

5E5061

Roll No. _____

[Total No. of Pages : 4]

5E5061

B.Tech. V Semester (Main & Back) Examination, Nov./ Dec. - 2017

Civil Engineering

5CE1A Theory of Structures - I

Time : 3 Hours

Maximum Marks : 80

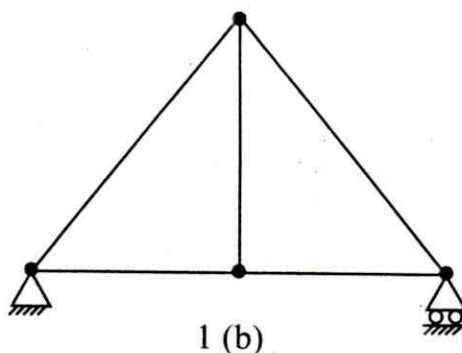
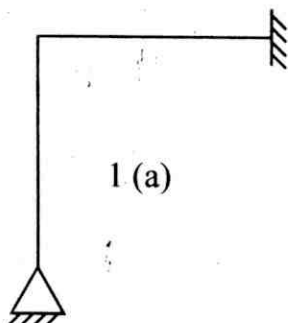
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any **five questions**, selecting **one question from each unit**. All Questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Define kinematic, indeterminacy. Calculate kinematic indeterminacy for the following structures. (6)



- b) Write and prove Maxwell Betti's generalized reciprocal theorem. (4)

- c) In a cantilever Beam AB, of span l , fixed at A and carrying a point load P at the free end B, the deflection 'y' of a section X, distance x from A is given by

$$y = \frac{px^2(3l-x)}{6EI}$$

If the cantilever is now loaded with a concentrated load W at

X and propped at B to the same level as A, show by the reciprocal theorem,

$$\text{that the reaction } R_B = \frac{Wx^2(3l-x)}{2l^3} \text{ E is modulus of elasticity and I is moment}$$

of inertia of the beam. (6)

OR

1. Analyze the rigid frame shown in fig. 2 using slope-deflection method. Draw the BMD. (16)

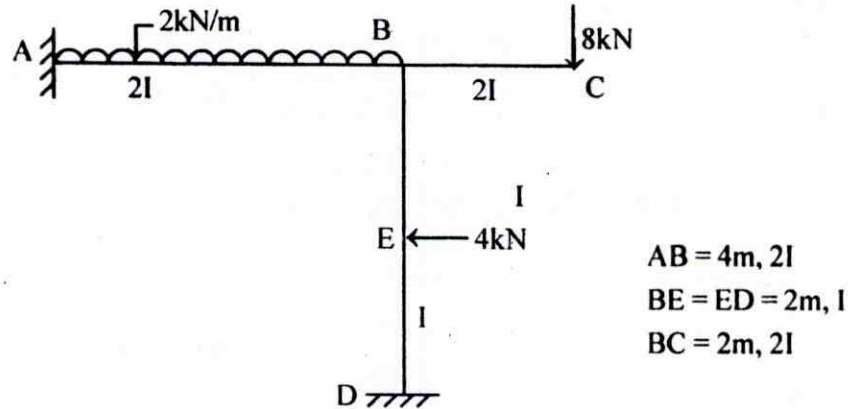


Fig. 2

Unit - II

2. A portal frame ABCD as shown in fig. 3 is hinged at A and fixed at end D. Analyze the frame using moment distribution method and draw the BMD and deflected shape. (16)

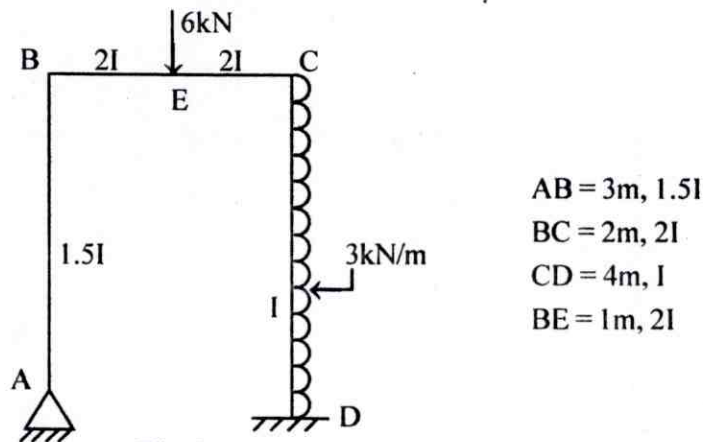


Fig. 3

OR

2. A horizontal beam ABCD is supported on hinges at all the supports. The beam is loaded as shown in Fig. 4. Take moment of inertia as $2.4 \times 10^6 \text{ mm}^4$ and $E = 2 \times 10^5 \text{ N/mm}^2$. Solve the beam using moment distribution method if the support B sinks by 30mm and C sinks by 20mm down respectively from the original same level. Draw BMD and deflected slope of beam. (16)

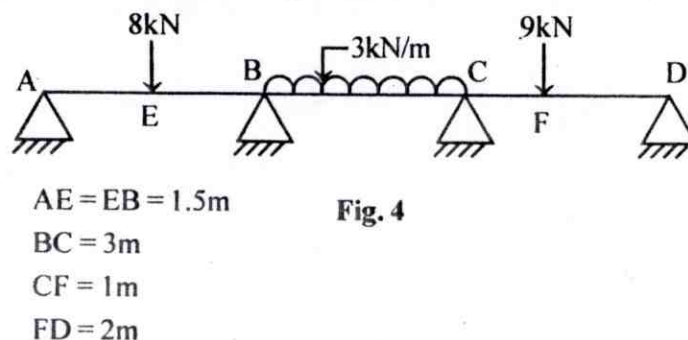


Fig. 4

Unit-III

3. Determine the horizontal deflection of roller support C of the frame shown in fig. 5 due to applied load of 80kN being applied at B. Area of members AB, BC and BD are each of 800mm^2 and AD and CD are each of 1600mm^2 area. Take $E = 2.06 \times 10^5 \text{ N/mm}^2$. (16)

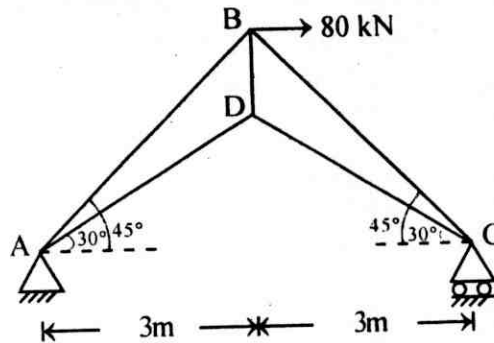


Fig. 5

OR

3. Find the forces in all the members of the frame shown in fig. 6. All the bars of same area of cross section and of same material. Use strain energy principles for solution. (16)

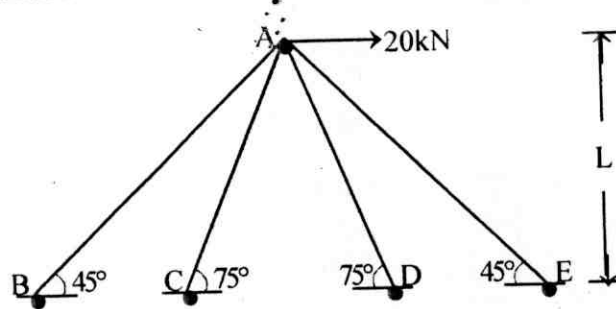


Fig. 6

Unit-IV

4. a) Derive the generalized column flexure formula to obtain stress 'f' at any point (x,y) in a column section subjected to axial load and moments. Write the sign conventions to be adopted while applying the formula. (8)
- b) A fixed beam AB, carries a point load W at a distance L/4 from support A. Calculate support moments using column analogy method. Take EI constant. Draw BMD. (8)

OR

4. Solve portal frame ABCD using column analogy method. Draw BMD fig. 7. (16)

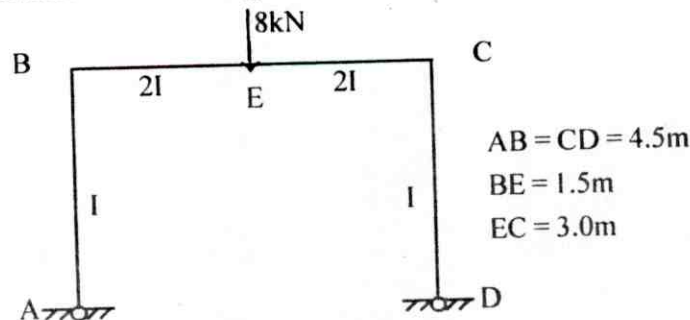


Fig. 7

Unit - V

5. In fig. 8, plan of a tripod is shown. The feet A, B and C being in some horizontal plane and apex D being 3.25m above the plane. Horizontal force of 100 kN and 50 kN are applied at D in the direction shown in fig. 8. Find the forces in member assuming that all joints are pin joints. (16)

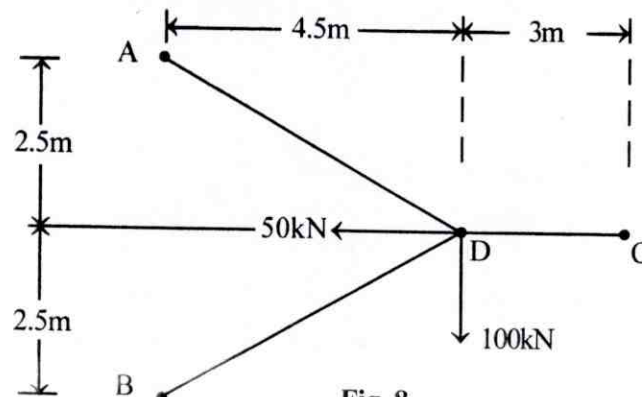


Fig. 8

OR

5. A building frame consists of three equal bays of 4m width and height of each storey is 4m. Find out wind moments, shears and direct forces in all columns and girders using portal method. Also mention the assumptions used in portal method fig.9. (16)

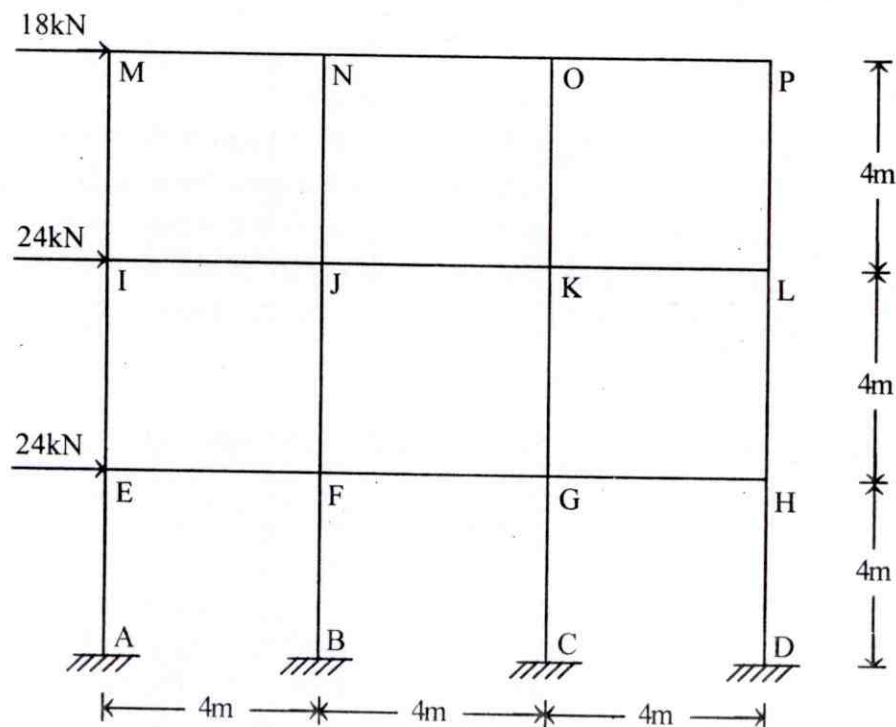


Fig.9



5E5062	Roll No. _____	[Total No. of Pages : 2]
	5E5062	
	B.Tech. V Semester (Main/Back) Examination, Nov./ Dec. - 2017 Civil Engineering 5CE2A Environmental Engg.-I	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What do you mean by environment? What are the components of environment? Describe role of an environmental engineer. (8)
- b) Describe various types of water demands. (8)

OR

1. a) What is per capita demand? How can we measure/find out it and what are the important factors which affect it? (8)
- b) Explain the terms – population forecasting and design period. Also discuss the factors which affect water consumption. (8)

Unit - II

2. a) How is the surface water different than ground water in terms of quality? Explain with suitable examples and also describe other sources of water. (8)
- b) What do you mean by hydrological cycle? Draw a neat sketch and explain the processes involved in it. (8)

OR

2. a) How do we assess the yield of a ground water source? Also explain the process of development of a source. (8)
- b) List out the chemical, physical and biological standards of drinking water with their permissible limits as per the Indian standards. (8)

Unit - III

3. a) What are the different types of pipes used in water supply? Explain their merits and demerits along with the selection criteria and factors affecting their selection. (8)
- b) What are the different unit processes involved in water treatment. Explain solids separation in detail. (8)

OR

3. a) What are the different types of pumps used in water supply? Describe their suitability with comparison. (8)
- b) What do you understand by softening of water? Explain in detail, any one method with neat sketch. (8)

Unit - IV

4. a) Explain the process of filtration and working of rapid sand filters with suitable sketch. (8)
- b) Explain the removal of dissolved solids from water with suitable explanation of the methods. (8)

OR

4. a) What is disinfection of water? Describe the process and different methods used for this purpose with their suitability. (8)
- b) Compare slow sand filters with rapid sand filters. (8)

Unit - V

5. a) What are the methods of water distribution? Explain the components of distribution system. Also discuss types of distribution reservoirs. (8)
- b) Explain the Hardy - Cross method for analysis of pipe networks with suitable example. (8)

OR

5. Write short notes on any Four : (4 × 4 = 16)
- i) Components of water service connection
 - ii) Plumbing systems
 - iii) Layout of Distribution system
 - iv) Mass curve method
 - v) Fire Hydrants

5E5063	Roll No. _____	[Total No. of Pages : 2]
	5E5063	
	B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017 Civil Engineering 5CE3A Geotechnical Engineering - I	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the Hydrometer test in detail with stretches. (8)
- b) A soil has a porosity of 40%, The specific gravity of solids 2.65 and a water content of 12%. Determine the weight of water required to be added to 100 m³ of this soil for full saturation. (8)

OR

1. a) Write about the is classification system of soil in detail. (8)
- b) Explain the liquid limit, plastic limit and shrinkage limit with fig and methods to find shrinkage limit. (8)

Unit - II

2. a) What are the different types of soil structures which can occur in nature. Describe in detail. (8)
- b) Discuss the characteristics and construction of montmorillonite' and Illite mineral groups. (8)

OR

2. a) What are different methods for determination of the co-efficient of permeability in laboratory. Discuss their limitations. (8)
- b) Explain permeability of stratified soil masses. (8)

Unit - III

3. a) What is quick sand? How would you calculate hydraulic gradient required to create quick sand conditions in a sample of sand? (8)
- b) Define total stress, neutral stress and effective stress. What is importance of effective stress. (8)

OR

3. a) Explain the term piping and uplift pressure. (8)
- b) Explain the method of constructing a flow net in an earth dam consisting of two different zones. (8)

Unit - IV

4. a) Describe direct shear test. What are its merits and demerits. (8)
- b) Explain unconfined compression test with fig. What is advantage over triaxial test. (8)

OR

4. a) A cylindrical specimen of saturated clay, 4 cm in diameter and 9 cm in overall length is tested in unconfined compression tester. The length of specimen after failures is 8 cm. Find the unconfined compressive strength of clay, if the specimen fails under an axial load of 46.5 N. (8)
- b) What is Mohr's strength theory for soils sketch typical strength Envelope for a clean sand. (8)

Unit - V

5. a) Describe standard proctor test and Modified proctor tests. (8)
- b) What are the factors that effect compaction? Discuss in brief. (8)

OR

5. a) What are the different methods of compaction in field. How would you select the type of roller. (8)
- b) What is mechanical stabilization. What are factors that affect the mechanical stability of mixed soil. (8)

5E5064	Roll No. _____	[Total No. of Pages : 3]
	5E5064	
	B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017	
	Civil Engineering 5CE4A Surveying - II	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain how will you determine reduced level of top of a chimney, when two instrument positions are not in same vertical plane of the chimney. Also derive related expression? (8)
- b) Following reciprocal observations were made from two stations P and Q.
 Horizontal distance between two stations = 7000m
 Angle of elevation from P to Q - $1^{\circ}58'20''$
 Angle of depression from Q to P - $1^{\circ}59'12''$
 Height of signal at P - 4.1047 m
 Height of instrument at Q - 1.58 m
 Height of signal at Q - 3.90 m
 Height of instrument at P - 1.47 m
 Find the difference in level between P and Q. Take $R \sin i'' = 30.88$ m. (8)

OR

1. a) Explain how will you determine the elevation difference between two stations by single observation. Derive expression for Elevation difference for angle of elevation. Support your answer with proper and neat sketch. (8)
- b) Derive expression for axis signal correction in trigonometric levelling for angle of elevation? (8)

Unit - II

2. a) Enumerate the methods of setting out simple circular curve. Explain the method perpendicular offset from long chord to set out simple circular curve? (8)
- b) Two tangents intersect at a chainage 1190 m, the deflection angle being 36° . Calculate necessary data for setting out simple circular curve by Rankine's tangential angle method. The radius of curve is 300 m, take normal chord length as 20 m. (8)

OR

2. a) Explain methods of computing length of transition curve? (8)
- b) Two straights AB and BC are connected by compound curve. If deflection angle of first curve is $40^\circ 30'$ and second curve is $36^\circ 24'$ respectively. The radius of first curve is 600 m and that of second curve is 800 m. If the chainage of intersection point is 8200 m, find the chainage of tangent points T_1 and T_2 and point of compound curvature. (8)

Unit - III

3. a) What do you understand by well conditioned triangle? What is the importance of a well conditioned triangle in triangulation? Derive the condition for a well conditioned triangle? (8)
- b) Write different criteria for selection of a triangulation station? (8)

OR

3. a) What is the necessity of a satellite station in the triangulation? How reduction to centre is done if satellite station is selected in triangulation network? (8)
- b) Two triangulation stations A and B are 100 km apart having elevations 180 m and 450 m respectively. The intervening obstruction situated at C is 70 km from A, has elevation 245m. Ascertain if A and B are intervisible or not. If A and B are not visible then find the height of signal at B so that the line of sight must nowhere be less than 3 m above ground surface. (8)

Unit - IV

4. a) Explain the following with examples: (8)
- Accidental errors.
 - Systematic errors.
 - Weight of an observation.
 - Station Adjustment.
- b) What do you understand by figure adjustment? Adjust Braced quadrilateral by method of least square, write condition equations? (8)

OR

4. a) What do you understand by weight of a quantity? Explain the laws of weights with suitable examples? (8)
- b) Find the most probable values of angles A and B from following observation: (8)

$$A = 42^{\circ}20'30.4'' - wt. - 1$$

$$B = 36^{\circ}18'25.2'' - wt. - 2$$

$$A + B = 78^{\circ}38'50.3'' - wt. - 3$$

Unit - V

5. a) Enumerate the different astronomical co-ordinate systems. Explain one of them in detail. (8)
- b) Explain what do you understand by declination? Show the variation of declination of sun with salient values and specific dates? (8)

OR

5. a) Explain the Astronomical Triangle? (8)
- b) Calculate the sun's azimuth and hour angle at a place in latitude $42^{\circ}30'N$, when its declination is (8)
- i) $22^{\circ}12'N$ and
- ii) $22^{\circ}12'S$



Roll No. _____

[Total No. of Pages : 3]

5E5065**5E5065****B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017****Civil Engineering
5CE5A Building Design****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates :**

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. IS 1893 - Part I 2. IS 875 Part III

Unit - I

1. a) What do you understand by symmetry and Asymmetry in building form? (4)
- b) Describe the shear wall. What are the function of shear wall. (6)
- c) What are the tube in tube structure of high rise buildings? (6)

OR

1. a) What do you understand by over turning in a building. (4)
- b) Write the contributory area principle of load flow from slab to supporting beam? (6)
- c) What is building configuration? Explain various configurations in building? (6)

Unit - II

2. Calculate wind load on rectangular clad building with mono slope roof with over hangs. Consider height (h) = 5.0 m, width (w) = 10m, length (l) = 20 m, roof angle $\alpha = 20^\circ$ and overhang = 0.5 m, ground is flat, life of building 25 years, terrain category - 2, and building is constructed at surat. (16)

OR

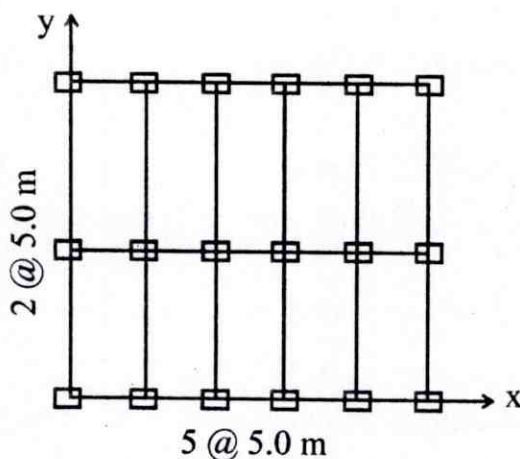
2. Calculate wind load on walls and roof of a rectangular clad building having pitched roof and located in a farm house, height of building is 4.0m, width 12 m and length 20m. Roof angle 10° , opening in wall = 10%, over hangs on either side is 0.5m, Building is located in Hyderabad. (16)

Unit - III

3. Calculate earthquake load on a 6 storey R.C. framed building with live load of 4.0 kN/m^2 on floors. Building is having 2 bays in X direction and 3 bays in Y direction, storey height is 3.0 m , all beams of $230 \times 400 \text{ mm}$ and columns $375 \times 500 \text{ mm}$ sizes. Floor thickness 100 mm and walls of 230 mm . Building is situated in seismic zone V and constructed for communication centre and is resting on rocky ground. Configuration of building is of special moment resisting frame. (16)

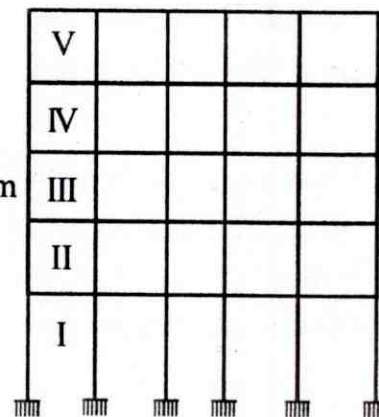
OR

3. a) What do you understand by centre of mass and centre of rigidity? (4)
- b) Calculate force in given frame building with following data. (12)
- Column size = $375 \times 375 \text{ mm}$
 - Beams size = $300 \times 375 \text{ mm}$
 - Brick wall thickness = 150 mm
 - Floor thickness = 120 mm
 - Live load on the floor = 4.0 kN/m^2
 - Storey height = 4.0 m each
 - No of storeys = 5



Plan

5 @ 4.0 m



5 @ 5.0

Elevation

Unit - IV

4. a) Write short note on ductile detailing of beam, column and beam - column joint? (8)
- b) What are the construction practices to ensure earthquake resistance for Masonry buildings. (8)

OR

4. a) How do you define wall and column in a masonry building? Explain effective length of masonry wall and column? (6)
- b) Calculate the height for a thickness of 300mm of a free standing masonry wall, subjected to wind load corresponding to 1.0 kN/m^2 . Permitted tensile stress in masonry is 0.05 N/mm^2 . (10)

Unit - V

5. a) Write a short note on mass housing and precast elements. (6)
- b) Calculate the stresses in shell of a cylindrical type using beam theory consider the radius of shell = 6.0 m, span = 20 m, semi central angle $\phi = 60^\circ$, thickness $t = 75 \text{ mm}$. (10)

OR

5. a) What are the difference between folded plate and cylindrical shell. (6)
- b) Write short notes on : (10)
- i) North light shell roofs
 - ii) Grid and ribbed floors



5E5068	Roll No. _____	[Total No. of Pages : 2]
	5E5068	
	B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017	
	Civil Engineering 5CE6.3A Solid Waste Management	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What are the main problems associated with solid waste disposal? (8)
- b) Explain the classification of solid waste. (8)

OR

1. a) What are the goals and objectives of solid waste management? (8)
- b) Describe the important characteristics of solid waste. Also discuss the factors influencing generation of solid waste. (8)

Unit - II

2. a) What do you mean by onsite handling of solid waste? How is the aspect of public health and aesthetics related to it? (8)
- b) What are the different types and materials used for storage containers? Explain with suitable sketches. (8)

OR

2. a) Explain the onsite processing methods used for solid waste. (8)
- b) How do we decide the location of containers? Write down the precautions and guidelines for this purpose. (8)

Unit - III

3. a) What are the important steps in collection and transfer system design? (8)
 b) Explain the equipment and labour requirement in reference to solid waste management. (8)

OR

3. a) Explain various methods of collection system with flow diagrams. (8)
 b) What are the different types of vehicles being used in for collection systems?(8)

Unit - IV

4. What do you understand by sanitary land filling? How is it different from a normal land filling? How is it practiced? Explain the filling process with a neat sketch. (16)

OR

4. Describe in detail the different processing techniques and methods of solid waste disposal with neat sketches. (16)

Unit - V

5. a) Explain the special techniques of treatment for industrial solid waste. (8)
 b) Describe the reuse and recycling of solid waste materials. (8)

OR

5. a) How is the nature, treatment and disposal of industrial solid waste different than the municipal solid waste? (8)
 b) Explain various methods of energy recovery from solid waste. (8)



Roll No. _____

[Total No. of Pages : 3]

5E5066**5E5066****B.Tech. V Semester (Main/Back) Examination, Nov./ Dec. - 2017****Civil Engineering****5CE6.1A Ground Improvement Techniques****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates :**

*Attempt any **five** questions, selecting **one** question from each unit. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Briefly discuss objectives of ground improvement techniques. (6)
- b) How soil is formed? Discuss different types of transported soil. (10)

OR

1. a) Discuss different types of transported soils. (10)
- b) Discuss factors affecting compaction. (6)

Unit - II

2. a) Discuss general principles of in-situ treatment of granular soil. (8)
- b) Discuss the method of compaction of sand by displacement piles. (8)

OR

2. a) Discuss dynamic compaction method of treatment of granular soil. (8)
- b) Explain blasting method of ground improvement. Discuss its suitability and limitations. (8)

Unit - III

3. a) What do you mean by compressibility of soil? Differentiate between compaction and consolidation. (8)
- b) Discuss vertical and radial consolidation. (8)

OR

3. a) Discuss mode of failures of stone column. What is unit cell? (8)
- b) How bearing capacity of single stone column is estimated? (8)

Unit - IV

4.

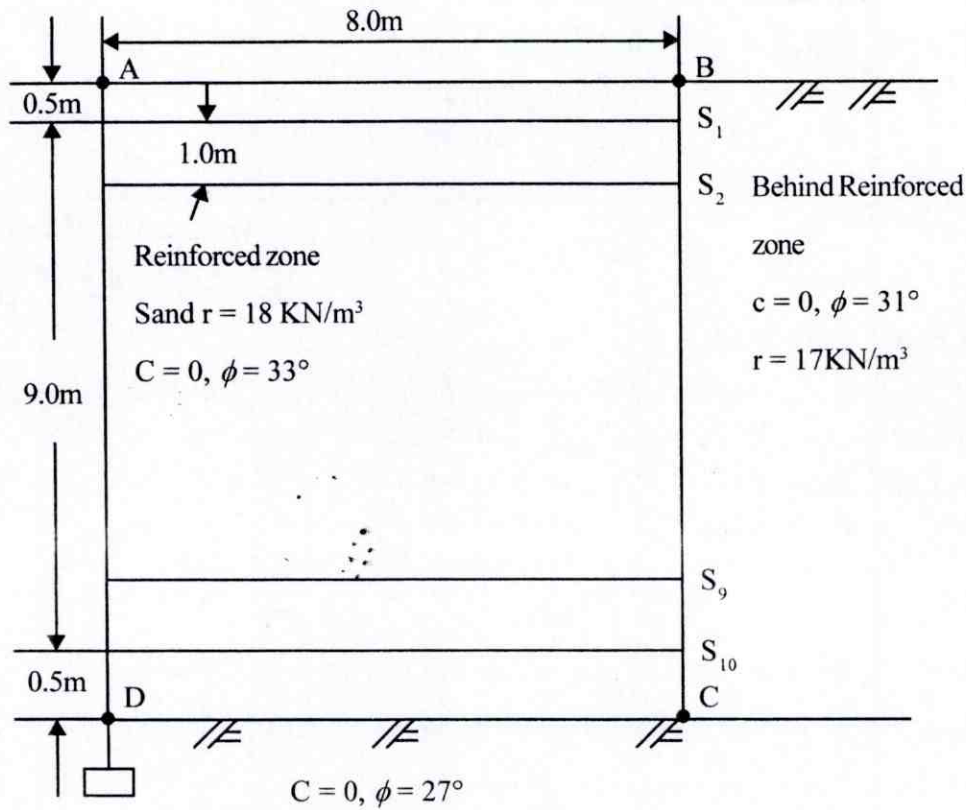


Fig - 1.

Check the stability of reinforced earth wall shown in fig-1 for stability against

- Sliding
- No tension
- Overturning and
- Bearing failure.

Safe Bearing capacity of underlying soil is 260 kN/m^2 .

(16)

OR

- State and discuss different types of Grout. Also discuss desirable characteristics of Grout. (8)
- What are different methods of Grouting? Explain any two methods. (8)

Unit - V

5. a) Discuss lime soil interaction. (10)
b) What is lime column? Discuss its advantages and disadvantages. (6)

OR

5. a) Discuss different methods of bitumen soil stabilization. (8)
b) Discuss factors affecting strength of soil-cement stabilization. (8)

