Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3162211 **Date: 01/06/2026**

Subject Name: Drilling Blasting Technology

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.**

Q.1	**(a)**	Enumerate the various drilling techniques employed in rock excavation.	**03**
	(b)	Describe the operating principle of rotary-percussive drilling systems.	**04**
	(c)	A drilling operation breaks 120 m^3 of rock in an 8-hour shift. Determine the drilling rate in m^3/hr and comment on its efficiency.	**07**
Q.2	**(a)**	What is meant by core recovery in drilling?	**03**
	(b)	Describe the different methods used in exploratory drilling.	**04**
	(c)	A borehole of length 75 m yields 54 m of core. Calculate the percentage core recovery and comment on its quality.	**07**
		OR	
Q.2	**(c)**	Explain how borehole data is interpreted for geological analysis.	**07**
Q.3	**(a)**	Define explosives and state their key characteristics.	**03**
	(b)	Explain the types of detonators and their practical applications.	**04**
	(c)	A blast uses 150 kg explosive to break 300 m^3 of rock. If rock density is 2.6 t/m^3, calculate: (i) powder factor (kg/tonne) (ii) specific charge (kg/m^3).	**07**
		OR	
Q.3	**(a)**	What is detonation velocity?	**03**
	(b)	Describe the NONEL initiation system used in blasting.	**04**
	(c)	Examine the factors influencing the selection of suitable explosives under varying mining conditions.	**07**
Q.4	**(a)**	Define the terms burden and spacing in blasting practice.	**03**
	(b)	Explain Livingstone's crater theory related to blasting.	**04**
	(c)	A bench of height 12 m has burden = 3.5 m and spacing = 4.5 m. If powder factor required is 0.6 kg/m^3, Determine: (i) Volume of rock broken per hole (ii) Charge required per hole	**07**
		OR	
Q.4	**(a)**	What is specific charge in blasting?	**03**
	(b)	Explain the parameters that affect the efficiency of blasting operations.	**04**

(c) Assess the effects of blasting-induced ground vibration and air overpressure on surrounding structures and environment. **07**

Q.5 **(a)** Define blasting cut in underground excavation. **03**

(b) Describe various types of cuts used in underground blasting operations. **04**

(c) In a tunneling blast, 50 holes of 2.5 m depth each are drilled. Total explosive used is 125 kg and rock broken is 200 tonnes. Determine: **07**
(i) Total drilling (m)
(ii) Specific drilling (m/tonne)
(iii) Powder factor (kg/tonne)

OR

Q.5 **(a)** Define detonator factor. **03**

(b) Explain the long-hole blasting method. **04**

(c) Analyze the existing blasting practices in underground metal mines and propose suitable improvements. **07**

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