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Total Number of Pages : 01

B.Tech  
PECI5411

8<sup>th</sup> Semester Back Examination 2018-19  
GROUND IMPROVEMENT TECHNIQUE

BRANCH : CIVIL

Time : 3 Hours

Max Marks : 70

Q.CODE : F076

Answer Question No.1 which is compulsory and any FIVE from the rest.  
The figures in the right hand margin indicate marks.

- Q1** Answer the following questions : (2 x 10)
- a) Define groutability ratio and how it is determined?
  - b) What is the electro-osmosis? Where is it used?
  - c) How vacuum consolidation is different from preloading and surcharging?
  - d) Define radial consolidation.
  - e) What are the different types of vertical drains installed in soft clay?
  - f) List the types of soil nailing.
  - g) What are the non-destructive methods in compaction control?
  - h) Define transmissivity of geotextile.
  - i) Write down the difference between sand piles and sand drains.
  - j) In which types of soils where the use of vibro floatation is essential and how?
- Q2**
- a) How would you determine the effective depth of soil improvement using dynamic compaction? List down the factors with proper justification, on which the effectiveness of this method would depend upon. (5)
  - b) What are properties of soils are modified by using additives? Briefly explain the functions of additives and use (5)
- Q3**
- a) Determine the transmissivity of geo-synthetic for the following cases for in plane drainage of seepage water behind 8 m high retaining wall where geotextile is placed along the back of the wall. Flow net has 6 nos. of flow channels and 7 nos. of equipotential drops and having unit hydraulic gradient. Given  $k=10^{-5}$  m/sec. (5)
  - b) Discuss the steps for analysis and design of reinforced retaining walls. (5)
- Q4**
- a) Explain the desirable characteristics of grouts. (5)
  - b) What quantity of cement is required for permeation grouting in gravel, having void ratio of 0.6, if the grout mix has a water : cement ratio of 6:1. Assume that 50% of void space gets filled with the grout slurry. (5)
- Q5**
- a) How stone columns and blasting help soil stabilize and gain bearing capacity? (5)
  - b) What is earthquake drain? Draw its figure. Briefly explain its operations and usefulness in preventing liquefaction during earthquake loadings. (5)
- Q6** Describe the various dewatering techniques available that will facilitate the case of construction? (10)
- Q7** List out the various types of geo-synthetics commonly used in ground improvement techniques? What are the various functions of geo-synthetics? Briefly explain each function with diagram. (10)
- Q8** Write short answer on any TWO : (5 x 2)
- a) Sand drain
  - b) Compare the advantages and disadvantages of ascending and descending stage of grouting.
  - c) Permeation grouting