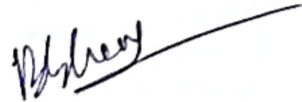



Discipline: Drilling Engineering	Semester: 6 <sup>th</sup> Semester	Name of the Teaching Faculty: Er. Brushabhanu Sahoo	
Subject(Theory): TUBE WELL DRILLING Subject Code: TH2	No. of Periods /week : 04	Session: Summer 2022 No of weeks:15	
Week	Class Day	Theory Topics	Remarks
1 <sup>st</sup>	1 <sup>st</sup>	Introduction to Ground Water hydrology and water well drilling.	
	2 <sup>nd</sup>	Define terms used in Ground water hydrology project- aquifer, confined aquifer, water table, static water table, perched water table, artesian well, porosity, permeability, void ratio, co-efficient permeability, radial flow, draw down, residual draw down, cone of depression, transmissibility, well yield, Sp. yield, Sp. retention, Safe Yield, over draft etc.	
	3 <sup>rd</sup>	Define terms used in Ground water hydrology project- aquifer, confined aquifer, water table, static water table, perched water table, artesian well, porosity, permeability, void ratio, co-efficient permeability, radial flow, draw down, residual draw down, cone of depression, transmissibility, well yield, Sp. yield, Sp. retention, Safe Yield, over draft etc.	
	4 <sup>th</sup>	Origin of water. Geological process produces the gigantic volume of water available today.	
2 <sup>nd</sup>	1 <sup>st</sup>	Definition of ground water. Explain the origin of ground water.	
	2 <sup>nd</sup>	Occurrence of ground water.	
	3 <sup>rd</sup>	Vertical distribution of ground water.	
	4 <sup>th</sup>	Aquifers, good aquifers and classification of aquifers.	
3 <sup>rd</sup>	1 <sup>st</sup>	Explain perched water table and artesian well.	
	2 <sup>nd</sup>	Classification of different types of water wells.	
	3 <sup>rd</sup>	Define Darcy's Law and explain flow of water. Definition co-efficient of permeability and co-efficient of transmissibility.	
	4 <sup>th</sup>	Derive a general expression for Darcy's law.	
4 <sup>th</sup>	1 <sup>st</sup>	Specify the different types of drills used for water well drilling.	
	2 <sup>nd</sup>	Water well construction methods and applications.	
	3 <sup>rd</sup>	Explain the basis for selection and application of drills.	
	4 <sup>th</sup>	Various methods of drilling shallow wells like boring, driving, jetting, hydraulic percussion drilling.	
5 <sup>th</sup>	1 <sup>st</sup>	Various methods of drilling shallow wells like boring, driving, jetting, hydraulic percussion drilling.	
	2 <sup>nd</sup>	Methods of drilling deep wells.	
	3 <sup>rd</sup>	Methods of drilling deep wells.	
	4 <sup>th</sup>	Compare & contrast a hydraulic percussive boring and manual rotary boring.	
6 <sup>th</sup>	1 <sup>st</sup>	Explain a D.T.H. drill respect to conventional rotary procedure of drilling.	
	2 <sup>nd</sup>	Explain the hydraulic percussive drilling and earth auger drill	
	3 <sup>rd</sup>	Principle of operation of hydraulic rotary drill.	

	4 <sup>th</sup>	State the need of flushing system for rotary drill.	
7 <sup>th</sup>	1 <sup>st</sup>	Various problems encountered during water well drilling.	
	2 <sup>nd</sup>	Describe the various types of disturbed strata for water well drilling.	
	3 <sup>rd</sup>	Drilling fluid problems during drilling.	
	4 <sup>th</sup>	Explain grouting and sealing casing.	
8 <sup>th</sup>	1 <sup>st</sup>	Well completion process.	
	2 <sup>nd</sup>	Well casings and cementing operation.	
	3 <sup>rd</sup>	Well screens and gravel packing.	
	4 <sup>th</sup>	Design the length of screen to be lowered in the water wells.	
9 <sup>th</sup>	1 <sup>st</sup>	Methods of installation of screen.	
	2 <sup>nd</sup>	Procedure of fixing the screen by gravel packing.	
	3 <sup>rd</sup>	Test hole and Well log.	
	4 <sup>th</sup>	Well Development. Objective and requirement.	
10 <sup>th</sup>	1 <sup>st</sup>	Well development by pumping.	
	2 <sup>nd</sup>	Well development by surging.	
	3 <sup>rd</sup>	Well development by surging with air.	
	4 <sup>th</sup>	Well development by back washing with air.	
11 <sup>th</sup>	1 <sup>st</sup>	Well development by hydraulic jetting.	
	2 <sup>nd</sup>	Well development by using chemicals.	
	3 <sup>rd</sup>	Well development by hydraulic fracturing.	
	4 <sup>th</sup>	Well development by using explosives.	
12 <sup>th</sup>	1 <sup>st</sup>	Objectives of testing water wells.	
	2 <sup>nd</sup>	Objectives of testing water wells.	
	3 <sup>rd</sup>	Pumping rate.	
	4 <sup>th</sup>	Water level measurement.	
13 <sup>th</sup>	1 <sup>st</sup>	Aquifer test.	
	2 <sup>nd</sup>	Drawdown measurement.	
	3 <sup>rd</sup>	Yield test.	
	4 <sup>th</sup>	Estimate the quantity of flow following the above test.	
14 <sup>th</sup>	1 <sup>st</sup>	Calculations related to testing water wells.	
	2 <sup>nd</sup>	Calculations related to testing water wells.	
	3 <sup>rd</sup>	Causes of failures of wells and suggested remedial actions.	
	4 <sup>th</sup>	Causes of failures of wells and suggested remedial actions.	
15 <sup>th</sup>	1 <sup>st</sup>	Causes of failures of wells and suggested remedial actions.	
	2 <sup>nd</sup>	Causes of failures of wells and suggested remedial actions.	
	3 <sup>rd</sup>	Causes of failures of wells and suggested remedial actions.	
	4 <sup>th</sup>	Causes of failures of wells and suggested remedial actions.	

  
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