

Final Examination, 2023

Course No.: CE 613

Time: 03 (Three) hours

3rd Year 2nd Semester

Course Title: Structural Analysis II

Full Marks: 60

N.B. : (i) Answer any three question from each PART

(ii) Use separate answer scripts for each PART

(iii) Marks allotted are indicated in the margin

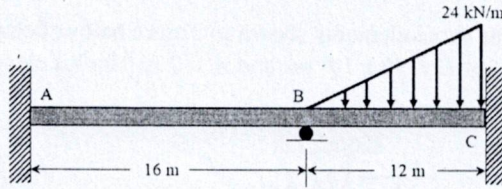
(iv) Special Instruction (if any)-----N/A-----

PART-A

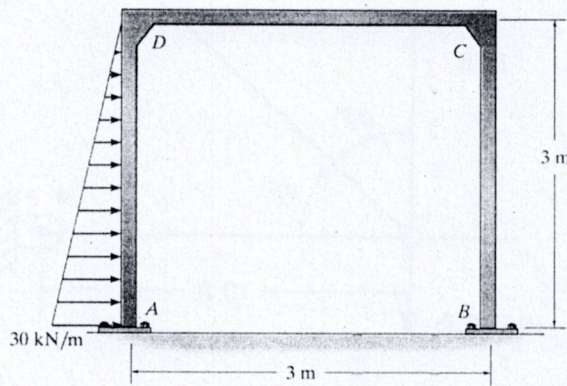
(Answer any two questions)

1. (a) Define the following terms: i) Degree of freedom, ii) Member stiffness factor, iii) Joint stiffness factor, iv) Distribution factor. 4

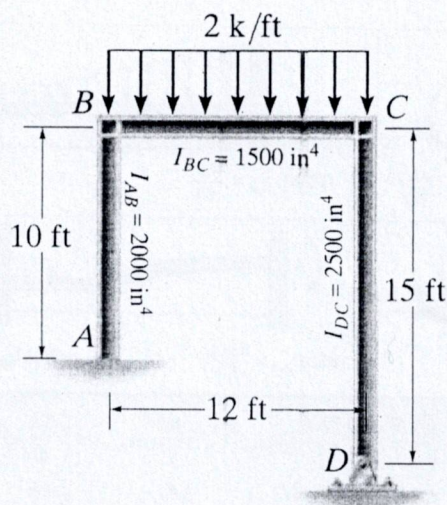
- (b) Draw the shear and moment diagrams for the beam shown below using the slope-deflection method. EI is constant. 6



2. Determine the moment at joints A, B, C, and D using slope-deflection equations. Assume the supports at A and B are fixed. EI is constant. 10



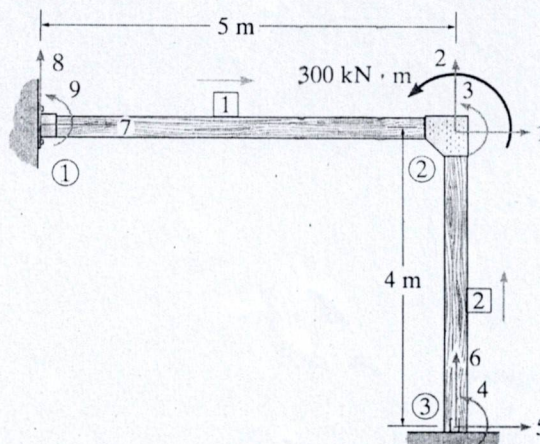
3. Determine the moments at each joint of the frame shown below using Moment distribution method. The moment of inertia of each member is indicated in the figure. Assume A is fixed, and D is pinned. 10



PART-B

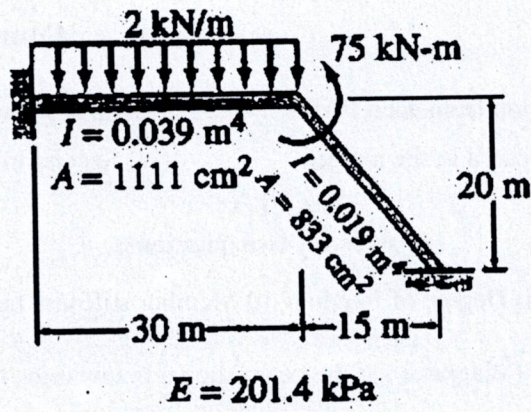
(Answer any two questions)

4. Determine the structure stiffness matrix \mathbf{K} for the frame given below. Assume ③ is pinned and ① is fixed. Take $E = 200 \text{ MPa}$, $I = 300 \times 10^6 \text{ mm}^4$, $A = 21 \times 10^3 \text{ mm}^2$ for each member. 10



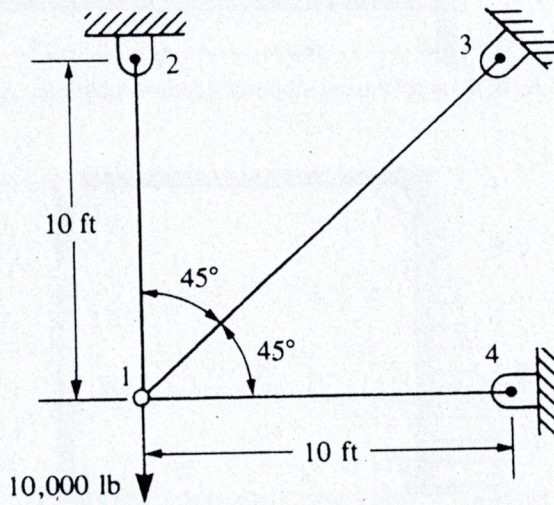
5. Determine the reactions and the member end forces for the frame shown in fig. below by using the matrix stiffness method.

10



6. For the plane truss composed of the three elements shown in Figure below, determine the x and y displacements at node 1 with the stiffness matrix method. Let $E = 30 \times 10^6$ psi and $A = 2$ in.² for all elements.

10



$(FEM)_{AB} = \frac{wL^2}{20}$ $(FEM)_{BA} = \frac{wL^2}{30}$	$(FEM)_{AB} = \frac{wL^2}{15}$	$(FEM)_{AB} = \frac{wL^2}{12}$ $(FEM)_{BA} = \frac{wL^2}{12}$
$(FEM)_{AB} = \frac{wL^2}{8}$	$(FEM)_{AB} = \frac{6EI\Delta}{L^2}$ $(FEM)_{BA} = \frac{6EI\Delta}{L^2}$	$(FEM)_{AB} = \frac{3EI\Delta}{L^2}$
$ \mathbf{k} = \begin{bmatrix} \left(\frac{AE}{L}\lambda_x^2 + \frac{12EI}{L^3}\lambda_y^2\right) & \left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & -\frac{6EI}{L^2}\lambda_y & -\left(\frac{AE}{L}\lambda_x^2 + \frac{12EI}{L^3}\lambda_y^2\right) & -\left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & -\frac{6EI}{L^2}\lambda_y \\ \left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & \left(\frac{AE}{L}\lambda_y^2 + \frac{12EI}{L^3}\lambda_x^2\right) & \frac{6EI}{L^2}\lambda_x & -\left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & -\left(\frac{AE}{L}\lambda_y^2 + \frac{12EI}{L^3}\lambda_x^2\right) & \frac{6EI}{L^2}\lambda_x \\ -\frac{6EI}{L^2}\lambda_y & \frac{6EI}{L^2}\lambda_x & \frac{4EI}{L} & \frac{6EI}{L^2}\lambda_y & -\frac{6EI}{L^2}\lambda_x & \frac{2EI}{L} \\ -\left(\frac{AE}{L}\lambda_x^2 + \frac{12EI}{L^3}\lambda_y^2\right) & -\left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & \frac{6EI}{L^2}\lambda_y & \left(\frac{AE}{L}\lambda_x^2 + \frac{12EI}{L^3}\lambda_y^2\right) & \left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & \frac{6EI}{L^2}\lambda_y \\ -\left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & -\left(\frac{AE}{L}\lambda_y^2 + \frac{12EI}{L^3}\lambda_x^2\right) & -\frac{6EI}{L^2}\lambda_x & \left(\frac{AE}{L} - \frac{12EI}{L^3}\right)\lambda_x\lambda_y & \left(\frac{AE}{L}\lambda_y^2 + \frac{12EI}{L^3}\lambda_x^2\right) & -\frac{6EI}{L^2}\lambda_x \\ -\frac{6EI}{L^2}\lambda_y & \frac{6EI}{L^2}\lambda_x & \frac{2EI}{L} & \frac{6EI}{L^2}\lambda_y & -\frac{6EI}{L^2}\lambda_x & \frac{4EI}{L} \end{bmatrix} $		

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Final Examination, 2023
Course No.: CE 643
Time: 03 (Three) hours

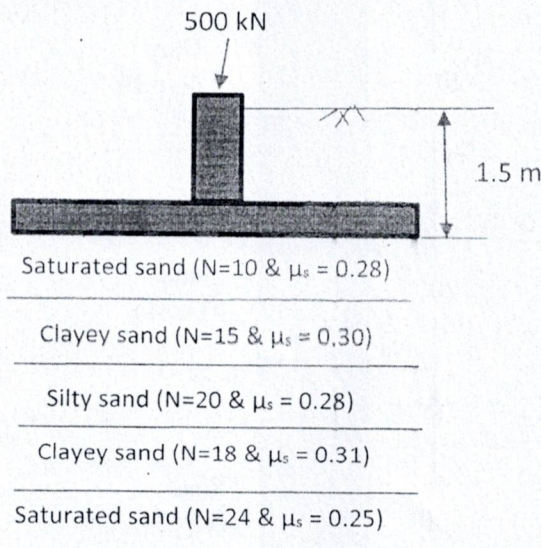
3rd Year 2nd Semester
Course Title: Geotechnical Engineering II
Full Marks: 60

N.B. : (i) Answer any two questions from each PART
 (iii) Marks allotted are indicated in the margin

(ii) Use separate answer scripts for each PART
 (iv) Special Instruction (if any)-----N/A-----

PART- A
 (Answer any three questions)

1. (a) What do you mean by shallow foundation and deep foundation? Explain mathematically with appropriate figures, and also describe the different purposes of the foundation. 2
- (b) Which fundamental requirements should followed for an efficient and high-functioning foundation? 2
- (c) When do you prefer combined footing instead of single footing? 2
- (d) Do you believe soil type under the foundation considerably affects foundation performance? Explain with neat a sketch. 2
- (e) What are collapsible soils? How do we identify collapsible soil deposits? Explain mathematically. 2
2. (a) What do you mean by subsurface investigation or soil exploration and which factors are considered for the subsurface investigation program? For civil engineering projects, which information is usually used from a sub-surface-investigation program? 3
- (b) What is soil sampling technique or simply sampling? Describe different types of soil sampling considering soil conditions. 3
- (c) For a soft sensitive clay sampling, the outside diameter of the cutting shoe is 50 mm. What is the maximum acceptable value of the inside diameter of cutting shoe? 2
- (d) For a 12-story-wide concrete building, estimate the bore depth for sub-surface investigation. From wash boring, which type of soil sample is collected? 2
3. (a) Define the terms: (i) Net ultimate bearing capacity (ii) Safe gross bearing capacity 1
- (b) Describe different types of shear failure of footing with neat sketch. 2
- (c) What factors influence the bearing capacity of a footing? 2
- (d) A strip footing of 2m width is founded at a depth of 2m below the ground surface. Use Terzaghi's theory and assume general shear failure. Take a factor of safety of 3.0. The soil at the site has $\gamma = 17 \text{ kN/m}^3$, $c = 15 \text{ kN/m}^2$ and $\phi = 25^\circ$. Determine the allowable bearing capacity for the following case: 5
 - (i) The water table rises to the level of the base of the footing
 - (ii) The water table rises to the ground surface and
 - (iii) The water table is 1m below the base of the footing
4. (a) Write the assumptions of Terzaghi's bearing capacity theory. 2
- (b) Determine immediate settlement at the center and corner of the 3 x 2 m size of footing as shown in figure below: Soil layer thickness = 3 m 6

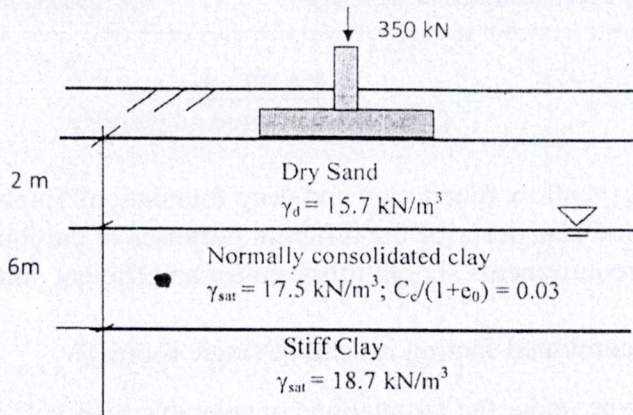


- (c) Explain the basic difference between primary consolidation settlement and secondary consolidation settlement. 2

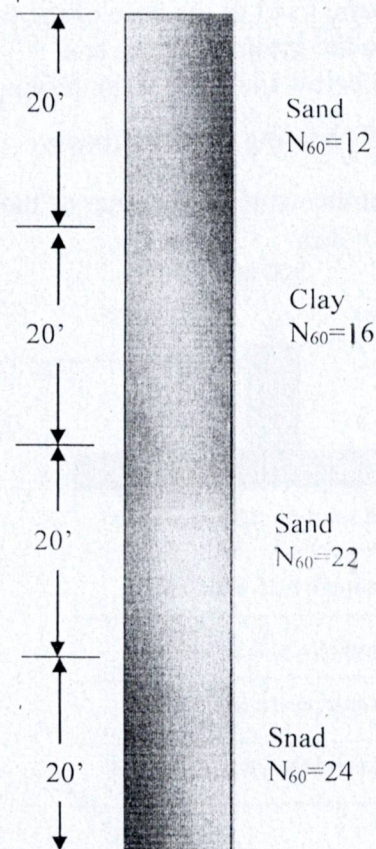
PART-B

(Answer any three questions)

5. (a) Calculate the total settlement consolidation settlement at middle oof the square footing of size 2 m x 2 m, shown in figure below. Use 2:1 pressure distribution

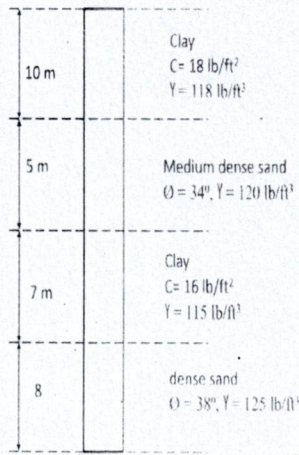


- (b) What is over consolidated clay and normally consolidated clay? Write down the reasons of tilting of the 'Tower of Pisa' 3
- (c) Explain the main criteria for determining the bearing capacity of the foundation. 2
- 6 (a) What are infinite slope and finite slope and describe factor of safety with respect to cohesion of soil. 2
- (b) Describes different causes of slope failure. 2
- (c) Why slope stability analysis is important? Describe on your own judgment. 2
- (d) To determine the factor of safety using Taylor's stability number for an embankment that is 15 m high with a slope of 40° , subjected to sudden drawdown, we use the following parameters: 2
- Cohesion (c) = 35 kN/m²
 - Angle of internal friction (Φ) = 16°
 - unit weight (γ) = 19 kN/m³
- (e) Describe different types of slope failure with appropriate figures and dimensions. 2
- 7 (a) Describe the tension pile and compaction pile using the appropriate figure. 2
- (b) Why is minimum reinforcement necessary for a driven concrete pile? 2
- (c) Determine the allowable bearing capacity of bored pile having diameter is 18 inch and consider F. S is 3.0 6



8. (a) A pile group consists of 9 piles (each row and column have 3 piles). The pile cap dimension is 10 ft X 10 ft. A single pile's total settlement value is 1.25 inches. Determine the settlement of pile group and group settlement ratio. If the pile diameter is 1.5 ft and the pile spacing center to center is 4.5 ft. Determine the pile group efficiency 5

(b) Calculate the allowable bearing capacity of the driven pile, which has a diameter of 0.5m, from the figure below 5



Attachment

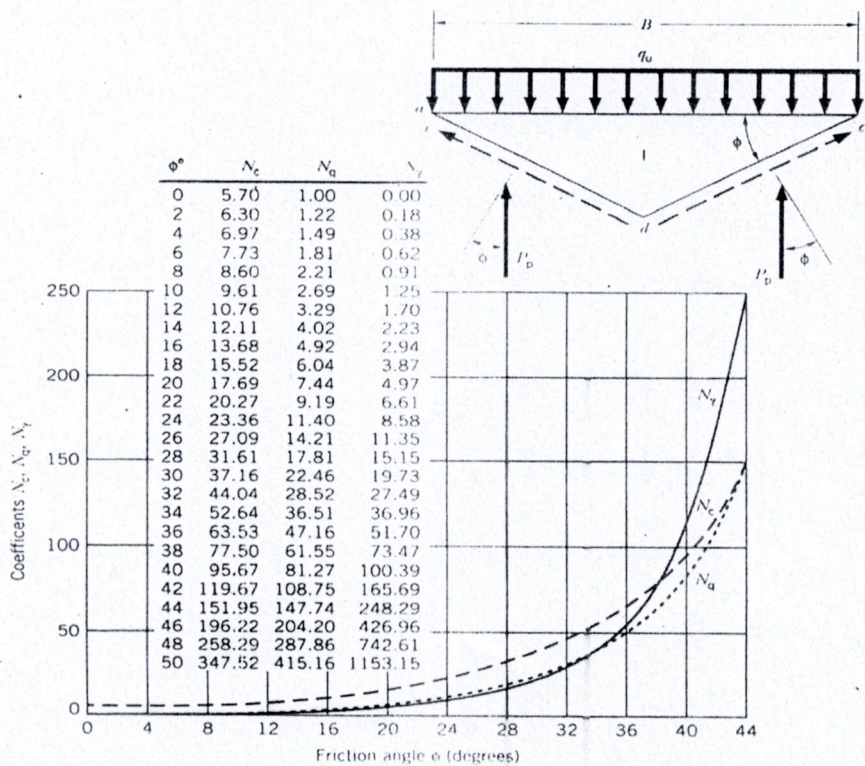
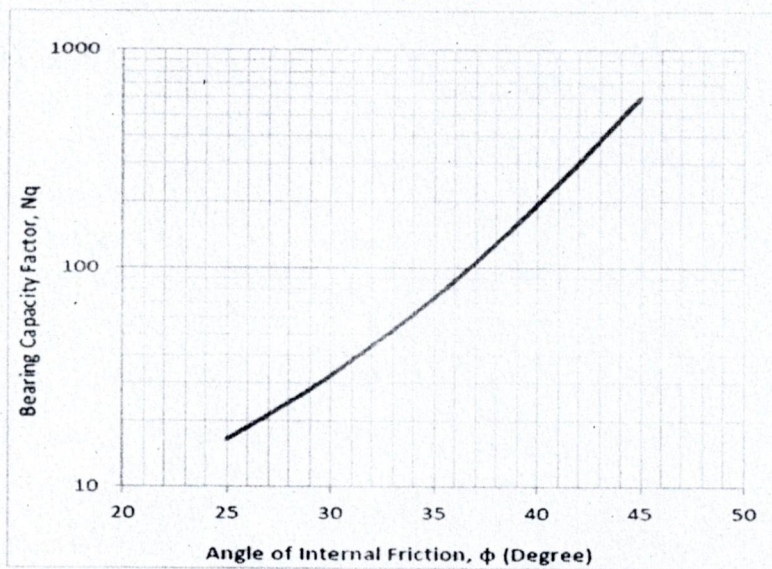


Figure: Terzaghi Bearing Capacity factor

Friction angle ϕ	Shape factors	Depth factors	Inclination factors
Any ϕ	$S_c = 1 + 0.2K_p(B/L)$	$d_r = 1 + 0.2\sqrt{K_p}(D/B)$	$i_c = i_q = (1 - \alpha/90^\circ)^2$
For $\phi = 0^\circ$	$S_c = S_q = 1.0$	$d_r = d_q = 1.0$	$i_r = 1.0$
For $\phi \geq 10^\circ$	$S_c = S_q = 1 + 0.1K_p(B/L)$	$d_r = d_q = 1 + 0.1\sqrt{K_p}(D/B)$	$i_q = (1 - \alpha/\phi)$

$K_p = \tan^2(45^\circ + \phi/2)$
 $\alpha =$ angle of resultant measured from vertical axis.

Sylhet Engineering College, Sylhet
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Department of Civil Engineering

Final Examination, 2023
Course No.: CE 683
Time: 02 (Two) hours

3rd Year 2nd Semester
Course Title: Project Management
Full Marks: 40

N.B. : (i) Answer any two questions from each PART
 (iii) Marks allotted are indicated in the margin

(ii) Use separate answer scripts for each PART
 (iv) Special Instruction (if any)-----N/A-----

PART- A

(Answer any two questions)

1. (a) “All managers carry out managerial functions but the time spent for each function varies according to their managerial hierarchy”, show your insight. 03
- (b) What is a scientific management? Describe in brief Taylor’s principles of scientific management. 04
- (c) Define the term construction management. What are the functions of construction management? 03
2. (a) Explain the terms (i) Earliest time, (ii) Latest time (iii) Event slack, (iv) Independent float and (v) Critical path. 03
- (b) What is CPM? Explain the basic steps in CPM? 02
- (c) Determine the early start and late start in respect of all node points and identify critical path for the network shown in figure 2(c). 05

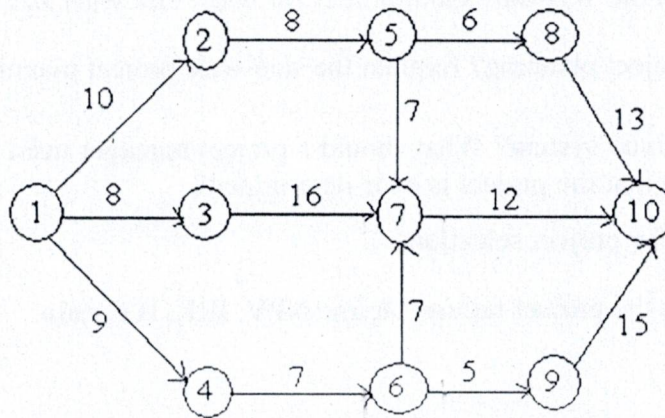


Figure 2(c)

3. (a) What are the differences between PERT and CPM? 03
- (b) A project has the following characteristics: 07

Activity	Most optimistic time (a)	Most pessimistic time (b)	Most likely time (m)
(1 – 2)	1	5	1.5
(2 – 3)	1	3	2
(2 – 4)	1	5	3
(3 – 5)	3	5	4
(4 – 5)	2	4	3
(4 – 6)	3	7	5
(5 – 7)	4	6	5
(6 – 7)	6	8	7
(7 – 8)	2	6	4
(7 – 9)	5	8	6
(8 – 10)	1	3	2
(9 – 10)	3	7	5

Construct a PERT network. Find the critical path and variance for each event

PART- B

(Answer any two questions)

4. (a) What is materials management? Why is it so important to project manager? 02
- (b) What are the principles of purchasing? Discuss in brief purchasing procedure. 03
- (c) What is a forecast? The table below shows the demand for a particular brand of lathe machine in a department store in each of the last twelve months. 05
- | | | | | | | | | | | | | |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Demand | 12 | 15 | 19 | 23 | 27 | 30 | 32 | 33 | 37 | 41 | 49 | 58 |
- Calculate the four month moving average for months 4 to 12. What would be your forecast for the demand in month 13?
 - Apply exponential smoothing with a smoothing constant of 0.3 to derive a forecast for the demand in month 13.
 - Which of the two forecasts for month 13 do you prefer and why?
5. (a) Why do we need to maintain an inventory? 02
- (b) The demand for spring water at the Plano WalMart is 600 litres per week. The setup cost for placing an order to replenish inventory is \$25. The water loses its freshness while stored at the Plano WalMart. To account for this, the WalMart charges an annual holding cost of \$2.6/liter. Determine how often the WalMart should order for water and what size each order should be. 05
- (c) What is meant by project planning? Explain the step-wise project planning in detail. 03
6. (a) What is over-determined system? What should a project manager need to do, if he/she finds in the middle of the project that the project is over-determined? 02
- (b) Mention the criteria for project selection. 03
- (c) Write the reasons for the project failure. Define NPV, IRR, B/C ratio. 05

Sylhet Engineering College, Sylhet
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Department of Civil Engineering

Final Examination, 2023

3rd Year 2nd Semester

Course No.: CE 625

Course Title: Reinforced Concrete Design II

Time: 03 (Three) hours

Full Marks: 60

N.B. : (i) Answer any three question from each PART

(ii) Use separate answer scripts for each PART

(iii) Marks allotted are indicated in the margin

(iv) Special Instruction (if any)-----N/A-----

PART- A

(Answer any three questions)

1. (a) Write down the ACI code specifications for column design. 3
- (b) Write a short note on "Strength Interaction Diagram of column". 2
- (c) Design a square tied column to support an axial dead load of 450 kips and a live load of 220 kips using $f_y = 60$ ksi, $f'_c = 5$ ksi and a steel ratio of 4.5%. Design the necessary ties. 5

2. (a) Why and where corner reinforcement is provided? 2
- (b) A floor slab of 62 ft 6 in x 47 ft 6 in (center to center distance of extreme column) beam supported commercial building is to carry service live load of 60 psf in addition to its own weight 1.5 inch thick floor finish, 0.5 inch thick plaster, 10 inch square columns are placed orthogonally at an interval of 20 ft 10 inch and 15 ft 10 inch on centers along longitudinal and transverse directions respectively, width of each beam is 10 inch. Using ACI Code coefficients design by the slab by U.S.D method if $f'_c = 4000$ psi, $f_y = 60000$ psi. Illustrate your answer by a neat plan showing both transverse and longitudinal reinforcement. Use the following moment distribution coefficients: 8
 $-C_a = 0.078,$ $+C_a \text{ DL} = 0.043,$ $+C_a \text{ LL} = 0.052$
 $-C_b = 0.036,$ $+C_b \text{ DL} = 0.013,$ $+C_b \text{ LL} = 0.016$

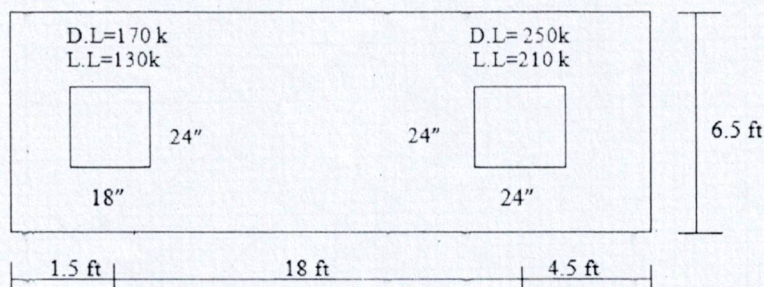
3. (a) What is the function of retaining wall? Draw and discuss the types of retaining wall. 4
- (b) Design a gravity wall is to retain a bank 12 feet high whose horizontal surface is subject to a live load surcharge of 450 psf. The soil is a sand and gravel mixture with a rather moderate amount of fine, silty particles, unit weight $w = 120$ pcf, $\Phi = 30^\circ$ (with adequate drainage to be provided), and base friction coefficient $f = 0.5$. The allowable bearing pressure is assumed to be 7000 psf. The weight of the concrete is $w = 150$ pcf. 6

4. (a) Discuss the types of footings. What are the main functions of footing? 4
- (b) A column 18 in. square, with $f'_c = 4$ ksi, reinforced with eight #8 bars of $f_y = 60$ ksi, supports a dead load of 250 kips and a live load of 200 kips. The soil (fill) has a unit weight of 100 pcf. The allowable soil pressure q_a is 5 kips/ft². Design a square footing with base 5 ft below grade, using $f'_c = 4$ ksi and $f_y = 60$ ksi. 6

PART- B

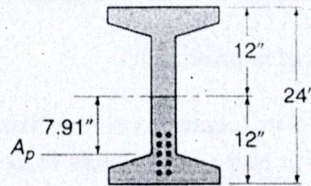
(Answer any three questions)

5. (a) Design the following combined footing at depth of 6 ft. Given that, unit weight of soil = 130 lb/ft³, allowable soil pressure = 4 ksf, $f'_c = 3$ ksi and $f_y = 60$ ksi. 10

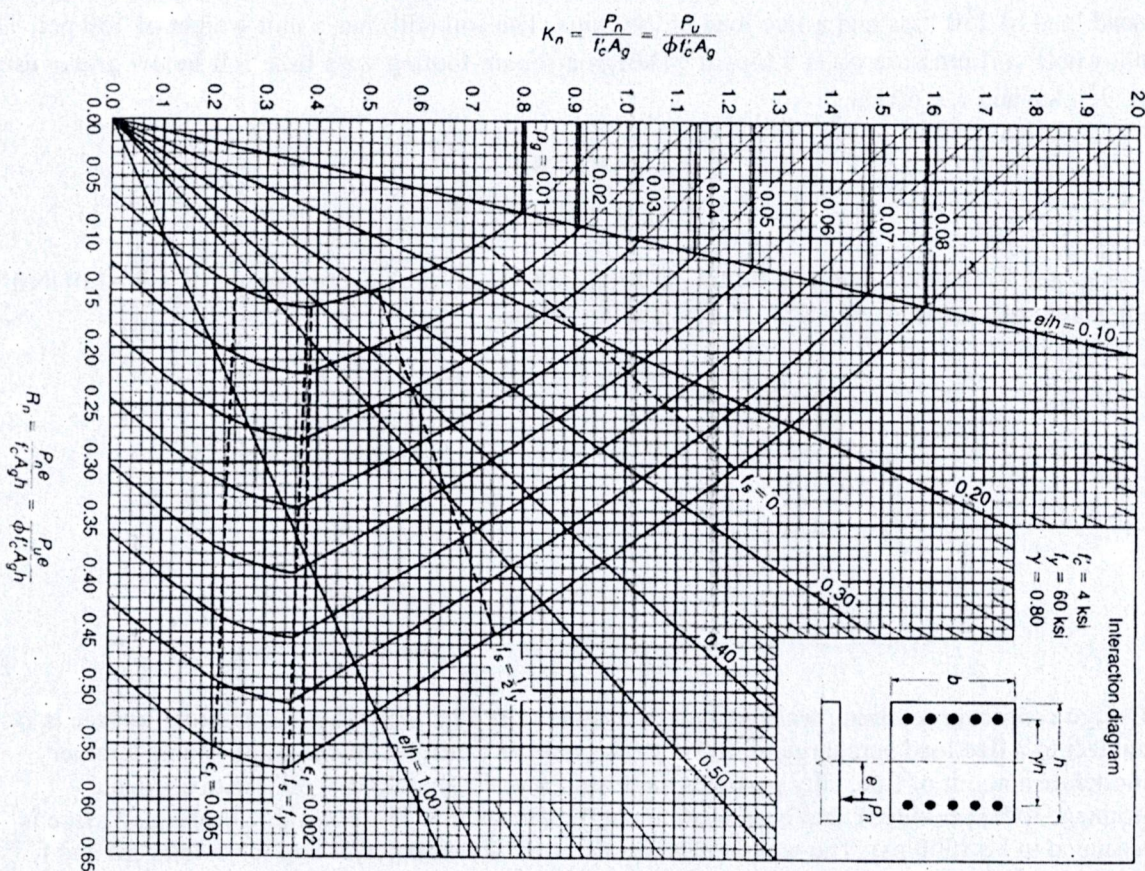


6. (a) Design cantilever retaining wall is to retain a bank 11 ft 6 in. high whose horizontal surface is subject to a live load surcharge of 400 psf. The soil is a sand and gravel mixture with a rather moderate amount of fine, silty particles, unit weight $w = 120$ pcf, $\Phi = 30^\circ$ (with adequate drainage to be provided), and base friction coefficient $f = 0.5$. The allowable bearing pressure is assumed to be 8000 psf. The weight of the concrete is $w = 150$ pcf. Using $f'_c = 4500$ psi and $f_y = 60000$ psi. Assume any other value if necessary. 10

7. (a) What do you mean by prestressed concrete? Discuss the three concepts to explain the behavior of prestressed concrete. 3
- (b) Why high strength steel is used in prestressed concrete? 2
- (c) A simply supported symmetrical I beam shown in cross section in Fig. will be used on a 40 ft simple span. It has the following section properties Moment of inertia: $I = 12,000 \text{ in}^4$ Concrete area: $A = 176 \text{ in}^2$ Radius of gyration: $r^2 = 68.2 \text{ in}^2$ Section modulus: $S = 1000 \text{ in}^3$ Self-weight: $w = 0.183 \text{ kips/ft}$ and is to carry a superimposed dead plus live load (considered "sustained," not short-term) of 0.750 kips/ft in addition to its own weight. The beam will be pretensioned with multiple seven-wire strands with the centroid at a constant eccentricity of 7.91 in . The prestress force P_1 immediately after transfer will be 158 kips ; after time-dependent losses, the force will reduce to $P_e = 134 \text{ kips}$. The specified compressive strength of the concrete $f'_c = 5000 \text{ psi}$, and at the time of prestressing the strength will be $f'_a = 3750 \text{ psi}$. Calculate the concrete flexural stresses at the midspan section of the beam at the time of transfer, and after all losses with full service load in place. 5



8. (a) A 12 X 20 in. column is reinforced with four # 9 bars of area 1.0 in^2 each, one in each corner. The concrete cylinder strength is $f'_c = 4000 \text{ psi}$ and the steel yield strength is 60 ksi . Determine (a) the load P_b , moment M_b , and corresponding eccentricity e_b for balanced failure; (b) the load and moment for a representative point in the tension failure region of the interaction curve; (c) the load and moment for a representative point in the compression failure region; (d) the axial load strength for zero eccentricity. 6
- (b) A column is to be designed to carry a factored load $P_u = 481 \text{ kips}$ and factored moment $M_u = 492 \text{ ft-kips}$. Material strengths $f_y = 60,000 \text{ psi}$ and $f'_c = 4000 \text{ psi}$ are specified. Cost studies for the particular location indicate that a reinforcement ratio p_g of about 0.03 is optimum. Find the required dimensions b and h of the column. Bending will be about the strong axis, and an arrangement of steel with bars concentrated in two layers, adjacent to the outer faces of the column and parallel to the axis of bending, will be used. 4



Sylhet Engineering College, Sylhet
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Department of Civil Engineering

Final Examination, 2023

3rd Year 2nd Semester

Course No.: CE 669

Course Title: Hydraulics and Hydraulic Structure

Time: 03 (Three) hours

Full Marks: 60

N.B. : (i) Answer any three question from each PART

(ii) Use separate answer scripts for each PART

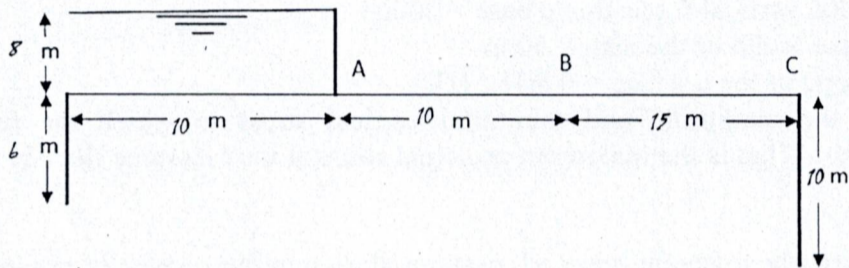
(iii) Marks allotted are indicated in the margin

(iv) Special Instruction (if any)-----N/A-----

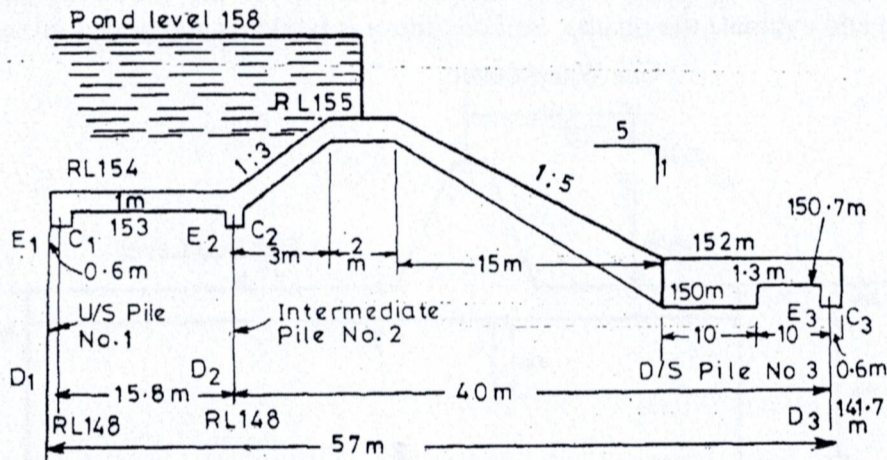
PART-A

(Answer any three questions)

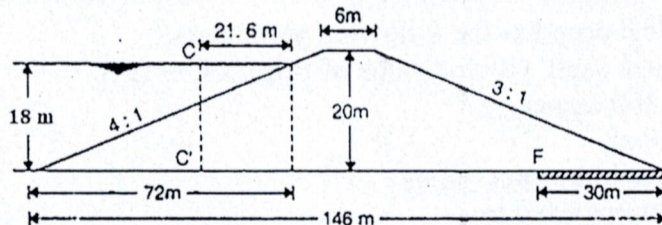
1. (a) Define exit gradient and critical exit gradient. 2
- (b) From Bligh's uplift pressure diagram, derive the expression used to calculate the thickness of the floor in a hydraulic structure. 2
- (c) Illustrate the failure of hydraulic structures built on a pervious foundation. 2
- (d) A hydraulic structure built on fine sand ($CI = 15$). Use Bligh's theory. Take $Gf = 2.5$. Determine: 4
 - a) Hydraulic gradient is safe or not.
 - b) Uplift pressure at points A, B, and C at distances 10, 20, and 35 m from the upstream end.
 - c) Thickness of floor at these points.



2. (a) Discuss the effect of horizontal acceleration due to seismic force acting on gravity dam. 4
- (b) From the following figure Evaluate the different corrections at downstream pile. Where $\text{OD3} = 27.7\%$, $\text{OE3} = 40.6\%$. Also Calculate Exit gradient. 6



3. (a) What are the design criteria for earth dams? 2
- (b) A wave in water 100 m deep has a period of 10 s and a height of 2 m. Determine the wave celerity, length. What is the water particle speed at the wave crest? 2
- (c) What are the Operational Challenges in Flood-Control Reservoirs 2
- (d) For the earth dam of homogeneous section with a horizontal filter as shown in Fig. below, if the coefficient of permeability of the soil material used in the dam is 5×10^{-4} cm/sec. Determine the phreatic line for this dam section with proper illustration and the discharge passing through the dam. 4

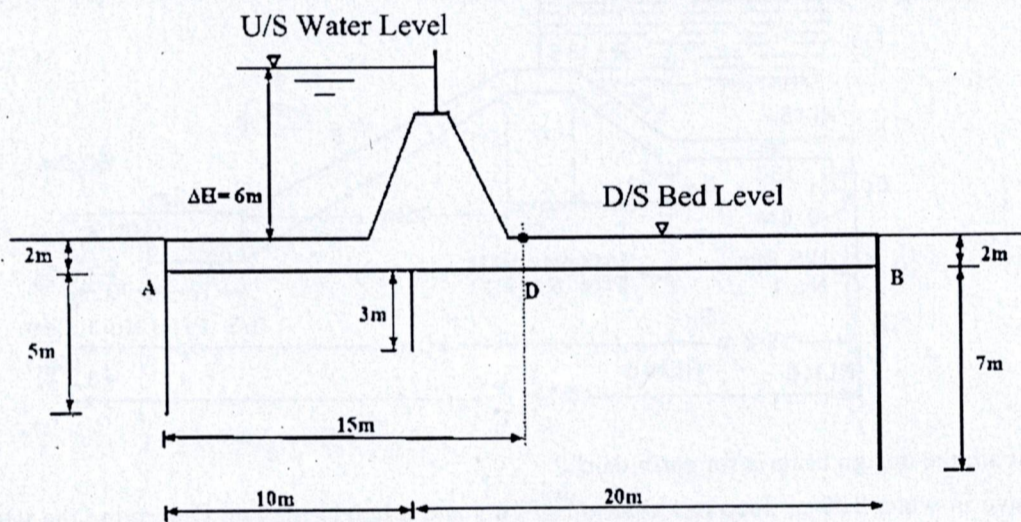


4. (a) Identify and explain the three typical locations where spillways can be constructed relative to a dam structure. 2
- (b) Describe the essential requirements that a spillway must fulfill to ensure effective operation. 2
- (c) What are the mandatory design Steps for designing a syphon aqueduct 2
- (d) Find the length of spillway from the following data: Height of spillway crest from river bed = 100 m Discharge = 8500 m³/s Permissible level of submergence above F.R.L. = 10 m Maximum permissible span (clear) = 12.5 m Thickness of each pier = 3 m Piers and abutments are rounded type. Assume any necessary data. 4

PART-B

(Answer any three questions)

5. (a) Explain the types of stilling basins in hydraulic structures with neat and properly labeled sketch showing the key components. 3
- (b) Discuss the factors influencing the selection of a suitable site for canal headworks, focusing on the different stages of river flow. 2
- (c) Calculate the bedload sediment transport rate in a tidal current given the following data: 5
 Depth mean current $u = 2.0$ m/s, grain size $D_{50} = 0.4$ mm, water depth $h = 10$ m, sea water density $\rho = 1027$ kg/m³ (@ 10° C and salt content 35 ppt), sediment density $\rho_s = 2650$ kg/m³ and kinematic viscosity $\nu = 1.36 \times 10^{-6}$ m²/s.
6. (a) Explain the concept of hydrodynamic drag force acting on submerged bodies in unsteady flow. Provide the formula for calculating drag force and define each term. 2
- (b) Discuss the Bagnold formula for estimating the rate of sand movement by wind, including the variables involved and their physical significance. 3
- (c) Following data were obtained from the stability analysis of a concrete gravity dam: 5
 (i) Total overturning moment about toe = 1×10^5 t-m
 (ii) Total resisting moment about toe = 2×10^5 t-m
 (iii) Total vertical force above base = 5000 t
 (iv) Base width of the dam = 50 m
 (v) Slope of the d/s face = 0.8(H): 1(V)
 Calculate the maximum and minimum vertical stress to which the foundation will be subjected to. What is the maximum principal stress at toe? Assume there is no tail water.
7. (a) List and describe different types of coastal pollution in the context of marine ecosystems. 3
- (b) Define bedforms and explain how they develop under varying flow conditions. 2
- (c) Differentiate between ripples and dunes in sandy beds, including their formation criteria and typical dimensions. 2
- (d) Find the hydraulic gradient and the head at point D of the following structure for static condition and evaluate the results. Soil condition is boulders and gravel mixed with sand. 3



8. (a) What is meant by cutoff? Define levee. What are the design considerations of a levee? 2
- (b) What is dominant discharge? Write down the factors governing the meandering parameters. 2
- (c) A weir with a vertical drop has the following particulars: 6
 Nature of bed: Coarse sand with the value of Bligh's $C = 12$
 Flood discharge = 300 cumecs
 Length of weir = 40 m
 Height of weir above low water = 2 m
 Height of falling shutter = 0.6 m
 Top width of weir = 2 m
 Bottom width of weir = 3.5 m
 Design the length and thickness of aprons and draw the cross sections of the weir.

Sylhet Engineering College, Sylhet
(Shahjalal University of Science & Technology)

Department of Civil Engineering

Final Examination, 2023

3rd Year 2nd Semester

Course No.: CE 651

Course Title: Transportation Engineering-I

Time: 03 (Three) hours

Full Marks: 60

N.B. : (i) Answer any three question from each PART (ii) Use separate answer scripts for each PART

(iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)-----N/A-----

PART- A

(Answer any three questions)

1. 1(a) Define Transportation Engineering. Briefly describe the Elemental Classification of Transportation Engineering. 04
- 1(b) Which characteristics are important for road transport system? Minimum ten benefit of a good system of roads. 06
2. 2(a) What do you mean by Transport Economics? Describe different types of Role of Transport in Society and enhance the economy of a country. 05
- 2(b) Why nature are important for Transportation Engineering? The steps of System Analysis Process with fig. 05
3. 3(a) Briefly describe Transportation System Model. What types of Movement and Transportation land cycle? 05
- 3(b) Which properties of the physical environment that have a direct impact on human behavior? 03
- 3(c) Which types of functional classes of traffic sign? 02
4. 4(a) Definition of Traffic Engineering. Briefly describe two modes of transport system. 03
- 4(b) Which types of factors are responsible for causes of congestion? 03
- 4(c) Which physical measures to control of vehicular movement? 04

PART- B

(Answer any three questions)

5. 5(a) What do you mean traffic signal? Short notes on isolated traffic signal design i) Phase ii) Amber period iii) Lost time 03
- 5(b) Design a two phase signal of an isolated cross junction for the following data: 07

Amber (a) in Sec	3			
Red -Amber in Sec	2			
	N-S	E-W		
Inter green, (i) in Sec	9	6		
Lost time, (I) in Sec	3	2		
Approaches				
	North	South	East	West
Arrival Flow (pcu/hr)	550	650	900	800
Sat. flow (pcu/hr)	2200	2300	2800	3000

6. 6(a) Explain how the saturation system helps in arriving at the best road system? 03
- 6(b) What types of characteristics are important for traffic? Briefly describe all traffic characteristics. 05
- 6(c) Draw different types of intersections. 02
7. 7(a) What do you mean by Reaction Time & types? Define PIEV & Why PIEV time will be increase? 05
- 7(b) Describe objectives of parking studies. Which method are follow in parking? 05
8. 8(a) Which factors are responsible for geometric design control criteria? 02
- 8(b) Short Notes: i) Super elevation curve ii) Sight distance 03
- 8(c) Define transportation planning. Briefly describe basic elements of transportation planning. 05