MID-SEMESTER EXAMINATION

Examination: 6th Sem B.Tech. (Mining Engineering)

Session: 2023-2024 **Semester**: Winter

Subject: Coal Mine Methane Recovery and Utilization (MNO304)

Time: 2 hrs **Max. Mark**: 32

Instructions: *Answer ALL questions*

Q.No.	*Question*	*Marks*
1.	With the help of a diagram, explain the utilization of ventilation air methane for the generation of electricity using Hybrid Coal Gasification Technology.	8
2	Explain how you would obtain the methane emission factors and the methane emission from both surface and underground mines?	4+4
3	With the help of diagrams, describe any two technologies for improving the quality of coal mine methane.	4+4
4	With the help of diagrams, describe the formation of coalbed methane and the different phases of methane movement in coal.	3+5

END

CLASS: VI Semester, **B. Tech, Mining Engineering**	**MID-SEMESTER EXAMINATION** **Session: 2023-2024**
SEMESTER: Winter Semester	**TOTAL MARKS: 32, TIME: 2 Hours**
SUBJECT: **Mine Automation and Data Analytics**	**COURSE CODE:** **MNC 305**
Answer all questions	
The use of diagrams, flowcharts, and figures is mandatory in all answers	

Q.1	Describe the mining automation maturity model with different stages.	5
Q.2	Brief about the role of the control system in the mine automation with example.	5
Q.3	Explain the system required for an autonomous drilling system to be deployed in an open-pit coal mine.	5
Q.4	Assume that you are a manager of a large open-pit iron ore mine and your management decided to use a robust fleet management system for material handling. Then detail here the aims and objectives of the system along with its advantages.	5
Q.5	Explain the type of machinery maintenance required in an autonomous system and its fundamental steps for maintenance improvement.	4
Q.6	Explain the concept of parallel mines.	4
Q.7	What are the roles of robotics in the mining industry?	4

Department of Mining Engineering
Indian Institute of Technology (Indian School of Mines), Dhanbad

Mid Semester Examination
Programme: VI B.Tech
Subject: Mine Legislation and Safety (MNC 304)

Session: 2023 – 2024 (Winter)
Full Marks: 64
Time: 2 hours

Answer all the questions

1. State the provisions of the followings as per 'The Mines Act, 1952':
   (a) Constitution of Section 12 Committee
   (b) Function of Section 12 Committee
   (c) Power to be exercised by the Section 12 Committee. (6+5+5)

2. State the provisions laid down in the CMR 2017 regarding the followings:
   (a) Notice of abandonment, closure or discontinuance,
   (b) Duties and responsibilities of mine manager. (6+10)

3. An opencast coal mine is having average annual output of 1.2 million tonnes of coal. The average overburden materials are need to be handled per year is 5.4 million m^3. The aggregate power of all the machinery used in the mine is 8250 KW. The electrical energy of 1100 volts is used and the installed capacity of all electrical equipment is 8.5 MVA. State and justify according to CMR 2017, the number and qualifications required of Manager, Assistant manager, Safety officer, Surveyor and Engineer of the mine. [The density of coal is 1346 Kg/m^3 (approx.)] [20]

4. State the provisions to be complied as per CMR, 2017 while designing "Haulage Roadways" in underground coal mines (12)

Indian Institute of Technology (Indian School of Mines), Dhanbad
DEPARTMENT OF MINING ENGINEERING

MID-SEMESTER EXAMINATION

Examination: (B.Tech. VIII ME) Semester: Winter Session: 2023-24

Subject: Underground Space Technology (MND407)

Duration: 2 Hours. Max. Marks: 32

Instructions: Make suitable assumptions wherever required. Sketches fetch full marks.

Answer any 8 questions. Be brief and to the point.

Sl. No.	Question	Marks
1	Why underground space creation has gained popularity? State a few underground space applications.	2+2
2	Natural caves provide a good learning for creating underground spaces. Justify this statement with two natural cave examples from India.	2+2
3	Cost of a tunneling is a key factor. Justify this statement. State a typical expression for arriving at cost of constructing a tunnel.	2+2
4	Draw the sectional layout of a hydel project, label the key facilities with their purpose.	4
5	State the engineering requirements of LPG storage underground with key features of the project. What is hydrodynamic confinement and how is it implemented?	2+2
6	Why geo-engineering investigations are important? State the factors that need consideration for fixing the intensity of investigations.	2+2
7	Write in short the purpose of the following with respect to geo-engineering investigations naming a few techniques.: a) Topographical survey b) Geological survey c) Triaxial strength of rock d) Geophysical techniques	4
8	It is proposed to locate a cavern of a hydel project in a hilly topography. Explain the same with respect to location, size, shape, Orientation considering the long-term stability.	4
9	Explain the lake tapping method in a hydel project. Draw a blasting scheme for plug blasting.	2+2
10	It is proposed to design a support system for cavern wall and roof of the following cavern dimension: Span: 30 m; Wall Height: 60 m; Length: 300m; Q value: 10; ESR: 1 Design suitable support system for wall and roof utilizing the graphs provided.	4