JHARKHAND Rai University
RANCHI

End Semester/Reappear (Semester VI) Examination May 2025

Programme: B. Tech (MiE)
Course: Mine Ventilation **Full Marks: 70**
Course Code:8PCCMiE310 **Time: 3 Hrs.**
Enrolment no. _____

Q.No.	Questions	CO	Bloom Taxonomy Category	Marks
	Section I			
1	**Short Answer type questions.**			**4 x 5 = 20**
a	Discuss the properties of oxygen. Also describe method to ascertain the percentage of Oxygen in mine.	CO1	Understand	
	or			
	Write short notes on mine air sampling.	CO1	Remember	
b	Define geothermal gradient and list sources of heat in underground mines.	CO2	Remember	
	or			
	What do you understand by equivalent orifice of a mine, explain briefly.	CO2	Analyze	
c	Compare the forcing fan with exhaust fan.	CO3	Analyze	
	or			
	State the effect of seasonal variation on natural ventilation.	CO3	Remember	
d	State the basic requirements for ventilation planning in coal mines.	CO4	Remember	
	or			
	Write the formula for calculating air quantity needed in a mine and explain each term.	CO4	Remember	
	Section II			
	Long Answer type questions.			**3 x 10 = 30**
2	What is the minimum quantity of air required to ventilate an underground district producing 150 tone of coal per shift employing a maximum of 100 person in a shift.	CO2	Evaluate	
	or			
	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	
3	What do you understand by motive column. Mean air temp in a D.C shaft 400m 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	Apply	
	or			
	Describe accessional and descensional ventilation with a neat sketch. Discuss why accessional ventilation is preferable? Discuss.	CO3	Understand	
4	Classify and explain about auxiliary ventilation system with neat sketch.	CO4	Analyze	
	or			
	Explain the importance of ventilation planning in ensuring safe and efficient mining operations.	CO4	Understand	
	Section III			
	Application based questions			**1 x 20 = 20**
5	Analyze the physiological effects on the human body when oxygen levels decrease and carbon dioxide concentration increases in underground coal mines. Discuss the potential health risks and consequences of these atmospheric changes."	CO1	Analyze	
	or			
	Describe the different techniques used for air sampling in underground mining operations, highlighting their significance and applications."	CO1	Analyze	

COURSE OUTCOME

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.