PAPER ID-420794

Subject Code: **RCE085**

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VIII) THEORY EXAMINATION 2021-22
ENGINEERING HYDROLOGY AND GROUND WATER MANAGEMENT

Time: 3 Hours ***Total Marks: 70***

Notes:

- *Attempt all Sections and Assume any missing data.*
- *Appropriate marks are allotted to each question, answer accordingly.*

SECTION-A	Attempt **All** of the following Questions in brief	Marks **(7X2=14)**
Q1(a)	What do you understand by precipitation?	
Q1(b)	Explain Thiessen polygon method of determining of average rainfall over a basin catchment are	
Q1(c)	What is the purpose of Water Budget Equation in Hydrology?	
Q1(d)	What do you mean by recuperation test?	
Q1(e)	Explain the concept of conjunctive use.	
Q1(f)	Define SAR.	
Q1(g)	Why artificial recharging the underground storage is needed?	

SECTION-B	Attempt **ANY THREE** of the following Questions	Marks **(3X7=21)**
Q2(a)	In a homogeneous isotropic confined aquifer has a constant thickness of 20 m, effective porosity of 20% and permeability of 15 m/day, two observation wells 1200 m apart indicate piezometric heads of 5.4 m and 3.0 m above MSL respectively. Assuming uniform flow, average grain diameter of sand 1 mm and kinematic viscosity (v) of water = 0.01 cm^2 /s, state (a) whether Darcy's law is applicable? And (b) what is the average flow velocity in pores?	
Q2(b)	Derive an expression for the yield of a well penetrating a confined aquifer stating the assumptions made.	
Q2(c)	Distinguish between the following: i. Cavity type and slotted type tube well ii. Storage coefficient and transmissibility coefficients	
Q2(d)	Write short notes on the following : (i) Sources of contamination of groundwater and preventive measures. (ii) Groundwater modeling techniques. (iii) Groundwater drainage.	
Q2(e)	What are the various design considerations of wells? Also write about the various methods to maintain the wells.	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q3(a)	Discuss briefly as to how the water is stored into the ground water reservoir.	
Q3(b)	What do you mean by design flood? What are the factors affecting the flood hydrograph? Explain the procedure of using a unit hydrograph to develop the flood hydrograph due to a storm in a catchment.	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q4(a)	A catchment has five rain-gauge stations. In a year, the annual rainfall recorded by the gauges is 78.8 cm, 90.2 cm, 98.6 cm, 102.4 cm and 70.4 cm. For a 6% error in the estimation of the mean rainfall, determine the additional number of gauges needed.	
Q4(b)	What is meant by hydrological cycle? How can the parameters of the cycle be written in an equation form? Draw a neat diagram to illustrate your answer.	

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SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q5(a)	Explain the following : (i) The extent of radius of influence (ii) Assumptions in Dupuit's theory (iii) Cone of depression (iv) Drawdown.	
Q5(b)	A 20 cm well fully penetrates a confined aquifer 20 m deep. Two observation wells located at r1 = 15m and r2 m from the pumped well are found to have drawdown of 2 m and1 m respectively. Determine the pumping rate and the radial distance of second well.	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q6(a)	Explain the terms well development and well shrouding. Also discuss the various methods of well development.	
Q6(b)	Prove that porosity of an aquifer is sum of the specific yield and specific retention.	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q7(a)	Write short notes on : (i) Ground Water Budgeting (ii) Surface and sub-surface investigation of ground water	
Q7(b)	What do you mean by salt water intrusion in coastal aquifer? What is the method to locate it? Explain the various methods to limit salt water intrusion	