



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad-500043

CIVIL ENGINEERING TUTORIAL QUESTION BANK

Course Title	ENGINEERING GEOLOGY			
Course Code	ACE003			
Programme	B. Tech			
Semester	III Semester			
Course Type	CORE			
Regulation	IARE-R16			
Course Structure	Lectures	Tutorials	Practical's	Credits
	5	1	-	4
Course Coordinator	Mr K Tarun kumar, Assistant Professor, Department of Civil Engineering			
Team of Instructors	Mr K Tarun kumar, Assistant Professor, Department of Civil Engineering. Mr Y Ravi kumar, Assistant Professor, Department of Civil Engineering.			

COURSE OBJECTIVES:

The course should enable the students to:

I	Know case histories of failures of civil engineering constructions due to geological drawbacks and importance of geology from civil engineering point of view.
II	Understand about structural geology, mineralogy and petrology.
III	Learn how to identify weathered minerals and rocks.
IV	Identify the minerals based on their physical properties

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

CACE003.01	Know the importance of geology in civil engineering.
CACE003.02	Distinguish weathered rocks from fresh rocks.
CACE003.03	Understand the effects of weathering on dams, reservoirs and tunnels.
CACE003.04	Understand the case histories of failure of some Civil Engineering constructions due to geological draw backs. Identify the minerals based on their physical properties.
CACE003.05	Identify and classify common minerals, rocks and soils, and understand their significance to different types of engineering projects.
CACE003.06	Identify and classify rock using basic geologic classification systems
CACE003.07	Study the minerals by their physical properties, chemical composition, optical properties and X-ray properties.
CACE003.08	Study the rocks by their physical properties, chemical composition, optical properties and X-ray properties
CACE003.09	Understand the geological classification of rocks into Igneous, Sedimentary and metamorphic rocks, their identification based on structure and texture.
CACE003.10	Identify the major types of rock-forming minerals and rock under both field and laboratory conditions.
CACE003.11	Understand the importance of various associated geological structures like folds, faults, joints and unconformities present at site for foundations.
CACE003.12	Identify subsurface information and groundwater potential sites through geophysical investigations
CACE003.13	Remember prediction of hazards and disasters.

CACE003.14	Posses the Knowledge and Skills for employability and to succeed in national and international level competitive examinations.
CACE003.15	Understand to select a suitable site for dams and reservoirs to avoid seepage, silting and tilting.
CACE003.16	Understand internal geological processes (e.g. faults, earthquakes, volcanoes) and how they affect engineering studies.
CACE003.17	Locate various subsurface mines and rock bodies by applying geophysical investigations.
CACE003.18	Gravity methods, magnetic methods, Electrical methods, seismic methods, radio metric methods and geothermal methods
CACE003.19	Understanding of impact of engineering solutions on the society and also will be aware of Contemporary issues.
CACE003.20	Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels.
CACE006.21	Posses the Knowledge and Skills for employability and to succeed in national and international level competitive examinations.
CACE006.22	Determination of shear strength of soil using direct shear test and tri-axial test in various drainage conditions.
CACE006.23	Recognize the behavior of soil in normal, over and under consolidated soil. Understand the concept of dilatancy in sandy soil.

UNIT-I			
GEOLOGY FROM CIVIL ENGINEERING			
Part - A (Short Answer Questions)			
S. NO.	QUESTIONS	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
1	What is mean by engineering geology?	Remember	CACE003.01
2	Define weathering.	Remember	CACE003.02
3	Name the different types of weathering.	Remember	CACE003.04
4	List the exogenous geological agents.	Remember	CACE003.04
5	Define denudation.	Remember	CACE003.02
6	What is chemical weathering?	Remember	CACE003.01
7	Draw a neat sketch of Stages of river development.	Remember	CACE003.02
8	Define Structural Geology.	Remember	CACE003.04
9	What is physical weathering?	Remember	CACE003.01
10	Write any two importance of geology in civil engineering	Understand	CACE003.01
11	Define denudation.	Remember	CACE003.01
12	Give the example for chemical reaction in chemical weathering?	Remember	CACE003.02
13	What is Stratigraphy?	Remember	CACE003.01
14	Define the endogenous geological agents?	Remember	CACE003.04
15	List the various branches of geology.	Remember	CACE003.03
16	Define biological weathering.	Remember	CACE003.01
Part - B (Long Answer Questions)			
1	Describe the importance of Engineering Geology in Civil Engineering.	Remember	CACE003.01
2	Discuss the various branches of Engineering Geology?	Remember	CACE003.02

3	Explain briefly few case studies of civil engineering failures due to Geological drawback.	Understand	CACE003.04
4	Write short notes on weathering.	Remember	CACE003.04
5	Give the importance of physical geology & structural geology.	Remember	CACE003.02
6	What is meant by weathering of rocks? Explain in detail different Geological agents responsible for weathering of rocks.	Understand	CACE003.01
7	Describe the chemical and biological weathering.	Understand	CACE003.01
8	Explain in detail the weathering due to air & water.	Understand	CACE003.02
9	Discuss the physical weathering and frost weathering.	Understand	CACE003.04
10	“The knowledge of geology is very essential at planning stage, design stage and construction stage of any civil engineering project”. Justify this statement with a reference to a dam site selection.	Understand	CACE003.03
11	Explain physical and chemical weathering process in detail. Add a note on weathering grade and its engineering significance.	Understand	CACE003.01
12	Give an account of geological work of wind explaining briefly some major geological features.	Remember	CACE003.02
13	Describe in detail about structural geology.	Understand	CACE003.04
14	Write in detail about the scope of geology and importance of geology in Civil engineering.	Remember	CACE003.04
15	Explain the process associated with river, wind and sea. Write the engineering significance.	Understand	CACE003.02
16	Write short notes on weathering of rocks and its significance in engineering point of view.	Remember	CACE003.04

UNIT - II

MINERALOGY AND PETROLOGY

Part – A (Short Answer Questions)

1	What is mineralogy?	Remember	CACE003.05
2	Give the various types of structure in igneous rock?	Remember	CACE003.05
3	List the various physical properties of minerals.	Remember	CACE003.06
4	Write the difference between lustre and streak.	Remember	CACE003.06
5	Define Mohrs scale of hardness.	Understand	CACE003.07
6	What are the various fractures present in a mineral?	Understand	CACE003.10
7	Write any two structure of a mineral	Understand	CACE003.05
8	Define specific gravity of a mineral.	Understand	CACE003.05
9	What are the different types of clay minerals?	Understand	CACE003.11
10	List any four uses of clay minerals.	Understand	CACE003.07
11	Define Petrology.	Understand	CACE003.08
12	What is meant by Rock?	Understand	CACE003.03
13	Give the various types of rocks?	Understand	CACE003.11
14	What is meant by magma?	Understand	CACE003.08
15	Define Igneous rock?	Understand	CACE003.09
16	List the various types of igneous rock?	Understand	CACE003.11
17	What do you understand by metamorphism?	Understand	CACE003.10

Part - B (Long Answer Questions)

1	How can you identify a mineral by the help of their physical and chemical properties?	Remember	CACE003.05
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2	Add notes on the following physical characteristics that are useful for the identification of rocks and minerals. (I) Colour (ii) Streak (iii) Hardness (iv) Form	Understand	CACE003.09
3	Give a detailed account on chemical composition, Physical properties, origin occurrence, engineering behaviour and uses of Clay minerals.	Remember	CACE003.06
4	Differentiate between: a. Quartzite and Marble b. Gneiss and Schist c. Gneiss and Slate	Understand	CACE003.06
5	Describe the different types of rocks. Give the classification, texture and structure of igneous, sedimentary and metamorphic rocks.	Remember	CACE003.05
6	With the help of neat diagrammatic sketches, describe briefly on Primary Sedimentary Structures.	Understand	CACE003.05
7	Differentiate between calcite and magnetite.	Understand	CACE003.06
8	Discuss about the various properties of quartz?	Remember	CACE003.06
9	Explain the significance of different Physical properties in mineral identification.	Understand	CACE003.07
10	Discuss the physical properties of the following minerals. 1. Feldspar 2. Hornblende 3. Talc	Understand	CACE003.10
11	Define Mineral. How are the minerals classified?	Understand	CACE003.07
12	What are sedimentary rocks? Explain the properties of any 4 sedimentary rocks?	Remember	CACE003.05
13	Differentiate between Igneous, sedimentary and metamorphic rocks on the basics of structures and texture.	Remember	CACE003.11
14	Describe the engineering properties of igneous rocks.	Understand	CACE003.07
15	Explain the term Fracture and types of Fracture in detail.	Understand	CACE003.08
16	State the term Form and discuss the different types of Form in detail	Remember	CACE003.05
17	Illustrate the different methods of study of Minerals.	Understand	CACE003.06
18	Explain the physical properties of Feldspar group of Minerals.	Understand	CACE003.07
UNIT-III			
STRUCTURAL GEOLOGY			
Part - A (Short Answer Questions)			
1	Define structural geology.	Understand	CACE003.13
2.	What is Disconformity?	Understand	CACE003.12
3.	Define Non conformity	Understand	CACE003.13
4.	Classify different types of folds.	Remember	CACE003.14
5.	List out two causes of folding from civil engineering point of view.	Remember	CACE003.13
6.	Define Folds	Remember	CACE003.15
7	What are the engineering considerations of a fold?	Understand	CACE003.12
8	Write about the origin of joints.	Understand	CACE003.12
9	State the Radial faults.	Understand	CACE003.13
10	Distinguish between heave and throw fault.	Understand	CACE003.21
11	Differentiate between foot wall and hanging wall.	Understand	CACE003.12

12	Define dextral fault and sinistral fault	Understand	CACE003.13
13	Write the difference between aquifuge and aquiclues	Understand	CACE003.12
14	Define Capillary water and Connate water	Understand	CACE003.13
15	Define water logging	Understand	CACE003.14
16	Draw and describe the parts of folds.	Understand	CACE003.13
17	List the types of folds.	Understand	CACE003.12
Part - B (Long Answer Questions)			
21	Write about Geological controls on Groundwater Movement.	Remember	CACE003.12
22	Explain briefly (Illustrate your answer with neat diagrammatic sketches) a. Fold b. Fault c. Joint.	Understand	CACE003.12
23	What is a joint? Discuss the various types of faults and write about the engineering applications.	Understand	CACE003.12
24	Write in detail about landslides and their causative effects and give the about the measures to prevent them.	Remember	CACE003.15
25	Discuss thoroughly about the dip and strike.	Remember	CACE003.14
26	Describe the Civil Engineering Considerations in Seismic Areas with reference to building Construction.	Understand	CACE003.13
27	Write an essay on classification and causes of earthquakes?	Remember	CACE003.12
28	What is a fault? Discuss the various types of faults and write about the engineering applications.	Understand	CACE003.13
29	Discuss the various Groundwater movements.	Understand	CACE003.12
30	Discuss thoroughly about the types of unconformity. Classify folds and faults and explain how they influence the design of dams.	Remember	CACE003.12
31	What is a water table and what are the types of ground water which occurs in the zone of aeration and saturation.	Remember	CACE003.12
32	Discuss, in brief, the causes and effects of earthquakes. In the connection enumerate some of the major Indian earthquakes and comment on the possible mode of origin.	Understand	CACE003.12
33	What are faults? Explain in detail with sketches on (i) Normal faults (ii) Reverse faults (iii) Strike slip fault (iv) Oblique fault.	Remember	CACE003.13
34	Illustrate with neat sketches about landslides and their types. What are the various measures to control landslides?	Understand	CACE003.14
35	Explain water table and types of ground water.	Understand	CACE003.15
36	Classify different types of Aquifers and briefly explain.	Remember	CACE003.15
37	Write a note on geological investigation of ground water.	Understand	CACE003.14
38	What is cone of depression? Explain neatly with diagram.	Remember	CACE003.14
39	Explain hydrological investigation of ground water.	Understand	CACE003.13
40	What causes earthquakes?	Understand	CACE003.12
UNIT-IV			
GEOLOGY OF DAMS AND RESERVOIRS			
Part – A (Short Answer Questions)			
1.	What are dams?	Understand	CACE003.20
2.	Define reservoir.	Understand	CACE003.16

3.	Write about Gravity methods.	Understand	CACE003.19
4.	Differentiate between Dam and Reservoir and their applications	Understand	CACE003.17
5.	Brief on the structure of dam with a neat sketch.	Understand	CACE003.18
6.	Define the term dead storage in reservoir.	Understand	CACE003.17
7.	Give the application of reservoir.	Understand	CACE003.16
8.	Explain about buttress dams	Understand	CACE003.16
9.	Differentiate between arch dam and earth dam.	Understand	CACE003.16
10.	List the different type of dams.	Understand	CACE003.19
11	What is natural electric field and artificial electric field	Understand	CACE003.17
12	List out the factors contributing to the success of a reservoir.	Remember	CACE003.16
13	Give the parts of dam.	Remember	CACE003.16

Part – B (Long Answer Questions)

1	What are the geological considerations necessary in the selection of a Dam Site?	Understand	CACE003.17
2	List the instruments used in Seismic Studies. Explain any one in detail	Understand	CACE003.16
3	Discuss in detail electrical method of investigation for ground water Exploration.	Understand	CACE003.19
4	Explain in detail about Profiling?	Understand	CACE003.17
5	What are dams and reservoirs? Explain the purpose of construction of major dams and reservoirs in India.	Understand	CACE003.16
6	Discuss in detail about Seismic method.	Understand	CACE003.15
7	Explain in detail about Magnetic method?	Understand	CACE003.16
8	Describe in detail the role of electrical methods of subsurface investigation in civil engineering practice.	Understand	CACE003.19
9	Explain different kinds of gravity methods that are followed during the Investigations.	Understand	CACE003.17
10	Discuss in detail electrical method of investigation for ground water Exploration.	Understand	CACE003.16
11	Describe seismic refraction survey to be conducted for determining the Depth of bed rock.	Understand	CACE003.18
12	Write about the various electrical conductivity and resistivity Methods.	Understand	CACE003.18
13	Describe the principle of gravity method with the help of a neat Sketch. What are the different parameters measured?	Understand	CACE003.16
14	Write the short note on the following Geophysical methods. (a) Seismic methods. (b) Geothermal methods.	Understand	CACE003.17
15	Explain the considerations of different types of rocks at the dam site Construction.	Understand	CACE003.19
16	Discuss the influence of Geological Structures over Dams	Understand	CACE003.17
17	Explain the geological factors influencing water tightness and life of reservoirs and write a short note on geological considerations in the Leakage of reservoirs.	Understand	CACE003.16
18	Outline the geological causes for the failure of dams, with a few Case Histories.	Understand	CACE003.18
19	Discuss the foundation and abutment competency of rocks with reference to dams.	Remember	CACE003.18
20	What are the geological considerations necessary in the selection of Dam site?	Understand	CACE003.19

TUNNELS			
Part - A (Short Answer Questions)			
1	Define tunnelling.	Understand	CACE003.17
2	Write a short note on Lining of tunnels.	Remember	CACE003.18
3	What are the effects of tunnels?	Remember	CACE003.19
4	List the different purposes of tunnels	Understand	CACE003.17
5	Write a short note on Over break.	Understand	CACE003.18
6	Give the different kinds of rocks suitable for constructions of tunnels. Explain in briefly	Remember	CACE003.19
7	Write the importance of ground water condition	Remember	CACE003.17
8	What is Lining of tunnels	Remember	CACE003.18
9	Define diversion tunnels.	Understand	CACE003.19
10	Differentiate between pressure tunnels and diversion tunnels.	Understand	CACE003.17
11	What are public utility tunnels?	Understand	CACE003.18
12	Define Pressure tunnels?	Understand	CACE003.19
13	What is mine subsidence?	Understand	CACE003.18
14	Define underground mining?	Understand	CACE003.17
Part - B (Long Answer Questions)			
1	What is a tunnel? Explain the terms that are used in tunnels with neat Sketches. Also explain the purpose of tunnelling.	Understand	CACE003.18
2	Explain the role of litho logy and geological structures in successful tunnelling?	Understand	CACE003.19
3	Mention the deteriorating effects produced in the ground during the excavation of tunnels.	Understand	CACE003.17
4	Write a short notes on a) effects of tunnelling on the ground and b) Over break	Understand	CACE003.18
5	What is the role of Igneous and metamorphic rocks at the tunnel site?	Understand	CACE003.19
6	Define the term tunnel and give purposes of tunnelling. Discuss in detail about the role of geological consideration for proper tunnelling.	Understand	CACE003.17
7	What are the effects on Inclined beds of tilted Strata at the tunnel site?	Understand	CACE003.18
8	Differentiate between tunnels and underground excavation. Discuss the purpose of tunnelling.	Understand	CACE003.17
9	Illustrate the standard methods for the selection of suitable tunnel?	Understand	CACE003.18
10	Explain the influences of the associated geological structures for Tunnelling.	Understand	CACE003.19
11	Write on the influence of ground water conditions for successful tunnels?	Understand	CACE003.17
12	Discuss the importance of subsurface geological conditions which Influences the tunnel alignment with suitable examples.	Understand	CACE003.18
13	Describe the various geological factors to be considered for the Construction of tunnels? Explain in detail with examples.	Understand	CACE003.18
14	Explain how the study of bed rocks is essential before the Construction of tunnels.	Understand	CACE003.17
15	What is meant by lining in tunnels? Discuss the litho logical and Structural reasons that necessitate lining.	Understand	CACE003.19

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