground mine.
CO2	Explain the causes & prevention of mine explosions like firedamp & coal dust explosion.
CO3	Gain knowledge of causes & prevention of inundation and uses of the rescue apparatus properly.
CO4	Analyze the causes of production of air born dust and its control as well as prevention and the standard of illumination at working place and other parts of the mine.

UNIT I

Section A (5 Marks)

1. Describe the brief idea about open mine fire. Discuss essential conditions for open mine fire. (CO1) (Understand)
2. Discuss about the incipient mine fire. (CO1) (Understand)
3. Describe the spontaneous combustion. also state why high volatile coal is more susceptible to spontaneous heating than medium volatile coal. (CO1) (Understand)

Section B (10 Marks)

4. Summarize factors affecting liability of coal to spontaneous combustion? (CO1) (Understand)
5. Illustrate the precautions which you will take in mine to prevent spontaneous heating. (CO1) (Understand)

6. Illustrate the various preventive measures which can be taken to control underground mine fire. (CO1) (Understand)
7. Describe the major causes for Surface and Underground fire. Discuss in detail. (CO1) (Understand)
8. Discuss various contributing factors for spontaneous combustion coal in mines. (CO 1) (Understand)
9. Illustrate the Spontaneous heating. Elaborate the stages of spontaneous combustion of coal in the mines. (CO1) (Apply)
10. Suggest mechanics of prevention of spontaneous combustion of coal. (CO1) (Apply)

Section C (20 Marks)

11. In underground you have seen various types of stopping used for sealing off a fire, classify them. Distinguish the permanent stopping with its specification. Sketch suitable diagram. (CO1) (Apply)
12. The percentages of various gases present in the return air of a normally working mine are as follows:

Gases	**Percentage %**
Oxygen	19.95
Nitrogen	78.72
Methane	0.93
Carbon dioxide	0.39
Carbon monoxide	0.005

Calculate the CO/O2 deficiency and CO2/O2 deficiency ratio. (Evaluate) (CO1)

UNIT II

Section A (5 Marks)

13. Explain the localization of mine fire. State the measure for the localization of fires at roadways fire. (CO2) (Understand)
14. Define Le Chatelier Principle used in explosion. Evaluate the lower limit of explosibility of a gaseous mixture containing 80% methane, 10% hydrogen, 10% ethane. (CO2) (Evaluate)
15. Summarize the causes of Firedamp explosion. (CO2) (Understand)

Section B (10 Marks)

16. Describe about the sealing off the fire area. Draw a suitable diagram of the trench barrier. (CO2) (Understand)
17. Write short notes on followings:
    a. Coward's diagram.

b. Isolation stopping. (CO2) (Remember)

18. Summarize in detail about the factors and preventions for firedamp explosion. (CO2) (Understand)
19. In underground you have seen various types of stopping used for sealing off a fire, classify them. Illustrate about the permanent stopping with its specification. Sketch suitable diagram. (CO2) (Apply)
20. Enlist the fittings of permanent stopping and draw its diagram. (CO2) (Understand)
21. Plan the steps which can be taken for prevention against coal dust explosion. (CO2) (Apply)
22. Elucidate about Firedamp explosion & coal dust explosion. What are the explosibility limit of firedamp and coal dust explosion? Discuss about the major preventions to deal with it. (CO2) (Apply)

Section C (20 Marks)

23. If there are chances of explosion in any coal mine, how will you prepare explosion proof stopping to safeguard mine? Distinguish the temporary stopping, its purpose and various types. (CO2) (Analyze)

UNIT III

Section A (5 Marks)

24. Differentiate limitations and uses of gas mask. (CO3) (Understand)
25. Discuss the advantages of fighting fires with inert gases in the mines. (CO3) (Understand)

Section B (10 Marks)

26. Define inundation. Summarize the various preventions you can take for inundation in mines. (CO3) (Understand)
27. Illustrate the self-contained breathing apparatus with schematic line diagram of closed-circuit breathing apparatus. (CO3) (Understand)
28. Compare the specification for both light and heavy stone dust barriers? (CO3) (Apply)
29. Illustrate the stone dust barriers. Summarize the properties and types of stone dust barriers in detail. (CO3) (Apply)
30. In underground if you are manager of mines and you have observed a fire which is extensive in nature which may lead to explosion, what steps you will take just after observing fire. (CO3) (Apply)

Section C (20 Marks)

31. Inertiziation of mine fire usually practices in mines. Illustrate the methods of Inertization of mine fires by providing the schematic line diagram of local Inertization and area inertization. (CO3) (apply)
32. Illustrate accidents and hazards? Cause wise data for injuries in an underground coal mine for a five-year period is given below:

Causes of injury	Number of injuries
Roof Fall	27
Fall of person	22
Rope haulage	17
Explosive	5
other	4

Calculate the cumulative probability of injury due to roof fall and fall of person? (CO3) (Apply)

UNIT IV

Section A (5 Marks)

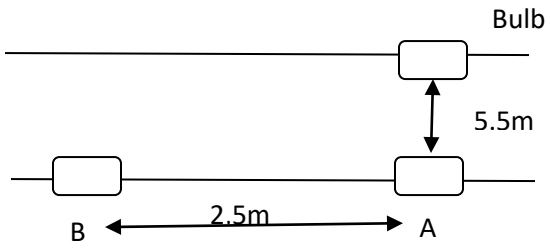
33. Reiterate the mine diseases Nystagmus and Silicosis. (CO4) (Remember)
34. Explain the stone dust? Summarize the desirable qualities of stone dust. (CO4) (Understand)
35. Reiterate the Pneumoconiosis which is prominent in coal miners? Classify it. (CO4) (Remember)

Section B (10 Marks)

36. Write notes on followings:
    a. Illumination.
    b. Asbestosis (CO4) (Remember)
37. Illustrate the Inundation in mines. Also illustrate the condition for the mine inundation from overlying strata. (CO4) (Apply)
38. Discuss the self-rescuer used for rescue in mines. (CO4) (Understand)

Section C (20 Marks)

39. Floor illumination at a point directly below a light source in an underground place of height 4m is 40 lux. Calculate the floor illumination in lux at a point 8m away from the light source? (CO4) (Evaluate)
40. A filament bulb produces 30 Lux illumination at point as shown in the figure. Assuming that no other source of lighting present in the roadway, calculate the illumination level in Lux at point B? CO 4 (Evaluate)



JHARKHAND Rai University
RANCHI

Summary Sheet

CO Wise

CO	Q. No	Marks
CO1	1,2,3,4,5,6,7,8,9,10,11	115
CO2	12,13,14,15,16,17	70
CO3	18,19,20,21,22,23,24,25,26,27	100
CO4	28,29,30,31,32,33,34,35,36,37,38,39,40	70
Total		**355**

Unit Wise

Unit	Q. No	Marks
Unit 1	1,2,3,4,5,6,7,8,9,10,11	115
Unit 2	12,13,14,15,16,17	70
Unit 3	18,19,20,21,22,23,24,25,26,27	100
Unit 4	28,29,30,31,32,33,34,35,36,37,38,39,40	70
Total		**355**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1,2,3,4,5,6,7,9,12,13,14,16,18,19,20,21,22,24,25,28,29, 30,31,32,33,34,36	165
HOT	8,10,11,15,17,23,26,27,26,27,34,35	190
Total		**355**

JHARKHAND Rai University
RANCHI

Prepared By: Dr. Jai Prakash Meena

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