INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

CIVIL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	**FOUNDATION ENGINEERING**			
Course Code	A60126			
Regulation	R15 (JNTUH)			
Course Structure	**Lectures**	**Tutorials**	**Practical's**	**Credit's**
	4	**-**	**-**	**4**
Course Coordinator	Mr. Y Ravi Kumar, Assistant Professor, Department of Civil Engineering.			
Course Faculty	Mr. Y Ravi Kumar, Assistant Professor, Department of Civil Engineering.			

OBJECTIVES:

The course should enable the students to:

I Identify the methods of soil exploration, different field tests, planning and preparation of soil investigation programme.
II Understand and analyze finite and infinite earth slopes to analyze the stability of slopes of earth dams under different conditions.
III Know earth pressure theory Rankine's theory of earth pressure Coulomb's earth pressure theory and Culmann's graphical method.
IV Enhance the ability of students in understanding the types, choice of foundation, location of depth, and safe bearing capacity when considering shallow foundation.
V Know the Indian standard methods for calculating safe bearing pressure based on N value, allowable bearing pressure and safe bearing capacity.
VI Analysis of pile foundation, types of piles, load carrying capacity of piles based on static pile formulae and dynamic pile formulae.
VII Understand the systems of well foundations, components of wells, functions and design criteria.

S. No.	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
	Part - A (Short Answer Questions)		
1	What do you understand by site investigation?	Remember	1
2	What type of information is obtained in reconnaissance?	Understand	1
3	Distinguish between disturbed and undisturbed samples?	Remember	2
4	How do you obtain undisturbed samples?	Remember	1
5	What is Boring log?	Remember	2
6	List advantages of open excavation methods of exploration.	Remember	1
7	List disadvantages of open excavation methods of exploration?	Remember	2
8	Explain briefly about the factors that affect the sample disturbance?	Understand	1
9	Explain various methods of drilling holes?	Understand	2
10	What is Reconnaissance? What is its use?	Remember	1
11	What is split spoon sampler? What is its use?	Remember	1
12	Explain the use of split spoon sampler.	Understand	1
13	What are the merits of wash boring method?	Remember	1
14	What are the demerits of wash boring method?	Remember	1
15	What is N-value of standard penetration test?	Remember	1
16	Define soil exploration.	Understand	2

17	Discuss the need of soil exploration.	Remember	2
18	What are the merits of split spoon sampler?	Remember	2
19	What are the demerits of split spoon sampler?	Remember	2
20	Sketch a split spoon sampler and explain its parts in brief.	Remember	1
Part - B (Long Answer Questions)			
1	List the various methods of soil exploration techniques.		2
2	Write short notes on Augur boring.	Understand	2
3	Write a detailed note on various types of boring.	Remember	2
4	Explain SPT test in detail.	Remember	2
5	Explain the various parameters which affect the sampling in detail.	Remember	2
6	Explain the Geophysical methods.	Understand	2
7	Explain the purpose of providing soil exploration.	Remember	2
8	Explain the factors involved in soil exploration.	Remember	2
9	Explain the elements on which soil exploration depends.	Remember	2
10	Describe the factors governing depth of investigation.	Remember	2
Part - C (Problem Solving and Critical Thinking Questions)			
1	A SPT was conducted in a dense sand deposit of 22m, and a value of 48 was observed for N. the density of the sand was 15kN/m2. What is the value of N, corrected for overburden pressure?	Remember	1
2	Compute the area ratio of a thin walled tube samples having an external diameter of 6cm and a wall thickness of 2.25mm. Do you recommend the sampler for obtaining undisturbed soil samplers? Why?	Understand	2
3	A SPT is conducted in fine sand below water table and a value of 25 is obtained for N. What is the corrected value of N?	Remember	1
4	A SPT was conducted in a dense sand deposit at a depth of 22m, and a value of 48 were observed for N. the density of the sand was 15kN/m2. What is the value of N, corrected for overburden pressure?	Remember	2
5	An N-value of 35 was obtained for fine sand below water table. What is the corrected value of N?	Remember	2
6	A SPT was performed at a depth of 20m in a dense sand deposit with a unit weight of 17.5kN/m2. If the observed N-value is 48, what is the N- value corrected for overburden?	Remember	2
7	A SPT is conducted in fines and below water table and a value of 30 is obtained for N. What is the corrected value of N?	Remember	2
8	An N-value of 40 was obtained for fine sand below water table. What is the corrected value of N?	Understand	2
9	Compute the area ratio of a thin walled tube samples having an external diameter of 8cm and a wall thickness of 3.25mm. Do you recommend the sampler for obtaining undisturbed soil samplers? Why?	Understand	2
10	A SPT was conducted in a dense sand deposit at a depth of 20m, and a value of 48 was observed for N. the density of the sand was 17kN/m2. What is the value of N, corrected for overburden pressure?	Remember	2
UNIT 2			
Part - A (Short Answer Questions)			
1	Define finite earth slopes with suitable examples.	Understand	3
2	Define infinite earth slopes with suitable examples.	Understand	3
3	Discuss classification of slopes.	Remember	3
4	What are the causes of failure of slopes?	Understand	3
5	Write brief notes on Taylor's stability number	Understand	3
6	What are types of slope failures?	Understand	3
7	What are different FOS used in stability of slopes	Remember	3
8	Discuss the basic assumptions made in the stability analysis of	Remember	3

	slopes.		
9	Describe a suitable method of stability analysis of slopes in cohesion less soil.	Remember	3
10	Discuss the use of stability charts?	Remember	3
11	Explain the assumptions that are made in analysis of the stability of slopes?	Understand	3
12	What is critical height?	Remember	3
13	What are the limitations of Culmann's law?	Remember	3
14	Discuss various methods for improving the stability of slopes?	Remember	3
15	Explain Under what conditions (i) a base failure and (ii) a toe failure are expected?	Remember	3
16	Discuss the basic assumptions made in the stability analysis of slopes.	Understand	3
17	Describe a suitable method of stability analysis of slopes in purely	Remember	3
18	Describe a suitable method of stability analysis of slopes in cohesion less soil.	Remember	3
19	Explain method of slices for stability analysis of slopes.	Remember	3
20	What is stability number utility in the analysis of stability of slopes?	Remember	3
Part - B (Long Answer Questions)			
1	Discuss the stability analysis of infinite slopes.	Understand	3
2	Explain the Swedish slip circle method and derive the factor of safety for a slope in cohesive soils.	Remember	3
3	Explain Bishops simplified method for determination of factor of safety of a finite slope.	Remember	3
4	Explain the basis for Taylor's stability number and the procedure of its use.	Remember	3
5	Describe the stability of slope of an earthen dam in "sudden drawdown" conditions.	Remember	3
6	Explain the method of slices for estimation on factor of safety of finite slopes.	Understand	3
7	Explain stability of earthen dam in full reservoir condition.	Remember	3
8	Obtain the expression for factor of safety of a c – φ soil using method of slices.	Remember	3
9	Explain stability of earthen dam in full reservoir and sudden draw down condition.	Remember	3
10	Explain the method of slices for estimation of factor of safety of finite slopes. Also, obtain the expression for factor of safety of a c – φ.	Remember	3
Part - C (Problem Solving and Critical Thinking Questions)			
1	It is proposed to construct a highway embankment using a c-φ soil having c= 20 kPa, φ = 10°, γ = 17kN/m^3. Determine the critical height up to which the embankment can be built with an inclination of 29° with a factor of safety of 1.50. Given the Taylor's stability number for these conditions as 0.0737.	Understand	3
2	Find factor of safety of a slope of infinite extent having a slope angle of 25°. The slope is made of cohesion less soil with φ = 30°. Also analyze the slope if it is made of clay having c' = 30kN/m2, φ' = 20°, e = 0.65 and Gs= 2.7 and under the following conditions: i. When soil is dry ii. When water seeps parallel to the surface of the slope iii. When the slope is submerged.	Understand	3
3	An excavation has to be made with an inclination of 40° in a soil with c' =40kPa, φ' = 10°, γ = 18kN/m2. What is the maximum height of the slope with a factor of safety of 2.01. The Taylor's stability number for the above condition is given	Remember	3

	as 0.097.		
4	An embankment 10m high is inclined at an angle of 36° to the horizontal. A stability analysis by the method of slices gives the following forces per running meter: Σ shearing forces = 450kN Σ normal forces = 900kN Σ neutral forces = 216kN The length of the failure arc is 27m. Laboratory tests on the soil indicate the effective values c' and φ' as 20kN/m^2 and 18° respectively. Determine the factor of safety of the slope with respect to a) Shearing strength b) Cohesion	Understand	3
5	An embankment is inclined at an angle of 35° and its height is 15m. The angle of Shearing resistance is 15° and the Cohesion intercept is 200kN/m^2. The unit weight of soil is 18kN/m^3. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion.	Understand	3
6	Find factor of safety of a slope of infinite extent having a slope angle of 20°.The slope is made of cohesion less soil with φ = 30°. Also analyze the slope if it is made of clay having c' = 35kN/m^2, φ' = 25°, e = 0.60 and Gs= 2.7 and under the following conditions: a) When soil is dry b) When water seeps parallel to the surface of the slope c) When the slope is submerged.	Understand	3
7	An excavation has to be made with an inclination of 45° in a soil with c' = 30 kPa, φ' = 15°, γ = 17kN/m^3. What is the maximum height of the slope with a factor of safety of 2. The Taylor's stability number for the above condition is given as 0.097.	Remember	3
8	An embankment 10m high is inclined at an angle of 36° to the horizontal. A stability analysis by the method of slices gives the following forces per running meter: Σ shearing forces = 450kN Σ normal forces = 900kN Σ neutral forces = 216kN The length of the failure arc is 27m. Laboratory tests on the soil indicate the effective values c' and φ' as 20kN/m2 and 18° respectively. Determine the factor of safety of the slope with respect to a) Shearing strength b) Cohesion	Remember	3
9	An embankment is inclined at an angle of 35° and its height is 10m. The angle of shearing resistance is 20° and the cohesion intercept is 200kN/m^2.The unit weight of soil is 17kN/m^3. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion.	Remember	3
10	An embankment is inclined at an angle of 35° and its height is 10m. The angle of shearing resistance is 20° and the cohesion intercept is 200kN/m^2.The unit weight of soil is 17kN/m^3. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion.	Remember	3
UNIT 3			
Part - A (Short Answer Questions)			
1	Explain the earth pressure in active condition.	Remember	4
2	Explain the earth pressure in passive condition.	Understand	4
3	Explain the earth pressure in at rest condition.	Remember	4
4	What is Plastic equilibrium condition of soil	Understand	4

5	What is Elastic equilibrium condition of soil	Remember	4
6	Explain the assumptions of Rankine's theory	Remember	4
7	What are the assumptions made in Coulomb's theory?	Remember	4
8	Distinguish between active and passive pressures	Understand	4
9	Write assumptions of Coulomb's earth pressure theory.	Understand	4
10	Write short notes on Culmann's graphical method.	Remember	4
11	Describe gravity and semi-gravity retaining walls.	Remember	4
12	Discuss the stability of retaining walls against overturning.	Remember	5
13	Discuss the stability of retaining walls against sliding.	Remember	5
14	Discuss the stability of retaining walls against bearing capacity.	Remember	5
15	Explain the significance of weep holes in performance of retaining	Remember	5
16	Describe cantilever retaining wall.	Remember	5
17	Describe counter fort and buttress retaining walls	Remember	5
18	Distinguish between counter fort and buttress retaining walls.	Understand	5
19	Distinguish between gravity and semi-gravity retaining walls.	Understand	5
20	Describe the various methods used for draining backfills.	Understand	5
Part - B (Long Answer Questions)			
1	Distinguish the Rankine's and Coulomb's theories for computation of earth pressure and suggest the suitability of these methods.	Understand	5
2	What is the effect of submergence on active and passive earth pressures?	Remember	5
3	Write short notes on Rankine's earth pressure theory.	Remember	5
4	Explain the trial wedge method.	Remember	5
5	Explain the significance of drainage filter in performance of retaining walls.	Remember	5
6	Give the minimum factor of safety for the stability of a retaining wall.	Understand	6
7	Draw the various Drainage provisions in Retaining wall	Understand	6
8	Give the criteria for the design of gravity retaining wall.	Understand	6
9	What are the stability conditions should be checked for the retaining wall	Understand	6
Part - C (Problem Solving and Critical Thinking Questions)			
1	A gravity retaining wall of height 3 m with uniform thickness (.i.e. rectangular in cross section) of 1.20m is constructed in RRM with a unit weight of 24kN/m3. The average properties of soil from top to bottom of wall includes c = 0kN/m2; φ= 30°. Analyze the stability of wall against overturning when the entire backfill is i. Moist with a unit weight of 18kN/m3 ii. Submerged(consider the saturated unit weight in submerged conditions as 9.80kN/m3).	Understand	6
2	A gravity retaining wall of height 3 m with uniform thickness(i.e. rectangular in cross section)of 1.20m is constructed in RRM with a unit weight of 24kN/m3.The average properties of soil from top to bottom of wall includes c = 0kN/m2; φ = 30°. Subsequently, 1m high fill is placed on top of the existing backfill after constructing a 0.60m thick wall above the existing wall matching with the backfill side face of wall (i.e. the offset is provided on the other side of backfill). Analyze the stability of wall against overturning	Understand	6

	before and after raising the height of backfill.		
3	Design a strip footing for load bearing wall transmitting a force of 200kN/m proposed to be laid at a depth of 1.50 m below the G.L on a c-φ soil with c =40 kPa and φ=20° , γ=17kN/m3. Given NC=11.80, Nq=3.90, Nγ=1.70.	Remember	6
4	A 2m wide square footing is laid at a depth of 1.2 m below the GL on a C- φ soil with c=40 kPa and φ=20°, γ=17kN/m^3. Given NC=11.80. Nq=3.90, Nγ=1.70. Using Terzaghi's theory, compute the ultimate bearing capacity when the GWT is, I. 5 m below G.L II. At G.L. III. 2 m below G.L Assume the change in shear parameter due to situation is negligible.	Remember	6
5	A 9m high retaining wall is supporting a backfill consisting of two types of soils. The water table is located at a depth of 5m below the top. The properties of soil from 0 to 3m include c = 0kN/m^2; φ = 33°; γ = 17kN/m^3 and those for soil from 3m to 9m include c = 0kN/m^2; φ = 40°; γ = 18.50kN/m^3; γ_{sub} = 20.50kN/m^3.Plot the distribution of active and passive earth pressure and determine the magnitude and point of application of total active and passive earth pressure acting on the retaining wall.	Remember	4
6	A 8m high retaining wall is supporting a c – φ backfill having c = 30kN/m^2; φ= 24°; γ = 18kN/m^3. Plot the distribution of active and passive earth pressure and determine the magnitude and point of application of total active and passive earth pressure acting on the retaining wall.	Remember	4
7	A 10m high retaining wall is supporting a backfill consisting of two types of soils. The water table is located at a depth of 6m below the top. The properties of soil from 0 to 4m include c = 30kN/m2; φ = 30°; γ=17kN/m3 and those for soil from 4m to 10m include c = 15kN/m2; φ =40°; γ = 20kN/m3; γsat = 20.50 kN/m3.Plot the distribution of active and passive earth pressure and determine the magnitude and point of application of total active and passive earth pressure acting on the retaining wall.	Remember	4
8	A trapezoidal gravity retaining wall of height 6m with top and bottom widths as 0.45m &1.20m respectively is constructed in RCC with a unit weight of 25kN/m3. Its bottom is resting 2m below the GL on soil having c = 0kN/m2; φ = 36°; γ = 18kN/m3; the friction angle is 2/3 of φ. The allowable bearing capacity of the soil for this case is found to be 200kN/m2 .The wall is supporting the 4m thick backfill above GL made of soil having c = 0kN/m2; φ = 30°; γ = 17.50kN/m3. Analyze the stability of wall against overturning, sliding and bearing capacity.	Understand	4
9	A trapezoidal masonry retaining wall 1 m wide at top and 3 m wide at its bottom is 4 m high. The vertical face is retaining soil (φ = 30°) at a surcharge angle of 20° with the horizontal. Determine the maximum and minimum intensities of pressure	Understand	4

	at the base of the retaining wall. Unit weights of soil and masonry are 20kN/m^3 and 24kN/m^3 respectively. Assuming the coefficient of friction at the base of the wall as 0.45, determine the factor of safety against sliding. Also determine the factor of safety against overturning.		
10	Design a gravity retaining wall of height 3m with uniform thickness (i.e. rectangular in cross section) constructed in RRM with a unit weight of 24kN/m3. The average properties of soil from top to bottom of wall include c = 0kN/m2; φ = 36°; γ = 18kN/m3; the friction angle is 2/3 of φ. The allowable bearing capacity of the soil for this case is found to be 200kN/m3. Analyze the stability of the wall against overturning, sliding and bearing capacity.	Understand	4
11	A gravity retaining wall of height 3 m with uniform thickness (i.e. rectangular in cross section) of 1.20m is constructed in RRM with a unit weight of 24kN/m^3. The average properties of soil from top to bottom of wall includes c = 0kN/ m^2; φ = 30°. Analyze the stability of wall against overturning when the entire backfill is i. Moist with a unit weight of 18kN/ m3. ii. Submerged (consider the saturated unit weight in submerged conditions as 9.80kN/ m3).	Understand	4
12	A gravity retaining wall of height 3 m with uniform thickness(i.e. rectangular in cross section)of 1.20m is constructed in RRM with a unit weight of 24kN/m3.The average properties of soil from top to bottom of wall includes c = 0kN/m2; φ = 30°. Subsequently, 1m high fill is placed on top of the existing backfill after constructing a 0.60m thick wall above the existing wall matching with the backfill side face of wall (i.e., the offset is provided on the other side of backfill). Analyze the stability of wall against overturning before and after raising the height of backfill.	Understand	4
UNIT 4			
Part - A (Short Answer Questions)			
1	What are the various types of settlements in foundations?	Remember	6
2	What are the types of settlements caused due to loads?	Remember	6
3	What are the types of settlements which are caused due to reasons other than loads?	Remember	6
4	Differentiate between uniform settlement and differential settlement.	Remember	6
5	What are the objectives of proportioning of footing?	Remember	6
6	What is the procedure for proportioning of footing?	Remember	6
7	Make a note on plate load test.	Remember	6
8	Make a note on initial settlement.	Remember	6
9	Make a note on consolidation settlement.	Remember	6
10	Make a note on secondary settlement.	Remember	6
11	Define pile foundation. When are pile foundations referred?	Remember	7
12	Classify piles based on their method of installation.	Remember	7
13	Classify piles based on their type of application.	Remember	7
14	What are the various classifications of piles?	Remember	7
15	Explain the settlement analysis of piles in short.	Remember	7
16	Write a note on dynamic formula of piles.	Remember	7
17	Make a note on static method for load carrying capacity of piles.	Remember	7
18	Write Hiley's formula for load carrying capacity of piles.	Remember	7
19	Write Engineering News Record formula for load carrying capacity of piles.	Understand	7

20	Define pile foundation. When are pile foundations preferred?	Understand	7
Part - B (Long Answer Questions)			
1	Explain the Static method for Estimating the load carrying capacity of a single pile driven in cohesive soil (Clay)	Remember	7
2	Explain the Dynamic formulae for Estimating the load carrying capacity of a single driven pile	Remember	7
3	Explain the in- situ penetration tests for Estimating the load carrying capacity of a single driven pile	Remember	7
5	What are the effects of Effects of pile driving?	Remember	7
6	Explain how the Group capacity of piles can be found by different methods	Remember	7
Part - C (Problem Solving and Critical Thinking Questions)			
1	Design a strip footing for load bearing wall transmitting a force of 200kN/m proposed to be laid at a depth of 1.50 m below the G.L on a c-φ soil with c =40 kPa and φ=20°, γ=17kN/m3. Given NC=11.80, Nq=3.90, Nγ=1.70.	Remember	6
2	A 2m wide square footing is laid at a depth of 1.2 m below the GL on a C- φ soil with c=40 kPa and φ=20°, γ=17kN/ m3. Given NC=11.80. Nq=3.90, Nγ=1.70. Using Terzaghi's theory, compute the ultimate bearing capacity (q6) when the GWT is, I. 5 m below G.L II. At G.L. III. 2 m below G.L Assume the change in shear parameter due to situation is negligible.	Remember	6
3	A concrete pile 30 cm diameter is driven into a medium dense sand (φ =35', r=21kN/ m^3), k = 1.0, tan δ = 0.7, Nq = 60). For a depth of 8m. estimate the Safe load, taking a factors safely of 2.5 (ii) if the water table rises to 2 m below the ground surface take unit weight of Water = 10kN/m^2.	Remember	6
4	Determine the total settlement of the foundation, for the condition given below, Ground level /GWT(+)0.00m. Sand with γ_{sat} =20.50kN/m^3 wide square transmitting a contact pressure of 320 kPa. Foundation level (-2.00m) Fully saturated compressible clay γsat=21.00kN/m^3, L.L = 108%, e_0=1.05, μ =0.28, ES =19500 kPa (-5.00m) IW = 1.05. Massive sheet rock as per 2V to 1H rule. Neglect the secondary. Adopt distribution of stress a consolidation settlement.	Remember	6
5	A timber pile was driven by a drop hammer weighing 30kN with a free fall of 1.2 m. The average penetration of the last few blows was 5 mm. What is the capacity of the pile according to Engineering News Formula?	Remember	6
6	A pile is driven with a single acting steam hammer of weight 15kN with a free fall of 900 mm. The final set, the average of the last three blows, is 27.5 mm. Find the safe load using the Engineering News Formula.	Remember	7
7	A pile is driven in uniform clay of large depth. The clay has unconfined compression strength of 90kN/ m^2. The pile is 30 cm diameter and 6 m long. Determine the safe frictional resistance of the pile, assuming a factor of safety of 3. Assume the adhesion factor = 0.7.	Remember	7
8	A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with cohesion 30kN/m^2.Bearing resistance may be neglected for the piles—Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group.	Remember	7
9	Design a square pile group to carry 400kN in clay with unconfined compression strength of 60kN/m^2. The piles are 30	Remember	7

	cm diameter and 6 m long. Adhesion factor may be taken as 0.6.		
10	A 30 cm diameter pile penetrates a deposit of soft clay 9 m deep and rests on Sand. Compute the skin friction resistance. The clay has unit cohesion of 0.6 kg/cm2. Assume an adhesion factor of 0.6 for the clay.	Remember	7
11	A square pile 25 cm size penetrates soft clay with unit cohesion of 75kN/m^2 for a depth of 18 m and rests on stiff soil. Determine the capacity of the pile by skin friction. Assume an adhesion factor of 0.75.	Remember	7
12	A square pile group of 9 piles of 25 cm diameter is arranged with a pile spacing of 1 m. The length of the piles is 9 m. Unit cohesion of the clay is 75kN/ m2. Neglecting bearing at the tip of the piles determine the group capacity. Assume adhesion factor of 0.75.	Remember	7
13	Determine the group efficiency of a rectangular group of piles with 4 rows, 3 piles per row, the uniform pile spacing being 3 times the pile diameter. If the individual pile capacity is 100kN, what is the group capacity according to this concept?	Remember	7
UNIT 5			
Part - A (Short Answer Questions)			
1	What are the types of caisson foundations?	Understand	8
2	Write a short note on open caisson foundation.	Understand	8
3	Write a note on pneumatic caisson foundation.	Remember	8
4	Write a note on floating caisson foundation.	Remember	8
5	With neat sketch, explain the components of pneumatic caisson.	Understand	8
6	With neat sketch, explain the components of open caisson	Understand	8
7	What is the procedure for sinking of pneumatic caisson?	Remember	8
8	Discuss the various types of shapes of well foundations.	Remember	8
9	Discuss the effect of impact and longitudinal loads on well foundations.	Remember	8
10	What is Caisson or well foundation?	Remember	8
11	How well foundations are classified?	Remember	8
12	Explain the suitability of well for different soil types?	Understand	8
13	Explain the process of well sinking.	Remember	8
14	Derive the expression for lateral stability of well foundations?	Remember	8
15	Determine the well foundation components.	Remember	8
16	What are the forces acting on well foundation?	Remember	8
17	Explain the design the criteria for well curb.	Remember	8
18	Explain the design the criteria for well horizontal soil reactions.	Remember	8
19	How skin friction effects the well sinking?	Remember	8
20	Discuss the different shapes of Cross-sections of wells used in practice, giving the merits and demerits of each.	Remember	8
Part - B (Long Answer Questions)			
1	Describe various types of caisson foundations and comment on their ability.	Remember	8
2	Explain in detail the procedure of sinking of well foundations.	Understand	8
3	Describe the component parts of a Pneumatic Caisson with a neat sketch.	Understand	8
4	What is a ‘Floating Caisson’? How is its stability checked? What are the merits and demerits of a Floating Caisson when compared with other types?	Remember	8
5	Discuss the various kinds of forces likely to act on a well foundation.	Remember	8

6	Discuss the different shapes of Cross-sections of wells used in practice, giving the merits and demerits of each.	Remember	8
7	Sketch and describe the various components of a well foundation, indicating the function of each.	Remember	8
8	What are the advantages and disadvantages of a Pneumatic Caisson when compared with other types?	Remember	8
9	Explain the various kinds of forces likely to act on a well foundation.	Remember	8
10	What are 'Tilts and Shifts'? What are the remedial measures to control these?	Remember	8
11	Explain the effect of water and earth pressure on well foundations.	Remember	8
12	How is the load-carrying capacity of an Open Caisson determined?	Remember	8
13	What are the merits and demerits of an Open Caisson?	Remember	8
14	Explain an 'Open Caisson' with a neat sketch showing all the component parts.	Remember	8
15	Describe the "Scour Depth", "Grip Length". How are they related in finalizing the depth of sinking of caissons?	Remember	8

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