

Course Name : 03 Years Diploma in Mining Engineering

Year : First

Subject Title : Elements of Mining Technology

Subject Code : M109/M116

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
02			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

The student of first year of Mining & Mine surveying must be aware of the Mineral Industry in the country and the Departments, which deal with mineral exploration, exploitation, safety, conservation and control of the mining industry. All technical definitions and terminologies connected with above are included here, as the students at this stage must be acquainted with these to cope up with the contents at later stage. Blasting is an important operation in all the mining operations. Knowledge of all the types of explosive, their properties and selection for different conditions/situation types of detonator/fuses etc is a must for them. Also it is essential for a mining engineer to understand systems of support of the mine workings. These all aspects have been included in the subject.

OBJECTIVES:

After undergoing the course of study the student shall be able to

1. State the various organizations engaged in coal and noncoal mining, their role and functions.
2. Understand various technical terms, operations involved in coal & noncoal mining.
3. Understand properties of explosives, procedure of conducting shot firing operation in underground coalmines with due regards to safety.
4. Understand the procedure of erection of temporary supports in underground coalmines.
5. State the major method of extraction of coal used in underground coal mines, their conditions of applicability.

DETAILED CONTENTS:

UNIT	CONTENTS	HOURS	MARKS
1.	Introduction to Mineral & Important Mining Organizations 1.1 Definition of minerals. 1.2 Uses of important minerals mined e.g. Coal, Iron ore, copper, zinc, bauxite, gold, manganese, mica, uranium etc. 1.3 Important Organizations involved like DGMS, IBM, GSI, CIL, MECL, CIMFR, CMPDIL etc their role and functions.	10	12
2.	Mining Terminology & Definition. 2.1 Common terminologies used in coal mining. 2.2 Common terminologies used in metal mining. 2.3 Common terminologies used in mine ventilation and environment. 2.4 Common terminologies used in mine supports. Simple definition, explanation, purposes and sketches.	08	10
3.	Explosives & Accessories 3.1 Common explosive bases, Properties of Explosives, High Explosive & Low explosive, their comparison. 3.2 Permitted explosives their types, composition, properties, uses, advantages & disadvantages. Brand names of some commonly used explosive of each type. 3.3 A detonator, common types of detonators, plain detonators, instantaneous and delay action detonators their construction, uses, comparison etc. low tension & high-tension detonators. 3.4 Safety fuses, detonating cords, detonating relays. 3.5 Exploders	12	16

CHAPTER	CONTENTS	Marks	Hrs
4.	<p>Shot Firing</p> <p>4.1 Drilling patterns for shot firing on machine cut face, in stone drift etc.</p> <p>4.2 Shot Firing tools</p> <p>4.3 Face preparation for shot firing,</p> <p>4.4 Preparation of priming charge, charging of hole in coal and rock in under ground working only, Direct and inverse initiation, shot firing circuits, procedure of shot firing of holes in gassy mine, precautions. Simultaneous & delay firing.</p> <p>4.4 Solid blasting, conditions to be satisfied before doing solid blasting, advantages of solid blasting, drilling patterns used with solid blasting</p>	10	16
5.	<p>Safety in Shot firing operation.</p> <p>5.1 Explosive required for blasting in coal/rock. Powder factor, detonator factor.</p> <p>5.2 Precaution to improve blasting results.</p> <p>5.3 Misfires, causes, remedy and method of relieving dealing with misfires, blown out shots, blown through shots causes and precautions.</p> <p>5.4 Purpose of stemming, Stemming materials used for shot firing, water ampoules for stemming.</p> <p>5.5 Storage of explosives, Magazines</p> <p>5.6 Disposal of outdated explosives.</p>	10	12
6.	<p>Introduction to coal mining method</p> <p>6.1 Classifications of method of working</p> <p>6.1.1 Board & Pillar</p> <p>6.1.2 Open cast method.</p> <p>6.1.3 Long wall.</p> <p>6.2 Applicability condition for selection of each methods of working. Layout of each method.</p> <p>6.3 Advantages & disadvantages</p>	10	14
	Total	60	80

LIST OF PRACTICAL

1. Errection of prop support At the face and incline road Ways.
2. Settings of cog support at junctions.
3. Setting of Cross Bar in the gallery.
4. Withdrawal of supports by Using Sylvester machine.
5. Demonstration of different Types of permitted Explosives Cartridges.
6. Demonstration of Instantaneous Electric Detonator

7. Demonstration of delay Detonator used for Shot firing in underground Mines.
8. Demonstration of shot Firing tools.
9. Demonstration of single Shot and multi shot exploder.
10. Study of different Drill hole patterns used For blasting in stone drifts
11. Demonstration of Preparation of Priming Cartridge.
12. Demonstration of methods of Charging of holes (Direct & Inverse initiation) for Blasting in underground Mines.
13. Demonstration of various Shot firing circuits.
14. Detection of misfire Shot and dealing with The misfire.
15. Sketch and Specifications Of explosive magazine

REFERENCE:

Author	Title	Year of Publication	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	1996	Mintech publication Bhubaneshwar.
S.K. Das	Explosives and Blasting Techniques	1993	Lovely prakashan Dhanbad.
D.J. Deshmukh	Mining Technology Vol.- I	1995	Central techno publication, Nagpur