

**INSTITUTE OF AERONAUTICAL ENGINEERING**

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech III SEMESTER END EXAMINATIONS (REGULAR/ SUPPLEMENTARY) - FEBRUARY 2024

Regulation: UG20

ENGINEERING GEOLOGY

Time: 3 Hours

(CIVIL ENGINEERING)

Max Marks: 70

Answer ALL questions in Module I and II

Answer ONE out of two questions in Modules III, IV and V

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

MODULE – I

1. (a) Explain the significance of physical geology, petrology, and structural geology in civil engineering.
[BL: Understand| CO: 1|Marks: 7]
- (b) Illustrate how geological surveys aid in predicting and addressing potential hazards in tunnel constructions.
[BL: Understand| CO: 1|Marks: 7]

MODULE – II

2. (a) Explore the definition of minerals and elaborate on the importance of studying minerals.
[BL: Understand| CO: 2|Marks: 7]
- (b) Discuss various methods employed in the study of minerals and specifically highlight the advantages of utilizing physical properties in identifying and categorizing minerals.
[BL: Understand| CO: 2|Marks: 7]

MODULE – III

3. (a) Mention the significance of Indian stratigraphy, paleontology, and the geological time scale in understanding the geological history of the region. [BL: Understand| CO: 3|Marks: 7]
- (b) Outline the importance of studying outcrop, strike, and dip in relation to common geological structures like folds, faults, unconformities, and joint types. [BL: Understand| CO: 3|Marks: 7]
4. (a) Discuss measures that can be implemented to prevent or mitigate the impact of earthquakes and landslides in susceptible areas. [BL: Understand| CO: 4|Marks: 7]
- (b) Describe the distinctive features of igneous, sedimentary, and metamorphic rocks, elaborating on their formation processes, mineral compositions, and engineering applications.
[BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Provide a detailed explanation of how grouting and other techniques can be employed to improve the geological competence of dam sites? [BL: Understand| CO: 5|Marks: 7]
- (b) Write the fundamental principles of environmental geology and how they are applied in the planning and construction of dams? [BL: Understand| CO: 5|Marks: 7].

6. (a) Develop a proactive plan for mitigating geo-hazards in dam construction projects. [BL: Understand| CO: 5|Marks: 7]
- (b) Evaluate the specific advantages and limitations of electrical resistivity methods and seismic refraction methods in geophysical studies for dam site evaluation. [BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) How can geological factors be leveraged to optimize tunnel construction in rock formations, considering excavation techniques and support systems? [BL: Understand| CO: 6|Marks: 7]
- (b) Write the purpose of tunneling and delve into the geological considerations influencing the choice of tunnel alignment and design. [BL: Understand| CO: 6|Marks: 7]
8. (a) Propose measures to address subsidence challenges over old mines during tunneling projects, emphasizing geological strategies for stability. [BL: Understand| CO: 6|Marks: 7]
- (b) Discuss the effects of tunneling on the surrounding ground and detail the role of geological assessments in minimizing disruptions through proper planning and construction techniques. [BL: Understand| CO: 6|Marks: 7]

