SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING
QUESTION BANK

III SEMESTER

1903305- APPLIED GEOLOGY

Regulation – 2019

Academic Year 2021-2022

Prepared by

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SUBJECT : 1903305 – ENGINEERING GEOLOGY
SEM / YEAR: III/II

UNIT I - PHYSICAL GEOLOGY

Geology in civil engineering – branches of geology – structure of earth and its composition – weathering of rocks – Scope of Geology in Engineering- scale of weathering – soils - landforms and processes associated with river, wind, groundwater and sea – relevance to civil engineering. Plate tectonics – Earth quakes – Seismic zones in India.

PART A

Q.No	Questions	BT Level	Competence
1.	State weathering.	BT-1	Remembering
2.	Describe briefly the layers of interior of earth.	BT-2	Understanding
3.	Define the term soil pedogenesis.	BT-1	Remembering
4.	What is meant by seismic zone and mention the zones?	BT-1	Remembering
5.	Explain in short the erosional landforms associated with ground water flow and depletion.	BT-2	Understanding
6.	Explain in detail about chemical weathering.	BT-2	Understanding
7.	Describe spheroidal weathering.	BT-2	Understanding
8.	Write about mohorovicic and Guttenburg discontinuity.	BT-3	Applying
9.	Explain about plate tectonics and name a few secondary tectonic plates.	BT-5	Evaluating
10.	Write short note on exfoliation and exudation.	BT-3	Applying
11.	Differentiate between water table and perched water table.	BT-4	Analyzing
12.	Explain aquifer and mention its types.	BT-5	Evaluating
13.	Mention the characteristics of levees and floodplains.	BT-3	Applying
14.	Differentiate aquifer and aquiclude.	BT-4	Analyzing
15.	Write about Mercalli scale.	BT-6	Creating
16.	Elaborate the interior structure of the earth.	BT-6	Creating
17.	Write about confined aquifer and unconfined aquifer.	BT-1	Remembering
18.	List the depositional landforms created by a river.	BT-4	Analyzing
19.	What is meant by continental drift?	BT-1	Remembering
20.	Tell about base level of erosion.	BT-1	Remembering
21.	Define the term Denudation.	BT-1	Remembering
22.	What is mean by Pedestal Rocks and how it is formed?	BT-3	Applying
23.	In what circumstances the coral reefs are formed and which geological process associated with this formation?	BT-6	Creating
24.	Describe about seismic waves and its types?	BT-2	Understanding

25.	Draw the Barchans and give detail about it?	BT-4	Analyzing

PART B			
1.	Write in detail about the structure of the earth and its composition with a neat diagram.	BT-6	Creating
2.	Give an account on mode of occurrence and prospecting of ground water.	BT-1	Remembering
3.	Mention the concept of plate tectonics and describe how earthquakes occur. Add a note on the distribution of earthquake in the world and in India.	BT-3	Applying
4.	Explain in detail about weathering of rocks add a note on the effect of weathering on the strength of rocks.	BT-2	Understanding
5.	Give a detail about natural causes of earthquakes and explain in detail about the earthquake belts of India.	BT-1	Remembering
6.	Discuss in detail about the scope of geology and importance of geology in Civil Engineering.	BT-4	Analyzing
7.	Explain physical and chemical weathering process in detail. Add a note on weathering grade and its engineering significance.	BT-2	Understanding
8.	Explain in detail on the geological actions of streams and rivers. Write a note on its significance in Civil Engineering constructions.	BT-2	Understanding
9.	Enumerate the geological process associated with winds. Write their engineering significance.	BT-3	Applying
10.	List the geological process associated with sea. Write their engineering significance.	BT-4	Analyzing
11.	(i)Give a detailed account of the erosional and depositional landforms created by the action of river. (9) (ii) List out the seismic waves and its behaviour. (4)	BT-1	Remembering
12.	Explain the geology of groundwater and types of groundwater; Enumerate the types of aquifers system.	BT-5	Evaluating
13.	(i) What are the deposits and features or landforms of wind? (9) (ii) Classify earthquake based on depth of focus and origin. (4)	BT-4	Analyzing
14.	Give a detailed account of groundwater occurrence in rocks. Add a note on the porosity and permeability of rocks.	BT-1	Remembering

PART C			
1.	Discuss brief theory about geological work of rivers and discuss in detail.	BT-6	Creating
2.	Tell about geomorphological process of weathering and erosion by anyone case study.	BT-1	Remembering
3.	List out the Landforms associated with wind erosion and its relevance to Civil Engineering	BT- 4	Analyzing
4.	Summarize about any one recent earthquake in India.	BT- 2	Understanding

UNIT II- MINEROLOGY

Physical properties of minerals – Quartz group, Feldspar group, Pyroxene - hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsum and Clay minerals.			
PART-A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define ore minerals.	BT-1	Remembering
2.	Define various varieties of quartz group minerals.	BT-1	Remembering
3.	Identify the physical properties of mica.	BT-3	Applying
4.	Define mineral.	BT-4	Analyzing
5.	Identify the different physical properties of minerals	BT-3	Applying
6.	Discuss the physical properties and uses of quartz, augite.	BT-2	Understanding
7.	What is mohr's scale of hardness?	BT-1	Remembering
8.	Discuss the physical properties and uses of hornblende, biotite.	BT-2	Understanding
9.	List out the clay group minerals and their important properties.	BT-4	Analyzing
10.	Differentiate between muscovite and biotite?	BT-4	Analyzing
11.	Define mineralogy.	BT-1	Remembering
12.	Show the isometric system of crystals.	BT-3	Applying
13.	Define tetragonal system of crystals.	BT-1	Remembering
14.	Determine orthorhombic system of crystals.	BT-5	Evaluating
15.	Describe about triclinic system of crystals.	BT-2	Understanding
16.	How will you assess the monoclinic system of crystals.	BT-5	Evaluating
17.	Write about feldspar group.	BT-6	Creating
18.	Define lusture.	BT-1	Remembering
19.	Discuss about form, streak.	BT-2	Understanding
20.	Write about hardness and specific gravity.	BT-6	Creating
21.	Write short notes on cleavage in amphibole and pyroxenes?	BT-6	Creating
22.	Give salient features and mention important properties of Felspar group.	BT-1	Remembering
23.	Describe about Fracture and its types?	BT-4	Analyzing
24.	Differentiate the term Axis of symmetry and twining axis.	BT-3	Applying
25.	Illustrate the term interfacial angle?	BT-2	Understanding

PART-B			
1.	What are the physical properties of Feldspar and Pyroxene group of minerals? Describe it.	BT-1	Remembering
2.	Tell about the physical properties of Quartz group of minerals. Explain it	BT-1	Remembering
3.	List the various physical properties of minerals and describe each property with examples.	BT-1	Remembering
4.	What are the composition properties of (i) Orthoclase feldspar (6) (ii) Microcline feldspar (7)	BT-1	Remembering
5.	Write a detailed note on the chemical composition, physical properties, origin, occurrence, engineering behaviour and uses of clay minerals.	BT-3	Applying

6.	Classify between mica and feldspar group of minerals.	BT-4	Analyzing
7.	Interpret the Mineral and Rock and Describe the physical properties of minerals with examples	BT-2	Understanding
8.	Identify the Pyroxene group of minerals and explain it briefly.	BT-3	Applying
9.	(i) Give a detailed account of Special Properties of Minerals (7) (ii) Give in detail about Plagioclase Feldspar (6)	BT-3	Applying
10.	Distinguish the properties and importance of (i) Augite (7) (ii) Hornblende. (6)	BT-4	Analyzing
11.	Explain about the properties of (i) Muscovite (7) (ii) Gypsum. (6)	BT-2	Understanding
12.	Explain the physical properties of Mica group of minerals with examples.	BT-2	Understanding
13.	Explain the composition properties of (i) Biotite(7) (ii) Calcite (6)	BT-5	Evaluating
14.	Elaborate the detail about crystallographic system.	BT-6	Creating
	PART C		
1.	Explain the various processes of formation of ore minerals.	BT-2	Understanding
2.	Inspect how coal and petroleum originate. Give detail account of their occurrence in India.	BT-4	Analyzing
3.	What are the Engineering Properties of clay.	BT-1	Remembering
4.	Illustrate the applications of various minerals.	BT-3	Applying

UNIT III –PETROLOGY

Classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Laterite, Shale, Quartzite, Marble, Slate, Gneiss and Schist.

PART A

Q.No	Questions	BT Level	Competence
1.	What do you mean by granulation in metamorphic petrology?	BT-1	Remembering
2.	Identify the importance of texture and structure of a building stone.	BT-3	Applying
3.	Distinguish between monomineralic rock and polymineralic rock with example.	BT-4	Analyzing
4.	Compare the relative strengths of shale, sandstone and quartzite.	BT-5	Evaluating
5.	Explain about contact metamorphism.	BT-2	Understanding
6.	Define petrology and mention its classification.	BT-1	Remembering
7.	Describe a brief note on stratification.	BT-2	Understanding
8.	What is meant by RMR? What is its significance?	BT-1	Remembering
9.	Identify the various physical properties of minerals.	BT-3	Applying

10.	Tell about the significance of determining RQD in engineering constructions.	BT-1	Remembering
11.	Give examples for Igneous rocks.	BT-5	Evaluating
12.	Classify rocks with examples.	BT-2	Understanding
13.	Explain briefly the term metamorphic facies and mineral paragenesis.	BT-2	Understanding
14.	Discuss about crushing strength of a rock.	BT-6	Creating
15.	What do you mean by diagnenessis?	BT-1	Remembering
16.	Compare the strength of schidst and quartzite.	BT-4	Analyzing
17.	Write briefly about attrition test.	BT-3	Applying
18.	Define Lopoliths and dykes.	BT-1	Remembering
19.	Discuss some distinguishing prime physical properties of the metamorphic rocks.	BT-6	Creating
20.	Difference between concordant bodies and discordant bodies.	BT-4	Analyzing
21.	Illustrate the term Texture and its types?	BT-2	Understanding
22.	What are the Clastic rocks?	BT-4	Analyzing
23.	List out the structures of Metamorphic rocks.	BT-1	Remembering
24.	Give short notes about Slate.	BT-3	Applying
25.	Explain the structure of igneous rocks and its textures.	BT-5	Evaluating

PART B			
1.	What is a dolerite? Describe its composition, origin and distribution.	BT-1	Remembering
2.	Write an essay on engineering properties, distribution and uses of granite.	BT-3	Applying
3.	Explain in detail about the igneous rocks with neat sketch.	BT-5	Evaluating
4.	Describe the origin, texture, structure and occurrence of granite, marble and sandstone rocks.	BT-2	Understanding
5.	What are the engineering properties of rocks to be tested for constructions of dams and tunnels and how will you determine the engineering properties of rocks at site and laboratory?	BT-1	Remembering
6.	Define metamorphic rocks. Explain about it briefly.	BT-1	Remembering
7.	How are rocks classified? Describe the major distinguishing properties of the major rock types.	BT-4	Analyse
8.	Explain the composition, texture, characteristics, occurrence and uses of black granite, basalt, Marble.	BT-2	Understanding
9.	Discuss about the composition, texture, characteristics, occurrence and uses of limestone, schist, Gneiss.	BT-6	Creating
10.	Write a short note on (i) Structure of igneous rocks (6) (ii) Structure of Sedimentary rocks (7)	BT-3	Applying
11.	Analyse the composition, texture, characteristics, occurrence and uses of laterite, Slate, Quartzite.	BT-4	Analyse
12.	Tell about the uses of major rock types and explain in detail about sedimentary rocks.	BT-1	Remembering

13.	Explain the concept on (i) Texture of igneous rocks (7) (ii) Texture of metamorphic rocks (6)	BT-2	Understanding
14.	How would you differentiate between igneous rock, metamorphic rock and sedimentary rock on the basis of structure & texture?	BT-4	Analyzing

PART C			
1.	Explain how the mineral textures of an igneous rocks be used to infer its origin.	BT-5	Evaluating
2.	Discuss about the composition, varieties, origin and Indian Occurrence of Coal.	BT-6	Creating
3.	Illustrate with examples of different types of rocks present in our earth in different site conditions.	BT-2	Understanding
4.	Write a case study about rocks and mineral resource of any geological conditions in India.	BT-3	Applying

UNIT-4- STRUCTURAL GEOLOGY AND GEOPHYSICAL METHODS

Geological maps – attitude of beds, study of structures – folds, faults and joints – relevance to civil engineering. Geophysical methods – Seismic and electrical methods for subsurface investigations.

PART-A

Q.No	Questions	BT Level	Competence
1.	What is meant by structural geology?	BT-1	Remembering
2.	Discuss about Recumbent folds with a neat diagram.	BT-6	Creating
3.	Using a diagram, define the terms dip and strike.	BT-1	Remembering
4.	What are joint and joint sets?	BT-1	Remembering
5.	Define the term Rock Quality designation.	BT-1	Remembering
6.	Name the different geological structures associated with convergent plate regimes.	BT-1	Remembering
7.	Differentiate between True dip and apparent dip of rock formation.	BT-4	Analyzing
8.	Interpret the difference between anticline and syncline.	BT-2	Understanding
9.	Briefly explain the principal involved in electrical resistivity survey for sub-surface investigation.	BT-2	Understanding
10.	With a neat sketch explain the wennersconfiguration.	BT-2	Understanding
11.	Write notes on faults and brief its significance.	BT-3	Applying
12.	Illustrate the effects of faulting.	BT-3	Applying
13.	Identify the uses of geological maps in understanding structural geology of a tectonically active area.	BT-3	Applying
14.	Explain the engineering considerations of a folds.	BT-2	Understanding
15.	Classify the types of dips.	BT-4	Analyzing
16.	Compare Wenner and berger methods.	BT-4	Analyzing

17.	How do joints influence the strength of rocks?	BT-5	Evaluating
18.	How will you evaluate the resistivity for sub-surface investigation?	BT-5	Evaluating
19.	Give detail about impacts of joints in engineering consideration?	BT-6	Creating
20.	Define outcrops.	BT-1	Remembering
21.	List out the faults basis on occurrence.	BT-1	Remembering
22.	What are the engineering importance of faults and its occurrence?	BT-4	Analyzing
23.	Give short notes about Seismic methods.	BT-3	Applying
24.	Write down the classification of joints based on origin?	BT-2	Understanding
25.	Elaborate the methods adopted for geological investigations.	BT-6	Creating

PART B			
1.	Identify the various geological structures and their role in selection of sites for engineering projects.	BT-3	Applying
2.	Explain in detail the principle, procedure and applicability of seismic methods for subsurface investigations.	BT-2	Understanding
3.	Illustrate with neat sketches on the folding processes and their civil engineering significance.	BT-2	Understanding
4.	What are the geophysical methods that help in knowing about sub-surface features during civil engineering investigations?	BT-1	Remembering
5.	Explain in detail about resistivity methods and Wenner configuration. Add note on its civil engineering applications.	BT-2	Understanding
6.	Define fault. Explain in detail with neat sketches on i) Normal fault (3) ii) Reverse fault (3) iii) Strike-slip fault (4) iv) Oblique fault (3)	BT-1	Remembering
7.	(i) What are joints? Discuss the various types of joints (6) (ii) Write about the engineering applications of folds. (7)	BT-1	Remembering
8.	How the geological investigations are conducted for sub-surface investigations using magnetic and acoustic methods?	BT-1	Remembering
9.	Evaluate the seismic refraction survey to be conducted for determining the depth of bed rock.	BT-5	Evaluating
10.	Analyse the joint structures with neat sketches and also write their role in dam and tunnel construction.	BT-4	Analyzing
11.	Write a detailed note on the mechanics and classification of folds and faults.	BT-3	Applying
12.	Discuss in detail about the electrical method of investigation for ground water exploration.	BT-6	Creating
13.	Write a note on gravitational method in geophysics.	BT-3	Applying
14.	Classify the causes of faults and effects on the engineering quality of rocks.	BT-4	Analyzing

PART C

1.	Explain in detail about seismic survey investigation to predict the groundwater vulnerability.	BT-2	Understanding
2.	Using case studies of structural failures, discuss the importance of geological investigation for the design and construction of large civil structures.	BT-6	Creating
3.	Write in detail about the types of faults and their influence on dams and tunnels.	BT-3	Applying
4.	i. Classify folds in rocks and describe each type in detail. (8) ii. Give an account of the role of folds in the design of dams and tunnels. (7)	BT-4	Analyzing

UNIT – V - APPLICATION O F GEOLOGICAL INVESTIGATIONS

Geological Investigations - Remote sensing for civil engineering applications; Geological conditions necessary for design and construction of Dams, Reservoirs, Tunnels, and Road cuttings - Hydrogeological investigations and mining - Coastal protection structures. Investigation of Landslides, causes and mitigation.

PART-A

Q.No	Questions	BT Level	Competence
1.	What is meant by Stand-up time in tunnelling?	BT-1	Remembering
2.	List any four measures to prevent coastal erosion.	BT-1	Remembering
3.	Define Remote sensing.	BT-1	Remembering
4.	Analyse the causative factors of landslides.	BT-4	Analyzing
5.	Tell about dead storage in reservoir.	BT-1	Remembering
6.	Define the term overlap in remote sensing.	BT-1	Remembering
7.	Differentiate between Arch and Gravity dams.	BT-4	Analyzing
8.	Summarize the function of groynes in coastal protection.	BT-2	Understanding
9.	Explain the term over break in tunnelling. How it can be controlled.	BT-2	Understanding
10.	Outline the term Parallax in aerial Photograph.	BT-2	Understanding
11.	Give a brief note on various coastal protection structures.	BT-3	Applying
12.	Illustrate the applications of Satellite Imagery.	BT-3	Applying
13.	Write short on sea wall and jetties in coastal protection Structures.	BT-3	Applying
14.	Differentiate between swelling ground and running ground in Construction site.	BT-4	Analyzing
15.	Classify the various types of aerial photographs.	BT-4	Analyzing
16.	What is meant by rock bolting explain with neat sketch?	BT-1	Remembering
17.	Explainthe importance of pay line in tunnelling operations.	BT-5	Evaluating
18.	Explain how the study of bedrocks is essential before the construction of tunnels.	BT-5	Evaluating
19.	Discuss about the elements of aerial photographs.	BT-6	Creating
20.	Elaborate the methods adopted for tunnelling.	BT-6	Creating
21.	What are the geological problems occurring after dam construction?	BT-3	Applying

22.	Write down the objectives of geological investigation of tunnel construction?	BT-4	Analyzing
23.	Give the functions of breakwater.	BT-2	Understanding
24.	List any four methods to prevent landslides.	BT-1	Remembering
25.	Write the applications of remote sensing techniques.	BT-6	Creating

PART-B			
1.	Classify the various geological factors to be considered for the construction of buildings? Explain in detail with examples.	BT-2	Understanding
2.	Identify the uses of remote sensing applications in hydrogeological and mining investigation studies.	BT-3	Applying
3.	Enumerate with appropriate figures on the types, causes of landslides and their mitigation measures.	BT-5	Evaluating
4.	Classify the important geological factors governing coastal process and give various coastal protection structures.	BT-4	Analyzing
5.	Identify the various causes and effects of sea erosion. Add a detailed note on coastal protection measures.	BT-3	Applying
6.	What are the various geological factors to be considered for the construction of dams? Explain with examples.	BT-1	Remembering
7.	(i) Why jetties are built along the shoreline? (6) (ii) What are the effects of sea waves on the coastal zones? (7)	BT-1	Remembering
8.	List the geological factors to be considered for the construction of road cuttings. Explain in detail.	BT-1	Remembering
9.	List out the various geological factors to be considered for the construction of Reservoirs? Explain in detail with examples.	BT-1	Remembering
10.	Differentiate between Dam and Reservoir and their applications.	BT-4	Analyzing
11.	Explain in detail the foundation evaluation techniques and influence of geological conditions on foundation and design of dams.	BT-2	Understanding
12.	Write in detail about (i) Landslides (7) (ii) Their causative effects. (6)	BT-3	Applying
13.	Explain in detail about the role of aerial photographs and satellite images in planning and execution of civil Engineering projects.	BT-2	Understanding
14.	Discuss in detail about the shoreline structures with neat sketch.	BT-6	Creating

PART-C			
1.	Discuss the use of geospatial techniques for disaster management. Enumerate your answer with case studies on landslide mitigation adopted in the Himalayan region.	BT-6	Creating
2.	Lithological and structural aspects are the primary considerations for the selection of suitable sites and design of tunnels. Using appropriate case studies or examples explain the validity of this statement.	BT-3	Applying
3.	Using case study write a detailed account of the application of	BT-3	Applying

	remote sensing in civil engineering.		
4.	Explain in detail the geological considerations to be taken into account during tunnelling.	BT-2	Understanding