Roll. No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, December 2024

Mining Engineering

Seventh semester

MI 5703 Mine Environmental Engineering

(Regulation 2019)

Time: 3 hrs

Max. Marks: 100

CO1	To study about spontaneous heating of coal and mine fires.
CO2	To study about methane and coal dust explosions
CO3	To study about inundations in mines
CO4	To study about mine rescue and first aid
CO5	To study about mine illumination

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10 x 2 = 20 Marks)

Q. No.	Questions	Marks	CO	BL
1	Why does coal undergo spontaneous combustion?	2	1	2
2	List the common methods of firefighting.	2	1	1
3	What is the purpose of balancing of pressures at stoppings?	2	1	2
4	What is ignition point / ignition temperature?	2	2	1
5	List the causes for a firedamp explosion.	2	2	1
6	How is the optimum location of a mine sump in an underground mine decided?	2	3	3
7	What is the purpose of a safety boring machine?	2	3	2
8	How does a self-contained breathing apparatus contain oxygen for an endurance limit of 4 hours with only a 2 liter tank capacity?	2	4	3
9	List the chemical equations involved in a chemical oxygen self-rescuer.	2	4	1
10	What is inverse square law in illumination?	2	5	1

PART- B (5 x 13 = 65 Marks)

Q. No.	Questions	Marks	CO	BL
11 (a)	Explain the methods to seal off a fire area with and without an explosion hazard. (2 methods in each category with diagrams). List the precautions to be taken against spontaneous heating as per Regulations.	13	1	2
	OR			
11 (b)	Explain the process of spontaneous combustion and its influence on various coal types. Describe the experimental studies of this process.	13	1	2
12 (a)	Explain the principle and process of generalized stone dusting. Explain the characteristics of a suitable dust and its method of application.	13	2	2
	OR			
12 (b)	Briefly explain the factors leading to the development of a coal dust explosion. Explain with a neat diagram the design, installation and functioning of stone dust barrier of German design.	13	2	2

13 (a)	What is a hydraulic seal/water dam? Explain the various designs with diagrams. (at least 4 types)	13	3	2
	OR			
13 (b)	Explain with neat diagrams, the installation and operation of bulk head doors and the various methods of dewatering flooded underground mines.	13	3	2
14 (a)	What are gas masks? With neat diagrams, explain their principle of operation, design features and their limitations. List the general requirements of a self-contained breathing apparatus.	13	4	2
	OR			
14 (b)	Explain in detail the rescue organization in mines. (Answer must include rescue stations, their objectives, required apparatus and equipment, mine rescue plans and mine emergency notification plans)	13	4	2
15 (a)	With neat diagrams, explain the various types of cap lamps. (Answer must include principle, design, chemical equations, working, usage with neat labeled diagrams)	13	5	2
	OR			
15 (b)	What is a coal stack fire? Explain the basic designs for extinguishing such type of fires. How is the prevention and fighting of coal refuse fires done?	13	1	2

PART- C (1x 15 = 15 Marks)

Q.No.	Questions	Marks	CO	BL
16.	A coal seam of 3m thickness at a depth of 200m is worked by two bord and pillar panels (A and B), having the prescribed barrier dimensions and separations. Panel A is a depillaring panel and is abandoned due to a fire. Mining is to be freshly started in panel B. Explain the design, construction and sealing of panel A with temporary/permanent stoppings, with various features to monitor the pressure and sample gases periodically. Having dealt with fire in panel A, how effectively panel B can be mined, without the danger of fire. (Answer must include the applicability of regulations for panels A and B.)	15	1	5