**Engineering Geology**

 **Q1) Correct the wrong statements:-**

1. **The clay and sand grain in a non-cohesive soil attract each other even in the absence of water .**
2. **The first step in an investigation is Data collection .**
3. **Kaolinite requires more water for change neutralization .**
4. **The well-graded gravel must have a Cu a value greater than 5 and Cc value between 2-4 .**
5. **There is no relation between soil development and parent material .**

 **Q2) Complete the followings :-**

 **1- Water content % = ----------------------------------------------------------**

 **2- The methods of grain size analysis are---------------------------------------**

 **3- If Fine-grained percent(60%) , coarse grain percent (40%) , liquid**

 **limit percent less than (50) percent ,the soil classified as ---------------.**

 **4- Soils consisting of particles that stick together in either a dry or wet**

 **state this type of soil called ---------------------------------------------------**

 **5-In Hydrometer method ( Rc ) = ---------------------------------------------**

 **6-In the unconfined compressive strength cohesion= -----------------.**

 **7-Toppling is -------------------------------------------------------------------.**

 **8-Types of engineering geologic investigation are ---------------------.**

 **9- void ratio = ------------------------------------------------------------------.**

 **10-Comperisibility is ----------------------------------------------------------.**

 **11-The engineeering properties are especially important to many**

 **types of engineering works and situations involving soil these**

 **types are ---------------------------------------.**

 **12- The radius of the Mohr’s circle in triaxial test = ---------------------.**

 **13 Circular failures ----------------.**

 **14porosity= --------------------------------------.**

 **15 The percent retained on a given sieve is determined by ------.**

**Q3) Discuss with sketch the Atterberg limits in relation to increasing**

 **water content .**

 **Q4) Write about :**

 **1- Factors which effect shear strength in non cohesive soil.**

 **2- The causes of overconsolidation .**

**Q5) Determine failure angle for this sketch if Ø (19.45) .**

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**Q6) How can classified the soil according to unified soil classification system**

**Q7) Compare between drained and undrained state in non cohesive soil**

**Q8)The fine grain percent of soil (70%)gm , coarse grain(30%)gm ,**

 **correction factor(a) (0.99) . Determine corrected finer percent if**

 **Rc (43) .**

**Q9) Discus the figures below . ( 3 marks )**

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 **diameter diameter diameter**

 **(figA ) (fig B) (fig C )**

**Q10) Compute the coefficient of uniformity and concavity if the effective size**

 **D10 (0.096), D30(0.16) D60 (0.24)**

 **Q11) Compute plastic limit if the weight of wet soil with**

 **can(40.10)gm , weight of dry soil with can(35)gm and weight**

 **of can(14.89)gm .**

**Q12) What are the engineering properties which are important**

 **to many types of engineering works and situations involving soil.**

**Q13) Write about Prefix & suffix according to unified soil classification system.**

**Q14) The particle-size distribution curve indicates that about 3%of the soil is**

 **finer than 0.075 mm (N0.200 sieve), also (50%) of the soil is sand and**

 **(47%)is gravel. If D10 (0.085), D30 (0.12) and D60 (0.135). Classify the soil**

 **according to USCS.**

 **Q15) Classify activity of clay, if percent of clay (17) %, liquid limit (54) and Plastic**

 **limit data are: - weight of can. (9.5), weight of can. with moisture soil (21.2)**

 **and weight of can. with dry soil (18.4).**

 **Q16) Why Kaolinite are non-expansive clay minerals**

 **Q17) Write about Soil development.**

 **Q18) Compute corrected finer percent for the soil if the fine grain**

 **percent (70%)gm, coarse grain percent (30%)gm, Ra (48), Z.C.(9)**

 **CT (-0.5) and correction factor(a) (0.93).**

 **Q19) Determine friction angle if failure angle between principle stress and plane**

 **of failure ( 35 ) .**

 **Q20) Write about Expansive soil**

 **Q21) Why uniformly and gap graded curves are poorly graded curve**

 **Q22) Write about Atterberg limits with sketch**

 **Q23) Compute water content if the weight of wet soil with can(28.3)gm , weight**

 **of dry soil with can (24.1)gm and weight of can(12.5)gm.**

 **Q24) Compute diameter of the soil grains at (15mint) at hydrometer analysis, if**

 **L(9.7)cm and k(0.01386).**

 **Q25) Determine failure angle between principle stress and plane of failure if Ø**

 **(20) .**

 **Q26)** **Write about Problematic soil.**

 Q27) **Why Calcium-rich montmorrillanite has a lower PI than does Sodium rich**

 **montmorillanite because**

 Q28) **Write about** **coarse grain soil classification according to unified soil**

 **classification system**

 Q29) **Determine the plasticity index. If the liquid limit (35.9) and the plastic limit**

 **data are:-weight of can. with moisture soil(17.2), weight of can. with dry**

 **soil(15.6) and weight of can. (8.3).**

 Q30) **Write about** **the important structural groups of clay minerals for**

 **engineering purposes**

 **Q31) prove failure angle (θ) *=* 45 + Ø /2**

 Q32) **Write about** **Clay mineralogy is the dominant factor in controlling the**

 **plasticity of a clay soil.**

 **Q33) From the grain size distribution curve the percent of Clay (10%), also (60%)**

 **of the soil is Gravel and Sand (30%). If D10 (0.075), D30 (0.15) and D60 (0.145).**

 **Classify the soil according to USCS.**

 **Q34)A shear box test was performed to give the following results for a cohesive soil**

 **sample, Normal stress (150) kN/m2, Shear stress at failure (110) kN/m2 and**

 **tan Ø (0.1) . Compute friction angle and Cohesion. Use Mohr-Coulomb**

 **equation**

 **Q35) Write about Factors effected shear strength**