Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VI(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2162207   **Date:21/05/2019**

Subject Name:Mine Ventilation

Time:10:30 AM TO 01:00 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)**	What is blackdamp? Explain briefly.	**03**
	(b)	Describe the methods of detecting carbon monoxide in an underground mine.	**04**
	(c)	What is the physiological effect of the following gases on human beings? (a) H_2S (b) CO_2 (c) CO (d) CH_4	**07**
Q.2	**(a)**	What do you understand by Gas blowers?	**03**
	(b)	How firedamp is detecting by using flame safety lamp? Explain with neat sketch.	**04**
	(c)	The analysis of a sample of air from old workings is reported as: O_2 = 15%, CO_2 = 2.8%, CH_4 = 4.3% and N_2 = 77.9%. Find the percentage of air and blackdamp in the sample as well as the composition of blackdamp assuming air to contain 20.95% O_2, 0.03% CO_2 and 79.02% N_2.	**07**

OR

	(c)	What do you mean by methane drainage? With a neat sketch, explain "Surface bore hole technique" of methane drainage.	**07**
Q.3	**(a)**	Discuss the necessity and standard of ventilation.	**03**
	(b)	What do you mean by frictional resistance and shock resistance?	**04**
	(c)	What is relative humidity? How relative humidity is measured using whirling hygrometer? Explain briefly with neat sketch.	**07**

OR

Q.3	**(a)**	Sketch the diagram of mine characteristics curve.	**03**
	(b)	Write a note on Coward's diagram with neat sketch.	**04**
	(c)	How is natural ventilating pressure produced? Derive the equation of natural ventilation pressure from air density.	**07**
Q.4	**(a)**	Write a note on Equivalent Resistance of mines.	**03**
	(b)	Calculate the pressure required to circulate 3000 m^3 per minute of air through a 2500m long tunnel of 3.5×3.5 m cross-section with k = 0.0098 Ns^2m^{-4}.	**04**
	(c)	Discuss the effect of heat & humidity at the work places. Also explain the method of improving cooling power of mine air.	**07**

OR

Q.4	**(a)**	What do you understand by equivalent orifice?	**03**
	(b)	Write a note on Kata Thermometer.	**04**
	(c)	Explain the construction and working of booster and auxiliary fans.	**07**
Q.5	**(a)**	Differentiate between Homotropal and Antitropal ventilation.	**03**
	(b)	Explain centrifugal fan in detail.	**04**

(c) Air temperature in downcast and upcast shafts 465m deep is 29°C and 36°C respectively. Calculate the height of motive column. Find out also the density of downcast air and the amount of natural ventilation pressure (N.V.P). Assuming the average barometric pressure in downcast shaft to be 750 mm of Hg. **07**

OR

Q.5 **(a)** What do you mean by Evasee? Discuss its importance. **03**

(b) Describe parallel and series operation of mines fans. **04**

(c) Write a brief note on axial flow fan with neat sketch. **07**

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