

ENGINEERING GEOLOGY

IMPORTANT QUESTIONS

UNIT- I

Short Questions:

1. What are the Geological Considerations necessary in the selection of a Dam Site?
2. Explain the importance of physical, structural geology & petrology in civil Engineering?
3. Explain the weathering properties for different types of rocks?
4. Define Engineering Geology? How the geological drawbacks play a major role in construction failures?
5. Explain the geological causes for failure dams Quote a few case histories.

Essay Questions:

1. Explain what is weathering and its importance in civil engineering constructions?
2. Explain some of the failures of civil engineering structures due to geological drawbacks?
3. Explain some of the physical properties of rock or a mineral and why they are useful for civil engineer?
4. Explain the branches of geology in detail?

Objective Questions:

Q.1: Geochemical prospecting is concerned primarily with the examination of the

- (a) Rocks and waters.
- (b) Waters and gases.
- (c) Rocks only.
- (d) Rocks, waters and gases.

Q.2: Lead and iron are immobile in:

- (a) Siliceous environment.
- (b) Calcareous environment.
- (c) Both (a) and (b).
- (d) None of these.

Q.3: The pathfinder element of gold is

- (a) As.
- (b) Se.
- (c) Mo.
- (d) So₄

Q4: The amount of a particular element present in the parent rock not affected by Dispersion or migration is known as:

- (a) Anomaly.
- (b) Threshold.
- (c) Background value.
- (d) None of these.

Q.5: Sampling is done:

- (a) Parallel to the strike of the ore body.
- (b) Across the strike of the ore body.
- (c) Diagonal to the strike of the ore body.
- (d) In any possible direction.

Q.6: The Baramulla tree (cat stemma commune) is a valuable indicator for:

- (a) Fe.
- (b) Cu-Mo.
- (c) U.
- (d) Mn-Fe.

Q.7: In a virgin area where copper is expected, which method is used to start prospecting:

- (a) Geobotanical.
- (b) Geophysical.
- (c) Geochemical.
- (d) Drilling

Q.8: Drilling process is employed in mining and geological work for :

- (a) Prospecting.
- (b) Exploration.
- (C) Blasting and during exploitation for development.
- (d) All the above.

Q.9 : Cable tool drill is a version of the

- (a) Hand drill.
- (D) Churn drill.
- (C) Empire drill.
- (d) Diamond drill

Q.10 : Which type of clay is used as a drilling mud :

- (a) China clay.
- (b) Fullers earth.
- (c) Bentonite clay.
- (d) Fire clay.

UNIT- II

Short Questions:

1. Discuss the chemical composition, structure, mode of formation, physical properties of any four minerals

- (a) Quartz
- (b) Feldspar
- (c) Mica
- (d) Augite
- (e) Hornblende
- (f) Garnet.

2.(a) Differentiate the following:

- i. Rock forming and ore minerals
- ii. Felsic and Mafic Minerals
- iii. Mineralogy and Crystallography
- iv. Streak and Cleavage.

(b) Discuss Chemical composition physical properties, occurrence varieties and uses of varieties quartz

3. (a) Discuss briefly on mode of formation of Minerals.

(b) Define the following:

- i. Isomorphism
- ii. Polymorphism
- iii. Pseudomorphism

4. Write the physical properties, chemical composition, atomic structure and uses of the following minerals

- (a) Chromite.
- (b) Hornblende.
- (c) Augite.
- (d) Asbestos.

5. Write short note on the following:

- (a) Mohr's Scale of hardness with examples

Essay Questions:

1. Compare and contrast the following pairs:
 - (a) Lava and Magma
 - (b) Sills and Dykes
 - (c) Plutonic and Volcanic rocks..
2. Give an account of different types of rocks among igneous, sedimentary and meta-metamorphic groups which occur more frequently and abundantly in nature. Add a note on rock cycle.
3. a) Define Dyke ? Explain different types of dykes with neat sketches ?
b) Explain textures of igneous and metamorphic rocks ?
4. Explain the cata elastic, porphyroclastic, maculose structures in rocks with neat sketches ?
- 5 Write short notes on the following:
 - (a) Graphic texture
 - (b) Porphyritic texture
 - (c) Progressive metamorphism
 - (d) Ripple marks.

Objective Questions:

Q.1: Which metal is the most mobile, from the dispersion of ions in relation to ore deposits?

Point of view:

- (a) Copper.
- (b) Lead.
- (c) Zirconium.
- (d) Silver.

Q.2: Match the following:

- | | |
|---------------|------------------|
| I (Deposits) | II (Pathfinders) |
| 1. Copper. | i. Arsenic. |
| 2. Gold. | ii. Mercury. |
| 3. Silver. | iii. Molybdenum |
| 4. Lead-zinc. | iv. Antimony. |
- (a) 1-ii, 2-iii, a-iv, 4-i.
(b) 1-iii, 2-i, 3-iv, 4-ii.
(c) 1-i, 2-ii, 3-iii, 4-iv.
(d) 1-iii, 2-ii, 3-i, 4- ii.

Q.3: High magnitude of anomalous elements in a particular area is called:

- (a) Anomaly.
- (b) Background value.
- (c) Threshold value.
- (d) Excessive value.

Q.4 : Liquid mercury is found in :

- (a) Sphalerite only.
- (b) Galena only.
- (c) Both Sphalerite and galena.
- (d) Copper and iron.

Q.5: Abnormal number of chromosomes in nuclei of plant cells, unusual shape .of fruit, Startle apetalousiand stalked leaf rosette, Indicate:

- (a) Al deposits.
- (b) Cu deposits.
- (c) U deposits.
- (d) Fe deposits.

Q.6: Which one is the main constituent of gaseous formations of petroleum?

- (a) Methane.
- (b) Ethane.
- (c) Propane.
- (d) Butane.

Q.7 : Biogeochemical method of exploration include the:

- (a) Chemical analysis of elements in vegetation.
- (b) Chemical analysis of underlying soils.
- (c) Chemical analysis of elements in vegetation and its underlying soils.
- (d) Analysis of biological characters of the soil.

UNIT- III

Short Questions:

1. (a) Write an essay on the Geological time scale
(b) Explain the principles of stratigraphy.
2. Explain how the unconformities are formed with neat sketch. What is their Importance from Civil Engineering of view?
- 3 .a) Explain the following types of faults
 - i) Dip – slip
 - ii) Reverse fault
 - iii) Oblique slip fault
 b) Explain the criteria for the identification of fault?
4. Write short notes on the following with sketches.
 - (a) Fan Fold.
 - (b) Columnar joints
 - (c) Angular unconformity
 - (d) Radial faults
5. Distinguish between normal fault and reverse fault. What is the role of faults in the selection of sites for dams, reservoirs, tunnels, Quarrying, roads and railway tracks along hill slopes?

Essay Questions:

1. (a) What is meant by earthquake? What are the effects of earthquakes?
(b) What are the precautionary measures taken in the construction of buildings?
in earthquake prone zones?
- 2.a) what is meant by earthquake? What are the effects of earthquakes?
b) What are the precautionary measures taken in the construction of buildings in earthquake prone zones?
3. Describe with a neat sketch the different types of sub-surface water? Brief explain the terms `Drawdown' and `Cone of depression .
4. Describe the Groundwater Exploration?
5. What are Landslides? Describe the Causes and effects of Landslides. Add a note on their preventative measures.

Objective Questions:

Q.1 : Churn drill is a type of :

- (a) Percussion drilling.
- (b) Rotary drilling.
- (c) Jet drilling.
- (d) None of these.

Q.2 : The purpose of the mud employed during drilling operation is /are :

- (a) To seal any water bearing formation.
- (b) To prevent the bore hole walls from collapsing.
- (c) To keep cool the drilling bit.
- (d) All the above are correct.

Q.3: The 'Sulekere series' of shimoga belt is equivalent to:

- a) Upper Dharwar
- b) Middle Dharwar
- c) Lower Dharwar
- d) None of these.

Q.3: The 'Billi Rhyolite' belongs to:

- 3) Kairagarh group
- b) Nandgaon group
- c) Sakoli group
- d) Sensor group

Q.4: The Mansar Formation, belongs to:

- a) Amga on group
- b) Chilpi group
- c) Sakoli group
- d) Saucer group

Q.5: 'Ranthambhor quartzite' belongs to:

- (a) Delhi system
- (b) Raialo system
- (c) Aravali system
- (d) Bundelkhand gneiss

Q.6: Match the correct one:

- | I | II |
|--------------------------|-------------------|
| 1. Alwar series | i) Raialo series |
| 2. Bhagwanpura limestone | ii) Aravallis |
| 3. Binota shales | iii) Delhi system |
| 4. Semri series | iv) Vindhyan. |
- a) 1-ii, 2-iv, 3-i, 4-iii
 - b) 1-i, 2-iv, 3-iii, 4-ii
 - c) 1-iii, 2-i, 3-ii, 4-iv

Q.7: The Dalma and Dhanjori lava belongs to:

- a) Dharwar age
- b) Cuddapah age
- c) Vindhyan age
- d) Carboniferous age

UNIT- IV

Short Questions:

1. What are the Geological Considerations necessary in the selection of a Dam Site?
2. Explain the geological causes for failure dams Quote a few case histories.
3. What are the influencing factors for a successful reservoir? And explain.
4. Distinguish between normal fault and reverse fault. What is the role of faults in the selection of sites for dams, reservoirs, tunnels, Quarrying, roads and railway tracks along hill slopes?
5. Explain the influencing factors for the water - tightness of the reservoir.

Essay Questions:

1. Explain the following:
 - a) Equipotential method
 - b) Wenner method
 - c) Resistivity traversing method
 - d) Self potential method.
2. a) Explain the geophysical studies by seismic and radiometric methods in detail?
b) What are the fundamental aspects of rock mechanics and environmental Geology?
3. Explain the Electrical Resistivity surveys for ground water prospection.

4. Explain in brief about Seismic refraction method.
5. Describe different Geophysical methods in terms of principle, parameters methods, equipment and applications of Seismic methods, Radiometric methods and Geothermal method?

Objective Questions:

Q.1: In an elastic material stress is:

- (a) Directly proportional to strain
- (b) Not proportional to strain
- (c) Unrelated to strain
- (d) Sometimes proportional to strain.

Q.2: The maximum shear strain occurs on:

- (a) 90° with principal planes
- (b) 45° with principal planes
- (c) Principal planes

(d) Independent of the principal planes.

Q.3: Tensile stress is:

(a) Stress caused by varying load.

(b) Stress due to any force

(c) Stress due to change in length under a load.

(d) Stress measured by the ratio of the increase or decrease in length of the unloaded piece under

Q.4: A material which recovers fully after unloading but not instantaneously is known as:

(a) Plastic

(b) Elastic

(c) An elastic

(d) Inelastic

Q. 5: Rocks indicates their deformation under loads is related with:

(a) Modulus of elasticity

(b) Hook's law

(c) Young's modulus

(d) All the above.

Q. 6: The values for shearing strength (s), Cohesion (c), and angle of internal friction (ϕ) for the tested rock can be obtained from the Mohr's strength envelope, using the equation :

(o = normal strength)

(a) $S = C + 0$

(b) $S = C + \tan \phi$

(c) $S = C + o \tan \phi$

(d) $S = C - o \tan \phi$

Q. 7: Match the following column:

1. Elastic (i) Marble

2. Elastic-Plastic (ii) Sandstone

3. Plastic-elastic (iii) Siltstone

4. Plastic-Elastic-plastic (iv) Basalt

(a) 1-ii, 2-iii, 3-iv, 4-i

(b) 1-iv, 2-iii, 3-ii, 4-i

(c) 1-ii, 2-iv, 3-i, 4-iii

(d) 1-i, 2-ii, 3-iii, 4-iv

Q. 8: Los Angeles's machine is used for:

(a) Toughness test.

(b) Abrasion test.

(c) Attrition test.

(d) Density test

UNIT- V

Short Questions:

1. Describe the geological consideration for successful tunneling.

2. Write short notes on

(a) Different purposes of tunnels

(b) Tunnels in faulted strata.

(c) Tunnels in folded strata.

3. Write short note on

(a) Effects of tunneling on the ground

(b) Lining of tunnel

(c) Overbreak.

Essay Questions:

1. Sand stones, Shales, Lime stones, Laterites and Conglomerate are the common sedimentary rocks found in nature". Discuss their suitability or otherwise at dam sites, reservoir sites and tunnel sites?

2. a) What are the effects of tunneling on the ground?

b) Describe the purpose of tunnels?

Objective Questions:

Q. 1: Stone generally: used for railway ballast is:

(a) Sandstone

(b) Limestone

(c) Marble

(d) Basalt or trap basalt.

Q. 2: An artificial stone made from pieces of marble and cement and used for floors facing of walls etc. is known as :

(a) Mosaic

(b) Terrazzo

(c) Marble

(d) None of these.

Q. 3: Specific gravity for most of the building stone lies between:

(a) 1.5 to 2.0

(b) 2.0 to 2.5

(c) 2.5 to 3.0

(d) 3.0 to 3.5

Q. 4: Selection of a dam site is made mainly based on:

(a) The geology of the site

(b) Cost of the dam

(c) Environmental study

(d) Ground water condition in the area.

Q. 5 : Abutment is :

(a) Upstream side of a dam

(b) Downstream side of a dam

(c) The sides of the valley on which the dam structure rests

(d) Openings for discharge

Q. 6: Which of the following is a fresh water fossil

a) Physa

b) Cerethium

c) Nucula

d) Ammonite

Q. 7: Gold prospecting in both geophysical and geochemical methods is most effectively done by

a) Electromagnetic surveys

c) Seismic profiling

b) Remote sensing

d) Soil analysis

Q. 8: The underground water that occurs within the zone of aeration is called

- a) Plutonic water
- c) Vadose water
- b) Meteoric water
- d) Connate water

Q. 9: A horizontal entry into an ore body is called

- a) Adit
- b) Shaft
- c) Bench
- d) Pit