

22380

23124

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) State any four factors which affects the choice of surface mining method.
 - b) Enlist the various factors on which the number of entries to surface mine depends.
 - c) Give the classification of surface mining machinery.
 - d) Define explosive and enlist their ingredients.
 - e) Describe the need of proper blasts design in a surface mining production cycle.
 - f) Define circular failure in the dump slopes of surface mines.
 - g) Enlist the various safety devices used in productive drill machines.

P.T.O.

- 2. Attempt any THREE of the following: 12**
- a) Describe the statutory provisions regarding width of bench.
 - b) Explain the opening up of open pits with a neat sketch.
 - c) Compare ANFO with Heavy ANFO on the basis of its properties and strength.
 - d) Describe site mix slurry/emulsion with its advantages and disadvantages.
- 3. Attempt any THREE of the following: 12**
- a) Explain the operation of percussive productive drill machine.
 - b) Compare power shovel with dragline from its operational and maintenance point of view.
 - c) Describe the two methods of secondary blasting technique with schematics.
 - d) Explain the needs of controlled blasting technique and explain any one method of controlled blasting.
 - e) Explain how the electronic detonator initiates an explosive charge in a blasthole.
- 4. Attempt any THREE of the following: 12**
- a) Explain how to control the flyrock problem in a surface mine.
 - b) Explain the operation of backhoe excavator with a line sketch.
 - c) Describe the general safety measure for surface mining blasting practice.
 - d) Explain the following elements of benches with a neat sketch:
 - i) Crest of bench
 - ii) toe of bench
 - iii) bench slope angle
 - iv) Ultimate pit slope angle.

- 5. Attempt any TWO of the following:** **12**
- a) Justify the operation of extended bench overcasting by dragline using a neat sketch.
 - b) Summarize the various precautionary measures regarding transport of explosives in bulk so that utmost safety standard can be achieved.
 - c) Illustrate the working and operation of surface mines along with its figure.
- 6. Attempt any TWO of the following:** **12**
- a) Describe why in-pit crushing system received the bulk of attention and also explain the two types of in-pit crushing.
 - b) Design a blast for following given condition:
Bench height = 8 m, Diameter of blasthole = 152 mm,
Width of face = 12 to 15 m; Length of face = 72 to 75 m;
Type of rock = limestone; Explosive = slurry.
Assume suitable data if necessary.
 - c) Solve the following:
A project of limestone mine, having a specific gravity of 2.65, is to produce 4.5 million tons of ore per year. It has to remove 10% of waste. Calculate
 - i) Number of blasthole drills (160 mm) with 60 m/shift of drilling.
 - ii) Hydraulic shovels of 4m³ capacity with 35 tons of rear dumper.

iii) Dumpers required for 1.5 km haul distance to crushing plant.

Following are the assumption:

Cycle time of shovel = $t_c = 30$ sec.

One round of trip of dumper = 15 min

Availability of drills = 70%

Availability of shovels = 75%

Availability of dumpers = 65%

260 working days in a year.

6 days per week.

3 shift working and 5.5 hours per shift production.

Daily maintenance will be in between breaks and weekly maintenance 1 day per week.

Assume suitable data, if necessary.
