

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019

Subject Code: 2162207

Date: 12/12/2019

Subject Name: Mine Ventilation

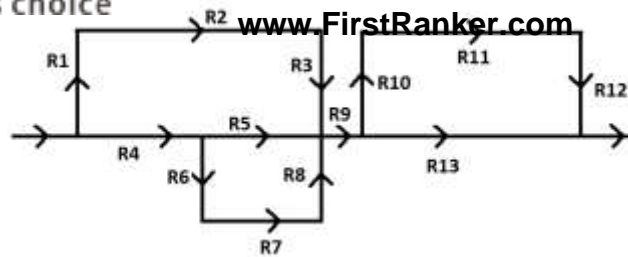
Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Explain the necessity of mine ventilation in underground mines.	03
	(b) Define damp. Name different damp(s) found in underground mines and their composition.	04
	(c) State the standards of ventilation in Indian mines as given by DGMS.	07
Q.2	(a) Define: (i) relative humidity; (ii) geothermal gradient; and (iii) autocompression.	03
	(b) Explain the working of the device used for measurement of relative humidity with the help of a neat labeled diagram.	04
	(c) Explain the occurrence, physiological effect and detection of methane (CH ₄) gas in underground mines. Also explain the methane explosibility curve.	07
	OR	
	(c) State the need for mine air refrigeration in underground mines. Explain how mine air is refrigerated.	07
Q.3	(a) Explain the working of kata thermometer using a neat labeled diagram.	03
	(b) What do you understand by equivalent orifice of a mine? Also give its expression.	04
	(c) Derive the Atkinson's equation of frictional resistance. Calculate the pressure loss in a mine airway of cross-section 4m*3m and length 250m, given that velocity of air is 30m/min and k=0.0105.	07
	OR	
Q.3	(a) Explain mechanical ventilation in brief.	03
	(b) State different fan laws.	04
	(c) Derive the Square law equation. 50m ³ /s of air is passing through a mine opening having 3m*4m cross-section and 50m length under a pressure difference of 100 Pa. Calculate the airway friction factor (k) and resistance of mine.	07
Q.4	(a) Explain the occurrence of carbon monoxide (CO) gas in the mines. Why is CO harmful?	03
	(b) Derive the equation for equivalent resistance in series as well as in parallel airways in underground mines.	04
	(c) Below figure shows the network of airway present in a mine having equal resistance 0.2 N s ² m ⁻⁸ , find out the equivalent resistance of the below network.	07



OR

- Q.4** (a) Write a short note on natural ventilation. **03**
 (b) Explain: (i) air crossing; (ii) air locks; (iii) regulators; and (iv) stoppings. **04**
 (c) Define: (i) Motive column; and (ii) NVP. **07**
 Mean air temperature in a D.C. shaft 400m deep is 28°C and in the U.C. shaft is 28°C. 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.
- Q.5** (a) Write the advantages and disadvantages of splitting of airways. **03**
 (b) With the help of a neat labeled diagram explain centrifugal fan. **04**
 (c) Write a short note on installation of fans. **07**

OR

- Q.5** (a) Differentiate between forcing and exhaust system of ventilation. **03**
 (b) With the help of a neat labeled diagram explain axial flow fan. **04**
 (c) With the help of different layouts explain auxiliary ventilation in blind headings. **07**

www.FirstRanker.com