S6 C

Model question paper

**Sixth Semester B.Tech Degree Examination**

**[2008 Scheme]**

**08.606.1 ELECTIVE II** **SOIL EXPLORATION (C)**

Time: 3hrs. Max. Marks: 100

Instructions: Graph sheets may be supplied on request.

**PART A [Answer all questions; 8× 5 = 40 marks]**

1. What are the objectives of soil exploration ?

2. What are the guidelines given by I.S. in choosing the spacing of boreholes in a soil exploration programme ?

3. Differentiate between electrical sounding and electrical profiling.

4. Discuss the correlations of N value with various engineering properties of soils.

5. Write a brief note on pressure meter test.

6. What are the merits and demerits of static CPT ?

7. What is meant by [i] chunk samples; [ii] recovery ratio.

8. Write a brief note on soil investigation report.

**PART B [Answer any one full question from each module]**

**MODULE I**

9. The following results from a seismic survey were obtained at a two layered site:

| Distance from shot point (m) | 30 | 60 | 90 | 120 | 150 | 180 | 210 |
|---|---|---|---|---|---|---|---|
| Time (millisec.) | 58 | 89 | 120 | 127 | 135 | 142 | 150 |

Determine the velocity of travel of the seismic wave in the two layers and the thickness of the upper layer. What are the limitations of seismic refraction method? **[ 20 marks]**

10. (a) Explain with a neat sketch, the wash boring method of soil exploration. What are the soil types for which the method is applicable? **[ 14marks]**

(b) Discuss the factors which influence the depth of borings. Suggest guidelines for deciding the depth of exploration. **[ 6marks]**

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## MODULE II

11. Explain with a neat sketch, the procedure for conduct of standard penetration test. Explain the corrections to be applied to observed N value. What are the merits of the test? **[ 20 marks]**

12. The results of a plate load test conducted on a 300mm square plate are given below:

| Load (kN) | 2.5 | 5 | 10 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|
| Settlement ( mm) | 0.75 | 1.5 | 5 | 15 | 40 | 75 |

Plot the results as per I.S., and find the allowable load on a square footing of size 1.2m × 1.2m for a permissible settlement of 40mm. Discuss the limitations of the plate load test. **[ 20 marks]**

## MODULE III

13.[a] Explain briefly piston sampler, with a neat sketch. **[ 8 marks]**

[b] The following are the dimensions of a thin walled sampler. Comment on the quality of the sampler.

| Outer diameter. of sampling tube [ mm] | Innner diameter. of sampling tube [ mm] | Outer diameter. of cutting shoe [ mm] | Inner diameter. of cutting shoe [ mm] |
|---|---|---|---|
| 75.2 | 74.0 | 76.2 | 73.5 |

**[ 12 marks]**

14. [a] Write a note on rock quality designation. **[ 8 marks]**

[b] Write a note on handling and transportation of samples. **[ 6 marks]**

[c] Draw a neat sketch of split spoon sampler and mark the various parts. **[ 6 marks]**

# SIXTH SEMESTER BTECH (CIVIL) MODEL QUESTION PAPER

## 08.606.2 Elective II SUB: SOLID WASTE MANAGEMENT

Time: 3 Hours Maximum Marks: 100

Answer all Questions

**PART – A**

1. List out the various categories of solid wastes.
2. Write a short note on the factors to be considered while laying out routes.
3. Explain the composition of municipal solid waste incinerator flue gas.
4. Write a short note on resource conservation and recovery.
5. Write a short note on radioactive wastes.
6. Explain the 3R concept in solid waste management.
7. List out the process parameters of composting.
8. List out the advantages of Bangalore process.

(5x 8=40 marks)

**PART-B**

MODULE-I

9. Explain briefly the various physical and chemical composition of solid waste.

OR

List out and explain the various methods used to determine the generation rate of solid waste

MODULE-II

10. List out and Explain different methods of separating or sorting of solid wastes

OR

Describe the processing techniques used in. solid waste management

MODULE-III

11. List out the different types of incinerator used in solid waste management and also sketch and label the various parts of an incinerator

OR

List out and Explain the various methods of solid waste disposal

(3x 20=60 marks)

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C

Model Question Paper

SIXTH SEMESTER B TECH DEGREE EXAMINATION

08 606.4 Elective II ADVANCED COMPUTATIONAL METHODS (C)

Time : 3 Hours Maximum : 100 Marks

**Part A**

Answer ALL Questions

1. (a) Explain the rules of round off in numerical problems
   (b) What do you mean by ill-conditioned linear systems.
   (c) Explain the Hermitian formula for interpolation
   (d) Explain the Jacobi Method for finding the eigen values and eigen vectors of a symmetric matrix
   (e) Explain Crank-Nicholson implicit method for solving parabolic equations.
   (f) Employ modified Euler's method to obtain correct to four decimal places the solution of the differential equation $\frac{dy}{dx} = x^2 + y^2$ for x=0.4 given that y=0 when x=0.
   (g) Give the different weighted residual methods
   (h) Explain any one numerical method to solve elliptic partial differential equations.

**(8X5=40)**

**PART – B**

Answer any **one full** question from **each** module

**Module I**

2. (a) Find the largest eigen value and the corresponding eigen vector of the matrix $A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ using power method

**OR**

(b) (i) Find to three decimal places the real root of the equation $xe^x - 2 = 0$ using Newton Raphson method

(ii) Solve the system of equations by LU decomposition method

$$2x + 3y + z = 9$$
$$x + 2y + 3z = 8$$
$$3x + y + 2z = 8$$

**Module II**

3. (a) (i) Apply Runge-Kutta method to find an approximate value of y for x=0.2, in steps of 0.1, if $\frac{dy}{dx} = x + y^2$ given that y=1, when x=0

(ii) Find by Taylor's series method the value of y at x=0.1 and x=0.2 to five places of decimals from $\frac{dy}{dx} = x^2 y - 1$, y(0)=1.

**OR**

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(b) (i) Certain corresponding values of 'x' and log x are given. Find $\log_{10} 310$ by Lagrange's interpolation formula.

| x | 300 | 304 | 305 | 307 |
|---|---|---|---|---|
| logx | 2.4771 | 2.4829 | 2.4843 | 2.4871 |

(ii) Find the cubic spline for the following table of values given. Find the value of f(x) at x=3.5.

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| f(x) | 30 | 15 | 32 | 18 | 25 |

**Module III**

4. (a) Given the differential equation $\frac{\partial^2 f}{\partial x^2} = \frac{\partial f}{\partial t}$ and the boundary conditions $f(0,t) = f(5,t) = 0$ and $f(x,0) = x^2\left(25 - x^2\right)$. Use the explicit method to obtain the solution for $x = x_i = ih(i = 0,1,...5; h = 1)$ and $t = jk\left(j = 0,1,2...,6; k = \frac{1}{2}\right)$.

**OR**

(b) Solve the boundary value problem defined by $y'' - x = 0$ and $y(0) = 0, y'(1) = -\frac{1}{2}$ by

i) Collocation Method
ii) Galerkin Method

2 Pages

Model Question Paper

**Name of the Examination: SIXTH SEMESTER B.TECH. DEGREE EXAMINATION**

**(2008 Scheme)**

**BRANCH: CIVIL ENGINEERING**

**SUBJECT: 08.606.5 Elective II TRAFFIC ENGINEERING (C)**

**Time: 3hrs.** **Max. Marks 100**

## PART A

**Answer all questions.**

1 What are the factors deciding the total reaction time of a driver?
2 Distinguish between Time mean speed and Space mean speed.
3 The length of skid marks produced on stopping a vehicle moving at 50 kmph by fully jamming the brakes is 6m. What is the average skid resistance?
4 Enumerate the various methods used in traffic management at an intersection.
5. Where are yield signs used?
6. Sketch typical lay-outs for systems of street lighting.
7. Explain the effect of turning vehicles on saturation flow and how it is addressed in signal design.
8. What are the factors affecting capacity and level of service?

(8 x 5 =40)

## PART B

**Answer one question from each module**

### Module I

9. a) Discuss the use of photographic techniques in traffic survey.
b) The data obtained during a spot speed study are given in table 1.

| Speed range (kmph) | No. of vehicles | Speed range (kmph) | No. of vehicles |
|---|---|---|---|
| 0-10 | 8 | 50-60 | 180 |
| 10-20 | 10 | 60-70 | 60 |
| 20-30 | 40 | 70-80 | 35 |
| 30-40 | 96 | 80-90 | 8 |
| 40-50 | 146 | 90-100 | 6 |

Determine i) speed limits ii) design speed. (20)

10. a) Explain moving observer method of speed study. What are its advantages over other techniques used? (10)

b) Discuss any two techniques used for origin-destination study, with their advantages and disadvantages. (10)

## Module II

11. a) What are mandatory signs? Explain any three with neat sketches. (5)

b) The traffic volume at a four legged intersection during peak hour (PCUs) is 500 and 825 in the EW and NS directions respectively. The approach widths are 6m for the NS approach and 8 m for the EW approach. The inter-green period is 8 seconds and the start-up lost time is 2.5 seconds. Design a traffic signal including pedestrian phase. Also prepare the signal timing diagram. (15)

12. a) What is meant by ITS? What is its relevance in a country like India? (10)

b) With a neat sketch, explain the street lighting at a T- intersection. (10)

## Module III

13. a) How is the capacity of a rotary computed? Explain with sketches. (10)

b) Assuming linear speed-density relationship, derive the expression for maximum flow. (10)

14. a) What do you understand by LOS? How is it determined? (10)

b) Explain the fundamental diagrams of traffic flow. (10)