22376

12425

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define Lumens and state its formula.

(b) Define Resuscitation.

(c) State Le-Chatelier's formula.

(d) Define ignition point in firedamp explosion. State the ignition point temperature of flammable firedamp air mixture.

(e) Enlist different types of Barriers to prevent coal dust explosion.

(f) State the locations where fire extinguishers have to be provided.

(g) Explain the stages of spontaneous heating.

2. Attempt any THREE of the following : **12**

(a) Describe the sensory indications of spontaneous heating.

(b) Enlist different types of temporary stoppings.

(c) With a neat sketch, interpret the behaviour of gases in a sealed off area.

(d) The percentages of various gases in the return air of a normally working mine are as follows :

Oxygen	-	19.95
Nitrogen	-	78.72
Methane	-	0.93
Carbon dioxide	-	0.39
Carbon monoxide	-	0.005

Calculate CO/O_2 deficiency and CO_2/O_2 deficiency ratio.

Assume the atmospheric air which goes down the mine, the percentage of Oxygen is 20.93%, Nitrogen (including inert gases) is 79.04% and of CO_2 is 0.03%.

3. Attempt any THREE of the following : **12**

(a) Explain the preventive measures for firedamp explosion.

(b) State the desirable qualities of a Stonedust. Explain the working of a Stonedust barrier.

(c) Explain any two methods of a sampling from behind the sealed off area.

(d) Explain Graham's Ratio. Enlist different methods of reopening of a sealed off area.

4. Attempt any THREE of the following : **12**

(a) Elaborate surface causes of inundation and its preventive measures.

(b) With a neat sketch, explain the working of a chemical oxygen self rescuer.

(c) Compare firedamp explosion with coaldust explosion.

(d) Explain the construction and working of a Bulkhead door.

(e) Describe the standards of lighting in underground and opencast mining.

5. Attempt any TWO of the following : **12**

(a) State and explain the factors affecting the mechanism of spontaneous heating.

(b) Describe the working of a chemical and air foam extinguisher with a neat sketch.

(c) Explain the factors to be considered before selecting a method of reopening of a sealed off area.

6. Attempt any TWO of the following : **12**

(a) Explain the working of a self contained compressed oxygen breathing apparatus with a neat sketch.

(b) Enlist different methods of resuscitation and explain any two methods of it.

(c) Define inflammability of a coal dust. Enlist and explain factors on which inflammability of a coal dust depends.
