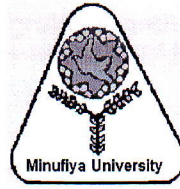


Menoufia University
Faculty of Engineering
Shebin El-Kom
Dept. : Civil Engineering
Semester : Second-Final Exam
Academic Year: 2017-2108



Postgraduate: Diploma
Subject: Improvement of Soil Properties
Code No. : CVE 517
Date: 28/05/2018
Time Allowed: 3.00 hours
Total Marks: 100

Answer of the following questions and assume any missing data

Question(1) (25)

- 1-a) Explain the difference between the required geotechnical investigation for ground improvement project and a regular construction project.
- 1-b) What are the different types of geosynthetics?
- 1-c) Explain the solutions that used to overcome the unsuitability of construction site.
- 1-d) What is the equivalent sand drain diameter of a wick drain measuring 100 mm wide and 5.0 mm thick that is 75 % void in its cross section? Use an estimated porosity of 0.40 for typical sand in sand drain.

Question(2) (25)

- 2-a) Show schematically the regular procedure for Vibroflotation technique as one of the used method in soil improvement.
- 2-b) What are the benefits of ground improvement?
- 2-c) During the construction of an earth dam, the following data are noted:
- 1- Soil from borrow pit has natural density = 1.8 gm/cm^3 , water content = 12%.
 - 2- Soil after compaction has density = 2.1 gm/cm^3 , water content = 16%.
- Estimate the quantity of soil to be excavated from the borrow pit and the amount of water to be added for every 1 m^3 of compacted soil of the earth dam.
- 2-d) Show schematically the reinforced retaining wall systems using geosynthetics and wall facing units.

Question(3) (25)

- 3-a) Explain in details the six primary functions of geosynthetics.
- 3-b) What are the methods for monitoring compaction in the field?
- 3-c) Explain the difference between soil stabilization & ground improvement.
- 3-d) Loose sand layer of 12 m thick located at project site in New Administrative Capital, a drooping of a heavy weight was used as one of soil improvement techniques. Design the system to attain a depth of compaction using Leonard's formula ($D = 0.5 (W \times h)^{1/2}$).

Question(4) Choose the correct answer for the following: (25)

- 1- Geogrids are primarily used for:
 - a- Reinforcement.
 - b- Separation.
 - c- Fluid barriers.
 - d- No one of the above.
- 2- Common ways to dealing with unsatisfactory soils include:
 - a- Bypassing the soil and / or removing & replacing the unsuitable soil.
 - b- Redesign the project.
 - c- Improving the soil properties.
 - d- Any one of the above.
- 3- Compaction is:
 - a- Artificial densification of soil mass for one or more reason.

- b- Change of soil composition.
- c- Natural process for combining grains together.
- 4- The used values for relative density in the field is normally :
 - a- Between 75 and 85 %.
 - b- Below 66 %.
 - c- More than 100 %.
- 5- CEC values is higher for:
 - a- Montmorillonite.
 - b- Illite.
 - c- Kaolinite.
- 6- Compaction as one of mechanical improvement methods:
 - a- Is cheapest.
 - b- Extensively used in highways and dams.
 - c- Available and common method.
 - d- Any one of the above.
- 7- Stabilization of surface layers can be accomplished using:
 - a- Lime stabilization.
 - b- Cement stabilization.
 - c- Chemical modification.
 - d- Any one of the above.
- 8- Soil improvement methods studied in this course include:
 - a- Mechanical & dynamic compaction.
 - b- Vibrofloating and/ or preloading.
 - c- Geosynthetics.
 - d- Admixtures.
 - e- All of the above.
- 9- Admixture soil improvement refers to any improvement application where:
 - a- Some material is added.
 - b- Mixed with existing soil.
 - c- Placed soil to enhance the engineering properties.
 - e- Any one of the above.
- 10- All geosynthetics specification should include:
 - a- General requirements.
 - b- Specific geosynthetics properties.
 - c- Placement procedures & overlaps.
 - d- Acceptance and rejection criteria.
 - e- All of the above.
- 11- Sand drains have been used extremely in many parts of the world, as:
 - a- Stabilizing soil for port development works.
 - b- For reclaimed areas on the seacoasts.
 - c- For foundations of structure in reclaimed areas.
 - d- Any one of the above.
- 12- As stated by Bowles, 1996, stone columns are not applicable to:
 - a- Thick deposits of peat
 - b- Highly organic silts.
 - c- Highly organic clays.
 - d- All of the above.
- 13- Seams for geosynthetics may be done by:
 - a- Sewing.
 - b- Mechanical fastener.
 - c- Thermally or chemically bonded.
 - d- Any one of the above.
- 14- The purpose of injecting a grout is:
 - a- To decrease permeability.
 - b- To increase shear strength.
 - c- To decrease compressibility.
 - d- One or all of the above.
- 15- A minimum overlap in geosynthetics applications should be:

- a- 30 cm.
 - b- 15 cm.
 - c- Variable per each product.
- 16- Thermal treatment refers to the modification and/or stabilization of soils by application of:
- a- Heat for improving properties of clayey soils.
 - b- Blending material.
 - c- Nuclear energy.
 - d- No one of the above.
- 17- Geosynthetics are:
- a- Planar products.
 - b- Polymeric materials.
 - c- Used with geotechnical-related material.
 - d- All of the above.
- 18- In cement stabilization, cement requirements depends on:
- a- Gradation of the soil.
 - b- Soil strength.
 - c- Mixing time.
- 19- Methods of studied soil improvement in this course include:
- a- Mechanical & dynamic compaction.
 - b- Geosynthetics.
 - c- Vibrofloating and/ or preloading.
 - d- Admixtures.
 - e- All of the above.
- 20- Bituminous soil stabilization can be used for:
- a- Cohesive soils.
 - b- Sandy soils.
 - c- Any one of the above.
- 21- The purpose of injecting a grout is:
- a- To decrease permeability.
 - b- To increase shear strength.
 - c- To decrease compressibility.
 - d- One or all of the above.
- 22- Lime stabilization has been extensively used to:
- a- Decrease swelling potential.
 - b- Decrease plasticity..
 - c- Decrease swelling pressure.
 - d- Any one of the above.
- 23- Preloading is a technique that can successfully use to densify:
- a- Soft cohesive soils.
 - b- Cohesionless soils.
 - c- Cohesive and cohesionless soils.
- 24- In soft cohesive soil, the vibroflotation technique used with:
- a- Gravel as backfill material.
 - b- Sand as backfill material.
 - c- Any type of cohesionless soil.
- 25- Field quality control of compaction can be achieved via:
- a- Nuclear density test.
 - b- Smooth wheeled rollers.
 - c- Adding water to treated soil.

With our best wishes.

This exam measures the following ILOs													
Question Number	Q1-a	Q2-a	Q2-c,d	Q3-a	Q4	Q1-c, Q1-d	Q2-b	Q3-b	Q3-d	Q4	Q1-b	Q3-c	Q4
	dk3-1	dk3-1	dk3-1	dk3-2	dk3-2	di5-1	di2-1	di5-1	di2-1	di2-1	dp1-2	dp1-1	dp1-2
Skills	Knowledge & Understanding Skills					Intellectual Skills				Professional Skills			