



Sixth Semester B.E. Degree Examination, June/July 2019
Mine Disasters and Rescue

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the process of interpretation of the status of fire inside a sealed mine based on the collected sample. (08 Marks)
b. When it is not possible to quench a mine fire using direct attack. Explain the next possible immediate action to be adopted. (08 Marks)

OR

- 2 a. A major explosion has taken place in a degree – III gassy seam of a mine when you are on the surface of the mine, as a manager. Explain the procedure to be adopted to quench the fire? Keep in view of the statutory obligation, required to be fulfilled while answering the questions. (10 Marks)
b. List the different types of underground and open cast fires and state the causes for the same. (06 Marks)

Module-2

- 3 a. A faint haze observed in a freshly exposed underground coal mine followed by petrol smell. What is the reason behind the faint haze and petrol smell? Explain the factors governing the same. (08 Marks)
b. How to determine spontaneous combustion of coal using experimental methods. (Explain any two methods). (08 Marks)

OR

- 4 a. Interpret the result of an analysis, that a sample of the return air from a district liable to heating or not.
Gases (%)
O₂ 20.20
N₂ 78.74
CO₂ 0.31
CO 0.003
CH₄ 0.75
Assuming the atmosphere has O₂ = 20.93% N₂ = 79.04% and CO₂ = 0.3%. (08 Marks)
b. Explain the symptoms and steps of spontaneous heating. (08 Marks)

Module-3

- 5 a. Explain the process of formation of fire damp in underground mine and how to estimate the hazard due to fire damp in mines. (08 Marks)
b. It is found that an abandoned mine is water logged. The approach to water logged area is sufficiently near to it and the water pressure is less based on piezometric readings. Explain the method of dewatering to be adopted. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the mechanism of coal dust explosion and how to estimate the hazard due to coal dust explosion. (08 Marks)
- b. It is found that an abandoned mine is water logged. The approach to water logged area is not sufficiently near to its and the water pressure is very high based on piezometer. Explain the method dewatering and precautions to be adopted. (08 Marks)

Module-4

- 7 a. Comment on the sources of light in mines. (06 Marks)
- b. If 'F' is a light source mounted at a height 'h' meter above the working place. I_0 is the intensity of the source light in a down ward vertical direction. Determine the illuminance calculation for a given point in any plane. (10 Marks)

OR

- 8 a. Determine the luminance calculations of a mine, considering the uniform reflectance of rock surface (ρ) and the number of lumens given by the source (ϕ). (10 Marks)
- b. Explain the methods of illumination survey. (06 Marks)

Module-5

- 9 a. When a mine ramp is collapsed in the xyz mine, trapping the miner's deep underground. The miners were left trapped more than low feet underground. Please comment on the rescue and recovery to be carried in your point of view. (10 Marks)
- b. A miner is entombed due to roof fall in underground mine. After initial observation it is found that he is asphyxiated. Explain the method of artificial respiration to be adopted to revive the miner. (06 Marks)

OR

- 10 a. An alarm is heard from underground to surface about mine fire in underground mine. Explain the resume and recovery work following mine disaster. (10 Marks)
- b. A miner is entombed due to roof fall in underground mine. After initial observation it is found that he is asphyxiated and rib cage is broken/fractured. Explain the rescue and recovery work following mine disaster. (06 Marks)

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