



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code : 18AG0703

Branch: B.Tech – Agricultural engineering

Year & Sem: II-B.Tech & II-Sem

Regulation: R18

UNIT-I

INTRODUCTION

- 1) Describe the hydrological cycle?
- 2) Explain about the different components of hydrological cycle? With neat diagram
- 3) Define precipitation and what are the major forms of precipitation?
- 4) Describe the different methods of recording of rainfall data?
- 5) Explain about the different methods of measurement of rainfall? With neat diagram
- 6) Define recording type of rain gauge and explain the types of recording type of rain gauges?
- 7) Briefly explain about the process of evaporation and transpiration?
- 8) Define evaporation and explain factors affecting on evaporation?
- 9) Explain about the estimation of evaporation?
- 10) Explain the evaporation measurement techniques?
- 11) Briefly explain the evapotranspiration estimation methods?
- 12) Explain wind measurement techniques for velocity and direction?

UNIT-II
GROUNDWATER

- 1) Explain the global distribution of water?
- 2) Write about divisions of subsurface water?
- 3) Define aquifer and explain the classification of aquifers?
- 4) Explain the classification of saturated zone?
- 5) Briefly explain about the properties of aquifer?
- 6) Distinguish between: (a) Aquifer and Aquitard (b) Aquifuge and Aquiclude
(c) Unconfined aquifer and artesian aquifer (d) Artesian aquifer and leaky aquifer
(e) Permeability and Hydraulic conductivity
- 7) Derive the equilibrium equation for confined aquifer? With neat diagram
- 8) A aquifer of 20 m thickness. A test well of 0.5 m diameter and two observation wells at a distance of 10 m and 60 m from the test well or drill through the aquifer pumping at a rate of $0.1 \text{ m}^3/\text{sec}$ for a long line. The following drawdowns are stabilized in these wells first observation well 4 m. second observation well n3m. Determine (a) Coefficient of permeability and (b) Drawdown in the test well
- 9) Derive the equilibrium equation for unconfined aquifer? With neat diagram
- 10) The fallowing observations are made on a 300 mm diameter well penetrating on unconfined aquifer
 - i. Rate of pumping = 1800 lit/min
 - ii. Drawdown in a well 30 m away = 1.8 m
 - iii. Drawdown in a well 60 m away = 0.6 m
 - iv. Depth of water in a well before pumping = 50 mDetermine (a) The radius of circle of influence and
(b) The coefficient of transmissibility of aquifer

UNIT – III**GROUNDWATER MANAGEMENT**

- 1) Briefly explain about the groundwater chemistry?
- 2) Define groundwater chemistry and list out the basic water quality parameters?
- 3) Define salinity and explain the classification of groundwater composition based on total dissolved solids content?
- 4) Briefly discuss about the origin and movement of groundwater?
- 5) Explain the water quality standards and list out the different water quality parameters based on FEPA and WHO standards?
- 6) Define saline intrusion and mechanism responsible for saline water intrusion?
- 7) Derive the equation for Ghyben-Herzberg relation for confined aquifer?
- 8) What are the impacts of saline water intrusion and how to control the saline water intrusion?
- 9) Briefly discuss about the dynamic equilibrium in natural aquifers?
- 10) Explain the environmental concern and regulatory requirements of groundwater quality?

UNIT – IV
GROUNDWATER TRANSPORT PROCESS

- 1) Explain hydro dynamic dispersion and coefficient of dispersion?
- 2) Explain aquifer advection dispersion equation?
- 3) Briefly explain about initial and boundary condition?
- 4) Briefly explain about artificial recharge techniques?
- 5) Explain groundwater pollution and legislation?
- 6) Explain solution of advection dispersion equation?
- 7) Explain remediation schemes for saline water intrusion?
- 8) Explain protection zone delineation?
- 9) Explain the occurrence of dispersion phenomenon?
- 10) Explain groundwater management studies?

UNIT – V**WELL HYDRAULICS**

- 1) Briefly explain about the Darcy's law? With neat diagram
- 2) Define Darcy's law and list out the validity of Darcy's law
- 3) Derive the equation of unsteady state flow of groundwater?
- 4) Drawdown was measured during a pumping test at frequent intervals in an observation well 200 feet from a well that was pumped at a constant rate of 500 ppm. The data for this pump test is listed in table. These measurements shows that the water level is still dropping after 4000 minutes of pumping, therefore analysis of the test data requires use of the Theis non equilibrium procedure. Determine S and T for this aquifer.

Pump test data	
Time (min)	Drawdown (feet)
1	0.05
2	0.22
3	0.40
4	0.56
5	0.70
7	0.94
10	1.2
20	1.8
40	2.5
100	3.4
300	4.5
1000	5.6
4000	7.0

- 5) A well penetrating a confined aquifer is pumped at a uniform rate of 2500 m³/day. Drawdown during the pumping period are measured in an observation well 60 m away; observations of “t” and “s” are listed in table. Using the Theis method determine T and S for this confined aquifer.

Pumping test data					
t(min)	S (m)	r^2/t (min)	t(min)	S (m)	r^2/t (min)
0	0	∞	18	0.67	200
1	0.20	3600	24	0.72	150
1.5	0.27	2400	30	0.76	120
2	0.30	1800	40	0.81	90
2.5	0.34	1440	50	0.85	72
3	0.37	1200	60	0.90	60
4	0.41	900	80	0.93	45
5	0.45	720	100	0.96	36
6	0.48	600	120	1.00	30
8	0.53	450	150	1.04	24
10	0.57	360	180	1.07	20
12	0.60	300	210	1.10	17
14	0.63	257	240	1.12	15

- 6) Briefly explain about the slug test procedure of an aquifer?
- 7) Explain about partially penetrating wells? With neat diagram
- 8) Explain the image well theory?
- 9) Derive the equation for Theis method and Cooper – Jacob method?
- 10) Explain about Dupit Forchheimer assumptions?

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