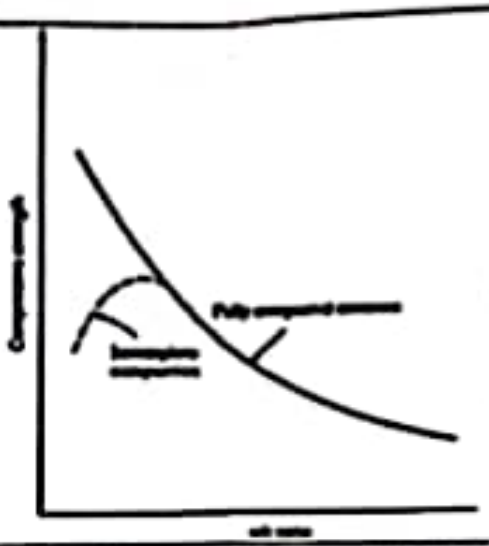
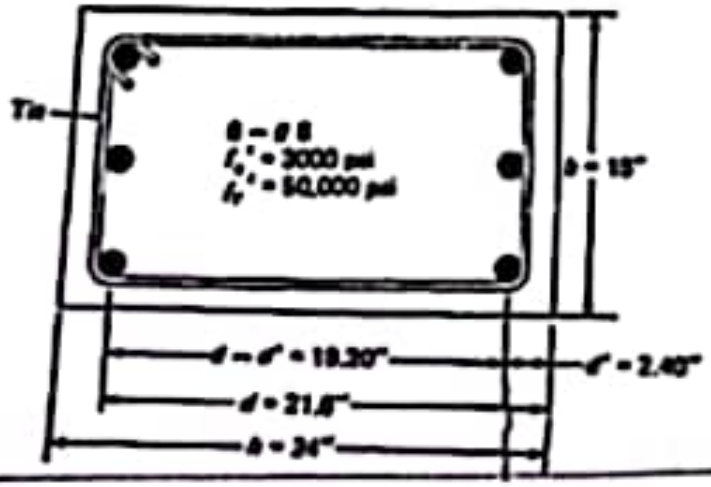
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHA

MID-SEMESTER EXAMINATION OF SECOND SEMESTER - THIRD YEAR (6TH SEMESTER) 2023, 20-BATCH, B.E (CI

SUBJECT: REINFORCED & PRE-STRESSED CONCRETE

Dated: 06.10.2023 Maximum Marks: 20 Time Allowed: 01 Ho

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS. QUESTION COMPULSORY.

Q. No		CLO	Taxonomy Level	PLO
01 (a)	**ILLUSTRATE** the effect of water cement ration on concrete in the light of following graph. Discuss the relation between water-cement ratio and workability. 	1	C3	3
01(b)	**DEMONSTRATE** the concept of "concrete cancer". What are possible remedial measures to control it.	1	C3	3
02	**DESIGN** a square tied column to support an axial dead load of 400 K and a live load of 232 K using $f'c$ = 5 ksi, fy = 60 ksi, and a steel ratio of about 5%. Design the necessary ties	2	C6	3
03	**PROPOSE** the following section to determine eccentric compressive strength P_o=P_b and eccentricity e_b for a balanced strain condition of a column section as shown in figure. Use ACI Code provisions 	2	C6	3

The End

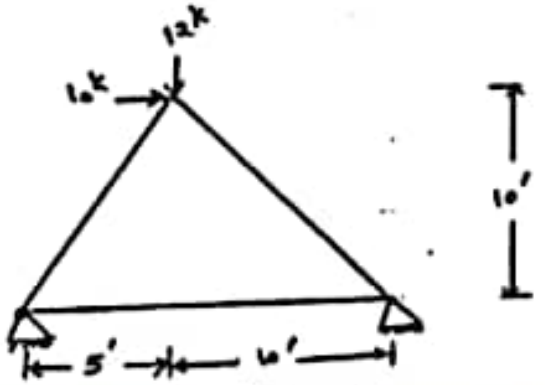
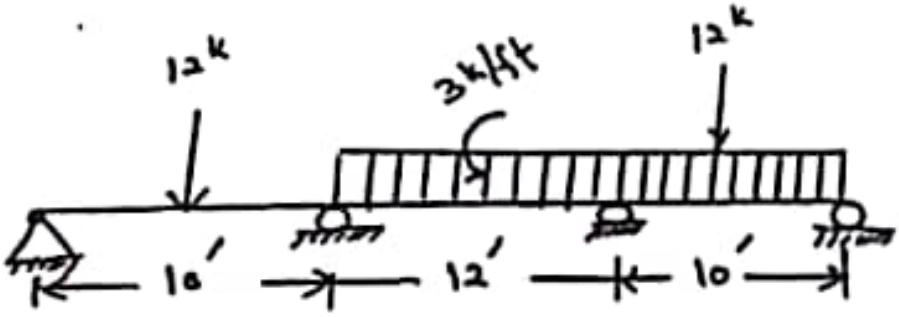
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF SECOND SEMESTER – THIRD YEAR (6TH SEMESTER) 2023, 20-BATCH, B.E (CE) B & C

SUBJECT: MODERN METHODS OF STRUCTURAL ANALYSIS

Dated: 04.10.2023 Maximum Marks: 20 Time Allowed: 01 Hour.

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		Question	CLO	Taxonomy Level	PLO	Marks
01		Discuss modern methods for analysis of structures. Also develop element stiffness matrix for truss.	1	C2	1	10
02		Form structural stiffness matrix of truss shown in figure. 	1	C2	1	10
03		Discuss basic concepts of stiffness matrix method. Determine fixed-end moments for the beam shown in figure. Also form fixed end forces matrix. 	1	C2	1	10

The End

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF SECOND SEMESTER - THIRD YEAR (6TH SEMESTER) 2023, 20-BATCH, B.E (CE-B&C)

SUBJECT: HYDROLOGY AND WATER STORAGE STRUCTURES

Dated: 03.10.2023 Maximum Marks: 20 Time Allowed: 01 Hour.

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS. QUESTION 03 IS COMPULSORY.

Q. No		CLO	Taxonomy Level	PLO	Marks
01(a)	DEMONSTRATE types and forms of precipitation with neat and clean diagrams.	1	C3	1	05
01(b)	A 121 hactare lake has an inflow through a riv er corresponding to 0.425 m^3/s (cumec) and outflow from same lake is 0.368 m^3/s (cumec) during one month water level in lake increases to 19700 m3 during same month it rained R mm. where as R is your Roll Number. USE Water-Balance Equation to determine evaporation from lake during this month.	1	C3	1	05
02	For the catchment area shown in Fig., the details of Thiessen polygons surrounding each raingauge and the recordings of the raingauges in the month of August 2011 are given below [table] Raingauge Station | 1 | 2 | 3 | 4 | 5 | 6 ; Thiessen polygon area (km²) | 720 | 380 | 440 | 1040 | 830 | 220 ; Recorded rainfall in mm during Aug 2011 | 121 | 134 | 145 | 128 | 99 | 115 USE following methods to calculate the average depth of rainfall on the basin in August 2011 by (I) arithmetic mean method, and (II) Thiessen mean method 	1	C3	1	10
03	DEMONSTRATE the following with diagrams 1. Weir and barrage 2. Canal head regulator and cross head regulator 3. Flow lines and Equipotential lines	2	C3	2	10

The End

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAM OF SECOND SEMESTER – THIRD YEAR (6TH SEM.) 2023 OF 20 BATCH, B.E (CE-G)

Dated: 28.11.2023 SUBJECT: SOIL MECHANICS Time Allowed: 3 Hours

Maximum Marks: 60

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		QUESTION	CLO	Taxi Level	Marks
Q. 01		What do you know by Atterberg's limits EXPLAIN the test procedure of liquid limit, plastic limit and shrinkage limit. Also draw Casagrande's Plasticity Chart and explain the usage of plasticity chart with examples.	02	C4	12
Q. 02		Following are the results of a sieve analysis. Make the necessary calculations and draw a particle-size distribution curve. Also determine a. D_{60}, D_{30}, and D_{10} b. Uniformity coefficient, C_u c. Coefficient of gradation, C_z	02	C4	12

U.S. sieve no	Mass of soil retained on each sieve (g)
4	0
10	40
20	60
40	80
60	140
80	122
100	210
200	56
pan	12

Q. 03		Define Geostatic stress in soil. Consider the upward flow of water through a layer of sand in a tank as shown in Figure. For the sand, the following are given: void ratio $e = 0.52$ and specific gravity of solids $G_s = 2.67$. a. Calculate the total stress, pore water pressure, and effective stress at points A and B. b. What is the upward seepage force per unit volume of soil?	02	C4	12
Q. 04	(a)	What are basis of classification of soils? which classification systems are used in geotechnical engineering? Classify the following soils using the Unified soil classification system. Give group symbols and group names.	02	C4	06
	(b)	The sieve analysis of five soils and the liquid and plastic limits of the fraction passing through the No. 40 sieve are given below. Classify the soils using the AASHTO classification system and give the group indexes.	02	C4	06
Q. 05	(a)	What is compaction of soil? why compaction of soils is necessary? Explain various methods and equipments for compaction of soil in field. Also describe modified proctor test and field density test in detail.	02	C4	06
	(b)	Describe following: 1. Flow nets and their uses 2. Optimum moisture content 3. Constant head permeability test	02	C4	06

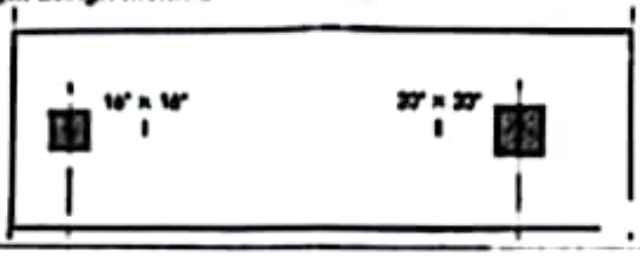
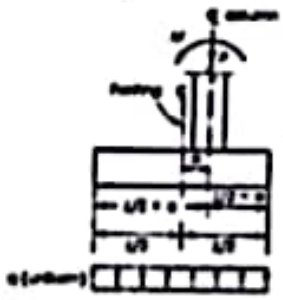
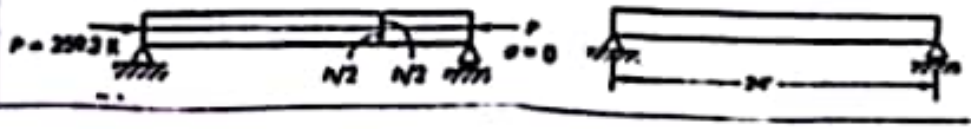
P.T.O

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH
FINAL SEMESTER REGULAR EXAMINATION OF SECOND SEMESTER – THIRD YEAR 2021 OF 20 BATCH B.E (CE-C)

SUBJECT: REINFORCED AND PRE-STRESSED CONCRETE

Dated: 01.12.2023 Maximum Marks: 60 Time Allowed: 3 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	(a)	Discuss Quality control and inspection in detail; How will you assure quality control at site. Explain general methods to be employed for inspection.	1	C2	1	06
	(b)	Discuss types of cracks that are usually encountered at site. What are possible remedial measures to be adopted while observing structural and non-structural cracks.	1	C2	1	06
Q. 02		Design a rectangular combined footing to support two columns, as shown in Figure. The edge column, I, has a section 16 × 16 in. and carries a DL of 180 K and an LL of 120 K. The interior column, II, has a section 20 × 20 in. and carries a DL of 250 K and an LL of 140 K. The allowable soil pressure is 5 ksf and the bottom of the footing is 5 ft below final grade. Use f'c = 4 ksi, fy = 60 ksi, and the ACI strength design method. 	2	C6	3	12
Q. 03		What is difference between concentric footing and eccentric footing? Design eccentric footing A 12 × 24 in column of an unsymmetrical shed shown in Figure subjected to an axial load PD = 220 K and a moment MD= 180 K-ft due to dead load and an axial load PL = 165 K and a moment ML = 140 K-ft due to live load. The base of the footing is 5 ft below final grade, and the allowable soil bearing pressure is 5 ksf. Design the footing using f'c = 4 ksi and fy = 60 ksi.  	2	C6	3	12
Q. 04		What is difference between pretensioning and posttensioning? Propose simply supported beam as shown in figure to determine the maximum stresses at midspan section due to its own weight and the following cases of loading and prestressing: 1. A uniform live load of 900 lb/ft 2. A uniform live load of 900 lb/ft and an axial centroidal longitudinal compressive force of P = 259.2 K 3. A uniform live load of 2100 lb/ft and an eccentric longitudinal compressive force P = 259.2 K acting at an eccentricity e = 4 in. 4. A uniform live load of 2733 lb/ft and an eccentric longitudinal compressive force P = 259.2 K acting at the maximum practical eccentricity for this section (e = 6 in.) 5. The maximum live load when P = 259.2 K acting at e = 6 in Use b = 12 in., h = 24 in., normal-weight concrete with f'c = 4500 psi, and an allowable f'c = 2050 psi. 	3	C6	3	12

P.T.O

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF SECOND SEMESTER – THIRD YEAR 2023 OF 20-BATCH, B.E (CE) (B&C)

SUBJECT: MODERN METHODS OF STRUCTURAL ANALYSIS

Dated: 24.11.2023 Maximum Marks: 60 Time Allowed: 03 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q.	QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	Analysis the beam shown in figure-1 by stiffness matrix method considering bending only.	1	C2	1	12
Q. 02	Analysis the frame shown in figure-2 by stiffness matrix method considering bending only.	1	C2	1	12
Q. 03	Compute member forces and deflection in beam shown in figure-3 by flexibility matrix method.	2	C3	2	12
Q. 04	Develop the relationship between shape function and displacement function for 2-node line element in finite element method.	3	C4	2	12
Q. 05	Discuss the concept of Dynamic structural Analysis. Explain the response of single freedom system and write Dynamic equilibrium equation.	3	C4	2	12

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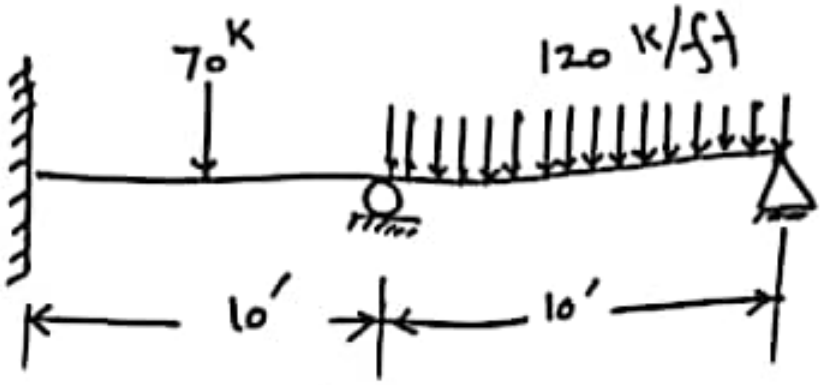


Figure-1

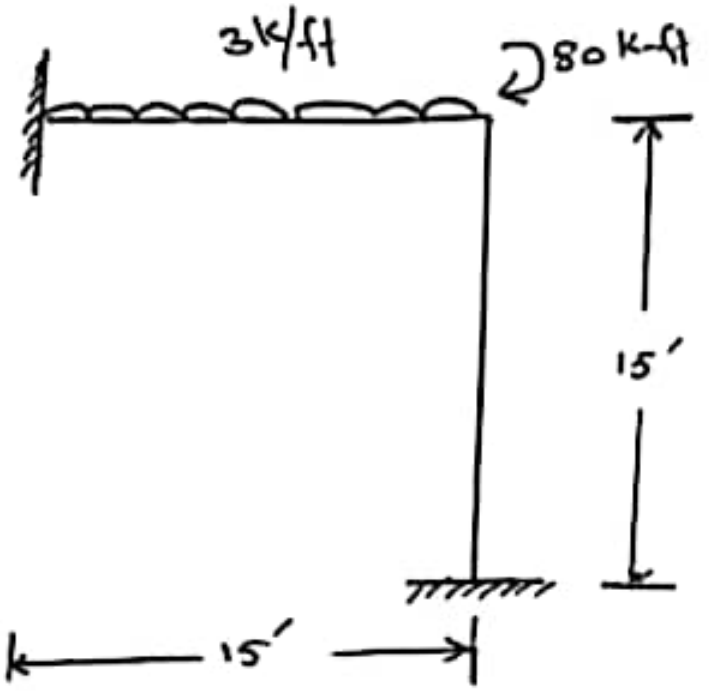


Figure-2

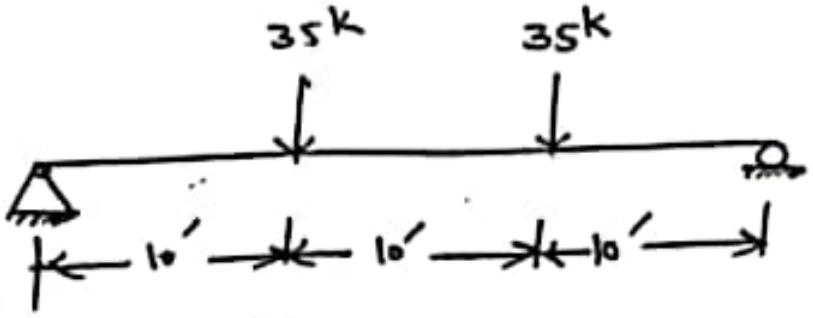


Figure-3

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF SECOND SEMESTER – THIRD YEAR 2023 OF 20 BATCH B.E (CE-B & C)

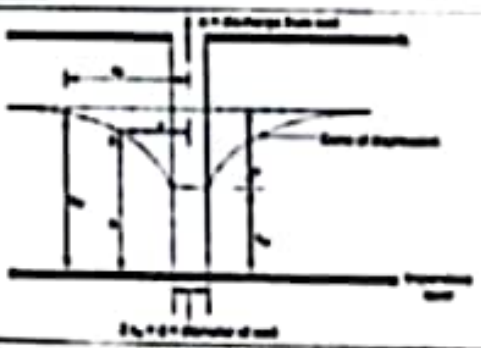
SUBJECT: HYDROLOGY AND WATER STORAGE STRUCTURES

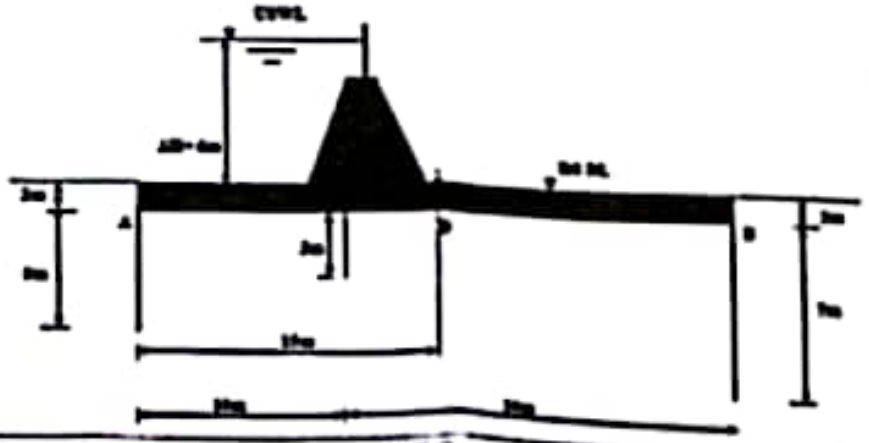
Dated: 21.11.2023 Maximum Marks: 60 Time Allowed: 3 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

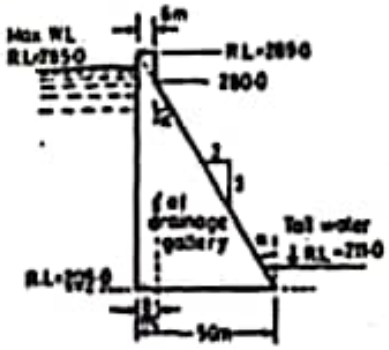
Q. #		CLO	Tax: Level	PLO	Marks
01	Demonstrate Hydrograph and Unit Hydrograph with applications. Illustrate the following run-off data of last spell of Monsoon season 2023 in Nawabshah region, run-off data of a drainage line was recorded for a catchment area of 500 hectares after a total rainfall of 10 mm in 30 minutes duration. Prepare a Unit Hdyrograph for area.	1	C3	1	12
02	Demonstrate various types of aquifers with neat and clean diagrams Solve a case of un-confined aquifer for a tube well of 30 cm diameter penetrates fully an unconfined aquifer to calculate its yield from following data: Draw down = 3 m, Strainer length = 10m, k = 0.05 cm / sec Radius of influence = 300 m	1	C3	1	12
03	Demonstrate Bligh's, Lane weighted creep theory and Khosla's theory of seepages. Water percolates at A and exits at B. Use following seepage theories to determine creep length and hydraulic gradient of hyraulic structure. a. Bligh's seepage theory b. Lane's Weighted creep seepage theory Comment on results explaining whether the hydraulic structure is safe or not. Also calculate residual uplift pressure at D by checking whether 2m floor thickness is sufficient to resist this residual pressure or not.	2	C3	2	12

Time (min)	Q Total (l/s)	Q Base (l/s)
0	5.0	5.0
30	43.3	5.0
60	158.30	5.0
90	464.80	5.0
120	694.80	5.0
150	1154.50	5.0
180	1001.20	5.0
210	847.50	5.0
240	694.70	5.0
270	311.50	5.0
300	158.30	5.0
330	81.70	5.0
360	5.0	5.0





P.T.O

04	Sketch various types of forces that act on gravity dam Analyze the section of gravity dam built of concrete for the following data. 1. Consider unit length of dam 2. Condition= Reservoir Full 3. Unit weight of concrete= 23.5 kN/m³ 4. Unit weight of water= 9.81 kN/m³ 5. Allowable stress in concrete may be taken as 2500 kN/m² Tabulate forces and moments to find out eccentricity. Apply following checks for performing stability analysis of gravity dam. 1. Check against overturning 2. Check against sliding (sliding factor) 3. Check against shear friction factor		2	C3	2	12
05	Illustrate Benefit-Cost analysis consideration of any hydraulic project. A project of unlined canal giving a seepage loss of 3.30 cumecs per million square meters of wetted area is to be proposed to be lined with 10 cm thick concrete lining which costs Rs. 180 per 10 square meters. Given the following data, work out the economics of lining and Implement Benefit-cost justification of this project. Annual revenue per cumec of water from all crops = 3.5 lacs Discharge in channel = 83.50 m³/s Area of channel = 40.8 square meters Wetted perimeter of channel = 18.3 m Wetted perimeter of lining = 18.8 m Annual maintenance cost of unlined channel per 10 m² = 10.0 (Rs.) Assume additional suitable data; if required.		2	C3	2	12

Formula and Design Aids

For Un-confined aquifer case

$$Q = \frac{\pi k_1 (s_1 + 2b_0)}{\ln\left(\frac{R}{r_w}\right)} = \frac{1.36\, k_1 (s_1 + 2b_0)}{\log\left(\frac{R}{r_w}\right)}$$

For Confined aquifer case

$$Q = \frac{2\pi T s}{\ln\left(\frac{R}{r_w}\right)} = \frac{2.72 T s}{\log\left(\frac{R}{r_w}\right)}$$

$$\therefore Q = \frac{2\pi k b (s_1 - s_2)}{\ln\left(\frac{r_2}{r_1}\right)} = \frac{2\pi T (s_1 - s_2)}{\ln\left(\frac{r_2}{r_1}\right)}$$

Bligh's Coefficients for Soil

Sl. No.	Type of Soil	Value of C	Safe Hydraulic gradient should be less than
1	Fine micaceous sand	15	1/15
2	Coarse grained sand	12	1/12
3	Sand mixed with boulder and gravel, and fine loam soil	5 to 9	1/5 to 1/9
4	Light sand and sand	8	1/8

Analysis of gravity dam

Factor of safety against overturning

$$F.S. = \frac{\sum (\text{Stabilizing moments})}{\sum (\text{Overturning moments})} = \frac{\sum M_r}{\sum M_o} > 1.5$$

Factor of safety against sliding

$$\text{Sliding factor, } S.F. = \frac{\mu \sum V}{\sum H} > 1$$

Shear friction factor,

$$S.F.F. = \frac{\tan\phi (\sum V) + b \cdot q}{\sum H} > 4$$

Lane's Coefficients for Soil

Sl. No.	Type of Soil	Value of Lane's Coefficient (C)	Safe Lane's Hydraulic gradient should be less than
1	Very fine sand or silt	8.5	1/8.5
2	Fine sand	7.0	1/7
3	Coarse sand	5.0	1/5
4	Gravel and sand	3.5 to 4.0	1/3.5 to 1/4
5	Boulders, gravels and sand	2.5 to 3.0	1/2.5 to 1/3
6	Clayey soils	1.6 to 3.0	1/2 to 1/3.6

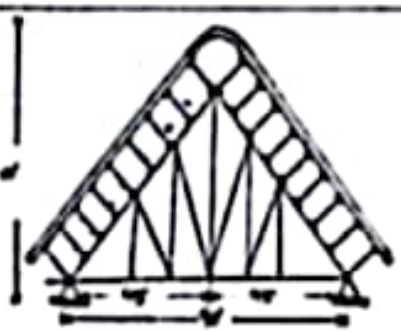
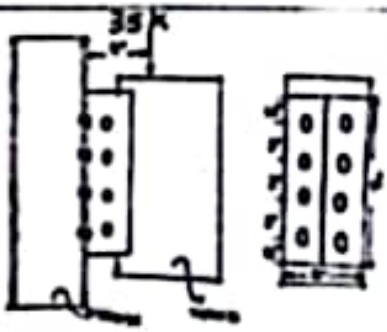
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAM OF SECOND SEMESTER – THIRD YEAR (6th SEM.) 2023 OF 20 BATCH, B.E (CE)

SUBJECT: STEEL STRUCTURES

Dated: 17.11.2023 Maximum Marks: 60 Time Allowed: 3 Hours

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS. ASSUME SUITABLE DATA WHEREVER NECESSARY.

Q. No		CLO	Taxonomy level	Marks
Q. 01	**Design** the connection joint in which a bridge diagonal ½ inch thick as to transmit a pull of 55 tons. It is to be connected with a ½ inch thick gusset plate with a double cover double riveted but joint with ⅞ inches dia rivets. Calculate the number of the rivets that will be necessary and the width of a flat required, if the permissible tensile stress in flat plate is 8 tsi and the shearing and bearing stresses in the rivets are not exceed to 6 tsi and 13 tsi respectively. Sketch the joints and calculate the actual stresses in the flat and rivets.	2	6	12
Q. 02	A Fink truss as shown in figure spaced 25ft on centers support $W_{8\times28}$ purlins as shown in figure. The purlins are supported at their midpoint by sag rods. Use A_{36} steel. **Design** the sag rod and the tie rod at the ridge for the following data. Metal deck = 4 psf Built up roof = 5 psf Snow = 20 psf Purlin weight = 67 lb/ft of length 	2	6	12
Q. 03	**Design** the Eccentric connection, a beam to column connection is made with a structural tee as shown in figure. Eight 7/8" diameter A_{325} bolts are used to attach the flange of the tee to the column flange. All structural steel is of A_{36}. Investigate the adequacy of this connection. 	2	6	12
Q. 04	**Design** a main compression member with a length of 30ft is pined at both ends and must support an axial compressive load of 750 Kips. Use steel with yielding point 60 ksi and select W_{14} shape.	2	6	12
Q. 05	**Design** welded plate girder loading conditions as shown in figure. 	2	6	12

P.T.O