

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING

EXAMINATION, 2019

(2nd Year, 1st Semester)

ENGINEERING GEOLOGY

Time: Three hours

Full Marks: 100

(50 marks for each group)

Use a separate Answer-Script for each group

GROUP - A

Answer any five (05) questions from the following:

1. What are the sequential major stages of a large civil engineering project? On which stage, the knowledge of 'Engineering Geology' is most pertinent and how? Discuss the importance of Geohydrological and Seismological maps for a civil construction project. (2+4+4)
2. How does the porosity differ from the void ratio for recent sediment strata? Why void ratio in the residual soil is generally higher than transported soil? Mention the different major categories of transported soil, classified on the basis of 'mode of formation'. (3+4+3)
3. What is 'coefficient of permeability' of a porous media? How does it differ from 'coefficient of relative permeability'? What are the major geotechnical parameters those affect the permeability of a porous strata? What is 'capillary-fringe'? (2+3+3+2)
4. Draw a schematic diagram to show the vertical depth wise occurrence of different soil layers. How does 'hardpan' form in subsurface soil layers of alluvial plains? Explain its importance on civil constructional practices? How does zone of 'illuviation' differ from zone of 'eluviation'? (3+2+2+3)
5. Distinguish between: (2.5 ×4)
 - a) Effluent and Influent condition of a fluvial flow
 - b) Compaction and Consolidation
 - c) Creep and Solifluction
 - d) Confined and Unconfined aquifer

6. What is 'bulk density' of a soil or rock sample? How the 'bulk density' generally measured in the field for moist cohesive soil? Prove that $e = \frac{G_s \times \gamma_w}{\gamma_d} - 1$, where, e = void ratio, γ_w = unit weight of water, γ_d = dry unit weight of the soil, G_s = specific gravity of the solid mass of the soil or rock. (2+3+5)
7. What is 'ground water table'? Why it fluctuates temporally and spatially? A soil sample in its undisturbed state was found to have volume of 100 cm^3 and weight of 210 gm. After oven drying the weight reduced to 172 gm. Compute, (a) the water content, (b) Dry density (c) Void ratio, and (d) Porosity of the soil. Assume $G_s = 2.7$. (2+3+5)

B.CIVIL ENGG. 2ND YEAR 1ST SEM. Examination, 2019**Subject: Engineering Geology****Time: 3 Hours****Full Marks: 100****Group-B (50 Marks)****(Use Separate Answer scripts for each Group)**

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| <u>Answer any 5 (five) questions from Group - B:</u> | | 10x5=50 |
| 1. | Discuss with diagram the Internal Structure of the Earth using Depth vs. Velocity curve of seismic waves. | 10 |
| 2. | Discuss about the nature of different earthquake waves. What is epicenter of any earthquake? | 8+2=10 |
| 3. | Define mineral? Briefly describe the optical properties of minerals. | 2+8=10 |
| 4. | Define Reservoir. What are the Geological factors that should be taken care of during construction of a stable dam? Explain with diagram. | 2+8=10 |
| 5. | Describe with neat sketches the orientation of basement rocks a river bed for a safe and stable Dam. | 10 |
| 6. | What is Centre of Symmetry? Discuss briefly about the Hexagonal and Isometric system. | 2+8=10 |
| 7. | What is Igneous Rock? How the Sedimentary rock is formed in nature? | 4+6=10 |
| 8. | What is Refractive Indices (R.I.)? How do you determine the relative R.I. of minerals by Becke Test? What is Moh's scale of Hardness? | 2+5+3=10 |