

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

Subject Code:3172213

Date:20-11-2025

Subject Name:Rock Fragmentation

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed

Marks

Q.1 (a)	What do you understand by mechanized drilling?	03
(b)	Discuss the principle and operation of “jack hammer” drill machine.	04
(c)	Explain the following terms with neat sketch: (a) Rotary drilling (b) Percussive drilling (c) Rotary-percussive	07
Q.2 (a)	Name the Factors influencing selection of drill.	03
(b)	What do you mean by penetration rate? Explain with one example.	04
(c)	Describe the properties of explosive in detail.	07
OR		
(c)	Explain detonators and its types with neat sketch.	07
Q.3 (a)	Define explosive. Also name the composition of explosive.	03
(b)	Write a note on wagon drill machine?	04
(c)	Explain burden, spacing and stemming with one example.	07
OR		
(a)	Name the types of permitted explosive.	03
(b)	What do you understand by Nonel and detonating relay?	04
(c)	Enumerate the blast design pattern using in surface mine with neat sketch.	07
Q.4 (a)	Write a short note on VOD probe.	03
(b)	Compare between the term slurry and emulsion explosive in detail.	04
(c)	Discuss the mechanism of rock breakage by percussive drilling with neat sketch.	07
OR		
(a)	State the application of image analysis technique in mining? Also name the software used for the same.	03
(b)	Compare the top hammer (TH) drill machine with down the hole hammer (DTH).	04

- (c) Bench height including subgrade drilling = 10 m 07
Burden = 4 m
Spacing = 5 m
Subgrade drilling = 1 m
Stemming length = 3 m
If the diameter of the hole is 200 mm and density of explosive and rock is 0.9 tonne/m³ and 2 tonne/m³ respectively. Calculate the powder factor in tonne/kg.

- Q.5** (a) Differentiate between low explosive & high explosive with suitable examples. 03
(b) Explain the types of secondary blasting. 04
(c) Relative weight strength of an unknown explosive is 1.5 times of ANFO in jules/gm. Absolute strength of TNT is 4000 jules/gm. TNT has relative bulk strength of 3 times of the ANFO in jules/cm³. If the specific gravity or density of ANFO, TNT and unknown explosive 0.9, 1.5 and 1.2 respectively. Determine the absolute strength of unknown explosive in jules/gm and jules/cm³. 07

OR

- (a) Write the application and importance of high speed video camera in mining. 03
(b) Discuss the Impact of ground vibration and air blast on the neighboring structures and communities. 04
(c) What do you understand by control blasting method? Explain any two method of control blasting in detail. 07
