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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, APRIL 2018

DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL ENGINEERING
Course No:07 CE 6422 - GROUND WATER CONTAMINATION AND POLLUTION TRANSPORT

Time: 3 hours **Max. Marks: 60**

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1a	Sketch and explain relation between soil texture and porosity with respect to groundwater flow?.	**4**
	Answer b or c	
b	Explain the use of piezometers and piezometer nests in groundwater analysis?	**5**
c	Explain with neat sketch heterogeneity and anisotropy of hydraulic conductivity?	**5**

Q.no.	Module 2	Marks
2a	Define flow lines and flow nets? Sketch and explain the flow line steady state and transient groundwater flow beneath a dam?	**4**
	A nswer b or c	
b	Explain the effect of compressibility and effective stress in groundwater flow?	**5**
c	Derive the expression for transient unsaturated groundwater flow starting from the fundamental equations of groundwater flow?	**5**

Q.no.	Module 3	Marks
3a	With the help of a neat sketch, explain bounded aquifers?	**4**
	Answer b or c	
b	What is meant by groundwater exploration in development? What are the various sequential steps of it?	**5**
c	Explain the effect of stepped pumping rates and well recovery in the	**5**

hydraulic head ?

Q.no.	Module 4	Marks
4a	Analyse the importance of dissolved gases present in ground water?	4
	Answer b or c	
b	Explain the importance of carbon-14 and tritium in groundwater analysis?	5
c	Explain the various field measurement techniques for the determination of index parameters What is meant by groundwater exploration in development? What are the various sequential steps of it?	5

Q.no.	Module 5	Marks
5a	Sketch and explain the chemical evolution paths for calcite and dolomite in open and closed system dissolution conditions of groundwater flow?	5
	Answer b or c	
b	Explain the important chemical evolution of groundwater in crystalline rocks?	7
c	What are the sources groundwater contamination? Discuss about them?.	7

Q.no.	Module 6	Marks
6a	What are the water quality standards for groundwater? Explain the importance of its analysis?	5
	Answer b or c	
b	State and explain the fundamental processes affect the transport of contaminants in ground water??	7
c	What is inverse modelling in ground water contamination? What is its difference from conventional modelling? Explain USGS-MOC model for ground water flow modelling?	7