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**Instructions:** Please write briefly, legibly and to the point. The points associated with each of the questions are given in parenthesis at the right hand side of each question. Please answer the questions in the question paper itself. Use back of the sheet if you run out of space.

**Time: 2 hrs**

**Full Marks: 42**

**NAME:**

**Roll No.:**

**MARKS obtained:**

**Answer all of the following questions:**

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1. What is the range of temperature <sup>at</sup> ~~to~~ which clay should be heated to form brick? What happens if you provide more temperature to the clay? (1)
  
  
  
  
  
  
  
  
  
  
2. What is the physical characteristic by which calcium silicate bricks are distinguished into different classes? (1)
  
  
  
  
  
  
  
  
  
  
3. Describe a Bull's trench kiln. (1)
  
  
  
  
  
  
  
  
  
  
4. If you are given a sample, how can you differentiate whether it is a fine aggregate or a coarse aggregate ? Describe. (1)

5. How is bulking related to the fineness modulus of fine aggregates ? (1)
6. If you are given a wet sample, will the surface moisture be a positive or a negative number, explain why ? (1)
7. What do you mean by tobermorite gel ? (1)
8. What is the utility of tetracalcium aluminoferrite ( $C_4AF$ ) in ordinary Portland cement? (1)
9. What is the unit used for measuring fineness in cement? (1)
10. What is a pozzolanic material ? (1)
11. What problems are associated with zero slump concrete ? (1)

12. What is meant by shrinkage of a concrete structure ? (1)
13. Which climate areas is air entrainment in concrete a requirement and why ? (1)
14. What are the two main criterions which affect the process of concrete curing ? (1)
15. Name 5 primary uses of geosynthetics. Name a type of geosynthetic which can be utilized for all of the 5 primary usage of geosynthetics. (3)
16. What is meant by seasoning of timber? (1)

17. Name and explain two different types of natural defects in timber. (2)
18. What is Veneer? (1)
19. Explain the primary difference between Want and Wane? (1)
20. Explain difference between Telford and Macadem construction. (1)
21. What do you understand by Golden quadrilateral, East-West and North-South Corridor? (1)

22. Explain the term Intelligent Transportation with reference to highways. (1)
23. Write the consistency limits (Atterberg's limit) of a soil in the increasing order (lowest to highest). (1)
24. What is the importance of soil classification in geotechnical engineering? (1)
25. Name two important geotechnical problems associated with fine and coarse grained soils. (2)

26. Define terms: pollutant, sustainable development, and the four domains of environment. (4)

27. Kharagpur's current population is 2 lakhs. If the average annual urban population growth rate is 3.0%, estimate its population in 50 years. Use exponential growth model. (2)

28. Distinguish between flash point and fire point of bitumen. (1)

29. What is cutback bitumen? (1)

30. Name the physical property that is used to classify bitumen. (1)

31. What is a Dam and what are its uses. (3)

32. Explain the term GIS. (1)