A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: UA302

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Professional Elective

Agriculture Engineering

21AGV302-GROUND WATER AND WELL ENGINEERING

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Aquiclude CO1- U

(a) clay (b) sand (c) sandy clay (d) red sand

2. The net water balance equation can be written as CO1-U

(a) P-Q-E-T-G = ΔS (b) P-Q+E+T-G= ΔS (c)Q- P-E+T-G = ΔS (d)P+Q+E+T+G = ΔS

3. Darcy's law states that: CO2- App

(a) v = Ki (b) v = K/i (c)v = K+i (d) v = K-i

4. _____ Enables aquifers of finite extend to be transformed to one of the infinite extend. CO1- U

(a) Observation well (b) Image well (c) Pumping well (d) None of the above

5. Which among this is not a corrosion resistant screening material for wells? CO2- App

(a) Steel (b) Alloys (c) Stainless steel (d) Brass

6. Well screen should be The thickness of gravel pack surrounding the CO1- U

(a) 5-10 cm (b) 10-20 cm (c) 20-30 cm (d) 40-50 cm

7. In …….. Method, a ring of black diamond bit is attached to a drill rod which is rotated CO1- U

(a) Core drilling (b) Cabletool percussion drilling (c) Hammer drilling (d) Jetting

8. Open hole method of well screen installation is applicable for…….. CO2- U

(a) Rotary drilled wells (b) Cable tool drilled wells

(c) Gravel packed wells (d) None of the above

9. Construction of a line of recharge wells in coastal region to avoid sea water intrusion is known as…….. CO2- U

(a) Pumping trough (b) pressure ridge (c) Subsurface barrier (d) None of the above

10. In ……method, water is led directly into the depleted aquifers by providing a conduit access, such as tube well or shaft or connector wells CO1- U

a) Injection method b) Induced recharge

c) Recharge shaft (d) None of the above

PART – B (5 x 2= 10 Marks)

11. Evaluate the permeability and Transmissibility in aquifer? CO1 -U

12. Evaluate infiltration galleries CO2- App

13. Describe specific capacity of wells. CO2- App

14. List the methods of constructing shallow wells? CO2- App

15. How can we control sea water intrusion? CO1-U

PART – C (5 x 16= 80 Marks)

16. (a) Elaborate in Ground water types and factors controlling in ground water? CO1 -U (16)

Or

(b) Explain the various properties of aquifers with appropriate equations**.** CO1- U (16)

17. (a) A 30cm well penetrates 50m below static water table. After a long period of pumping at a rate of 1800lpm , the drawdown in the well at 20 m and 50 m from the pumped well where 1.7 and 0.8m respectively. Determine transmissibility of the aquifer. What is the draw down? CO2- App (16)

Or

(b) From the pumping tests of a semi-confined aquifer of thickness 30m and permeability 20m/d, it is estimated that the recharge rate from an overlying unconfined aquifer through an aquitard of thickness 2 m is, 50mm/year. The average piezometric surface in the semi-confined aquifer is 16m below the water table in the unconfined aquifer. Determine the hydraulic characteristics of the aquitard (semi-confining layer) and the aquifer. CO2- App (16)

18.	(a)	Describe the design of collector wells.	CO1- U	(16)
		Or		
	(b)	From the pumping tests of a semi-confined aquifer of thickness 30m and permeability 20m/d, it is estimated that the recharge rate from an overlying unconfined aquifer through an aquitard of thickness 2 m is, 50mm/year. The average piezometric surface in the semi-confined aquifer is 16m below the water table in the unconfined aquifer. Determine the hydraulic characteristics of the aquitard (semi-confining layer) and the aquifer.	CO2- App	(16)
19.	(a)	Explain and differentiate well development, well completion and well disinfection.	CO1- U	(16)
		Or		
	(b)	Elaborate the various pumping equipment used for well.	CO1- U	(16)
20.	(a)	Write the preventive measures of groundwater pollution.	CO1- U	(16)
		Or		
	(b)	Enumerate the roles and responsibilities of Central water commission on groundwater quality.	CO1- U	(16)