

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 4 – EXAMINATION – SUMMER 2026

Subject Code: BE04022051

Date: 02/06/2026

Subject Name: Mining Geology - II

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)** Draw a neat, labeled sketch of a simple geological fault, clearly identifying the dip and strike. **03**
 - (b)** Describe the tabular classification framework used to categorize igneous rocks. **04**
 - (c)** Describe the tectonic and geomorphic evolution of northern India: Detail the geological origin of the Himalayas, the Indo-Gangetic Alluvium, and the Thar Desert. **07**
- Q.2**
- (a)** Define the term 'Schistosity' and briefly state how it develops in metamorphic rocks. **03**
 - (b)** Explain how the cooling history of an igneous rock determines its resulting texture and structures. **04**
 - (c)** Provide a comprehensive classification of volcanoes. Detail their structures, types of products ejected, and global distribution using neat, labeled diagrams. **07**
- OR
- Q.2**
- (c)** Elaborate on the process of metamorphism: Discuss its types and agents, explain the development of metamorphic textures **07**
- Q.3**
- (a)** Classify mountains based on their genesis and outline the distribution of any one type **03**
 - (b)** Explain the distribution of the different Seismic-zones of India based on regional risk levels. **04**
 - (c)** Write a detailed account of sedimentary geology: Explain the formation of sedimentary structures, and elaborate on the distinct characteristics of sandstone, shale, and limestone. **07**
- OR
- Q.3**
- (a)** Differentiate between Conglomerate and Breccia based on their textural features. **03**
 - (b)** Describe the petrological characteristics, mineral composition, and texture of Basalt. **04**
 - (c)** Explain the crystallization process of magma. Contrast the behaviors of uni-component and bi-component systems using appropriate phase equilibrium diagrams. **07**
- Q.4**
- (a)** Define earthquake magnitude and intensity, highlighting the primary difference in how they are measured. **03**
 - (b)** Explain multi-generation folding using a neat, illustrative structural diagram. **04**
 - (c)** Evaluate how the texture, structure, and physical properties of igneous, sedimentary, and metamorphic rocks directly dictate economical rock excavation and mine planning. **07**
- OR

- Q.4**
- (a)** State the major geological hazards commonly encountered during tunnel excavation. **03**
 - (b)** Discuss the stratigraphic importance and predominant rock types of the Gondwana Supergroup. **04**
 - (c)** Analyze how structural weaknesses like multi-generation folds, active fault lines, and intensive joints affect tunnel stability. Explain the site selection criteria used to bypass these hazards. **07**

- Q.5**
- (a)** List the primary agents responsible for causing rock metamorphism. **03**
 - (b)** Compare and contrast the distinctive physical characteristics and textures of Gneiss and Slate. **04**
 - (c)** Write an extensive essay on the Phanerozoic Stratigraphy of India, focusing on the geological characteristics of the Siwalik Supergroup and the Mesozoic successions of Gujarat. **07**

OR

- Q.5**
- (a)** Sketch a neat, labeled diagram showing the basic parts of a geological fold. **03**
 - (b)** Explain the geological concepts of metamorphic facies and metamorphic grade. **04**
 - (c)** Discuss the civil and mining engineering challenges of dam construction: Detail the essential geological investigations required and the preventive measures used against reservoir-associated landslides. **07**
