CBCS SCHEME

Fifth Semester B.E. Degree Examination, June/July 2023
Mine Ventilation

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a. Discuss the production, properties and effects of Carbon monoxide.   **(10 Marks)**
    b. Discuss the production, properties and effects of Hydrogen sulfide.   **(10 Marks)**

OR

2   a. Explain gas chromatography and its applications.   **(10 Marks)**
    b. Summarize the explosibility curve of methane with neat sketch.   **(10 Marks)**

Module-2

3   a. Explain the minor sources of heat in mine.   **(10 Marks)**
    b. Discuss the consequence of heat loss when lower than heat generated.   **(10 Marks)**

OR

4   a. Distinguish between latent heat and sensible heat.   **(10 Marks)**
    b. Explain about the direct heat indices in underground mines.   **(10 Marks)**

Module-3

5   a. The average air velocity as measured in a 2m diameter smooth lined airway is 0.01 ms^{-1}. What is the maximum velocity of flow and where does it occur in the airway? If the average velocity is raised to 0.5 ms^{-1}, what would be the maximum velocity and what would be the thickness of the laminar sub-layer at the boundary.   **(10 Marks)**
    b. Derive an expression for airflow through mine opening.   **(10 Marks)**

OR

6   a. Derive an expression for laminar flow through pipes.   **(10 Marks)**
    b. A fan passes 9000 m^3 of air per minute at 500 Pa when running at full speed and 6000 m^3/min at 200 Pa when running at slow speed. Calculate the NVP, assuming it to be constant.   **(10 Marks)**

Module-4

7   a. Explain the various effects of seasonal variations of natural ventilation.   **(10 Marks)**
    b. Explain the factors affecting the natural ventilation.   **(10 Marks)**

OR

8   a. Discuss the various effects of an Evasee.   **(10 Marks)**
    b. Derive an expression to determine the pressure to be developed by a Booster fan.   **(10 Marks)**

Module-5

9   a. Discuss the factors to be considered for planning the ventilation system.   **(10 Marks)**
    b. A quantity of 3300 m^3 of air passes per minute through an airway 3m×2m by 500m long. What quantity would pass through an airway 4m × 2m and of the same length, same nature of lining, at the same pressure?   **(10 Marks)**

OR

10 a. Explain the factors to be considered for ventilating a new mine.   **(10 Marks)**
    b. Explain the various precautions to be taken during ventilation survey.   **(10 Marks)**

* * * * *