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Fifth Semester B.E. Degree Examination, June / July 2014
Mine Environmental Engineering – I

Time: 3 hrs.

Max. Marks: 100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Explain the typical analysis of atmospheric air represents the intake air and return any mine airway. (10 Marks)
- b. Explain the following underground mine gases and their occurrence, properties, detection and physiological effects:
 - i) O₂
 - ii) CO₂
 - iii) CO
 (10 Marks)
- 2 a. Explain the methods of methane drainage in coal mine with neat sketch. (10 Marks)
- b. Draw neat sketch of safety lamp. (10 Marks)
- 3 a. Explain the effects of heat and humidity on the mines. (10 Marks)
- b. Explain the cooling power of mine air in underground mine. (10 Marks)
- 4 a. Explain the following :
 - i) Fundamentals of air flow.
 - ii) Reynolds number.
 - iii) Laminar flow through pipes. (10 Marks)
- b. Explain the laws of mine air friction in underground mine. (04 Marks)
- c. What is the water gauge required to pass 1500 m³ of air / minute through an airway of 2.5m × 3m cross section and 2000 m long. [Equal to 0.001 kilomurg]. (06 Marks)

PART – B

- 5 a. Explain the following natural ventilation in underground mine:
 - i) Ascensional ventilation.
 - ii) Descensional ventilation.
 - iii) Homotropical ventilation. (10 Marks)
- b. A total quantity of 100 m³/min of air is passing through two splits an airway is,
 - i) 2.5 m × 1.5 m and 100 m long.
 - ii) 2 m × 1.5 m and 125 m long.
 Calculate the quantity of air passing in each split. (10 Marks)
- 6 a. Explain types of Fans are used in underground mine and draw neat sketch of centrifugal fan. (10 Marks)
- b. Explain the characteristic curves of forcing and exhaust fan used in underground mine. (10 Marks)
- 7 Explain the importance of ventilation survey in underground mine:
 - a. Pressure survey
 - b. Quantity survey
 - c. Quality survey (20 Marks)
- 8 a. Explain the objective of ventilation planning (10 Marks)
- b. Explain the types of ventilation system in underground mine. (10 Marks)