

Sample problems

Sample Problem 1

A rectangular channel 12 m. wide and a depth of 1.2 m. carries a discharge of $14 \text{ m}^3/\text{s}$.

Coefficient of roughness is 0.017.

- Calculate the slope of the channel.
- Calculate the critical depth.
- Calculate the critical slope.

Solution

(a) Slope of the channel bed:



$$A = 12(1.2) = 14.4$$

$$P = 12 + 2(1.2) = 14.4$$

$$R = \frac{A}{P} = \frac{14.4}{14.4} = 1$$

$$Q = \frac{AR^{2/3}S^{1/2}}{n}$$

$$14 = \frac{14.4(1)^{2/3}S^{1/2}}{0.017}$$

$$S = 0.000273$$

Sample Problem 2

A discharge of $4.53 \text{ m}^3/\text{s}$ in a rectangular open channel 1.82 m. wide with a slope 0.002 and $n = 0.012$. If the channel ends in a free outfall.

- Calculate the depth at the brink y_m .
- Calculate the critical depth.
- Indicate the type of flow.

Solution

Hydrology Problems And Solutions

E. F. Schulz



Hydrology Problems And Solutions:

Groundwater Hydrology Problems with Emphasis on Approximate Computer Solutions Kenneth Runesson, Nils-Erik Wiberg, 1979 *Problems in Applied Hydrology* E. F. Schulz, 1989-06-30 HYDROGEOLOGY: PROBLEMS WITH SOLUTIONS NANDIPATI SUBBA RAO, 2016-12-01

Numerical calculations are inevitably required in the field of hydrogeology and play a significant role in dealing with its various aspects. As often as not, students are seen struggling while solving numerical problems based on hydrogeology as they find difficulty in identifying the correct concept behind the problem and the formula that can be applied to it. Also, there is a dearth of books which help the readers in solving numerical problems of varied difficulty level and enable them to have a firm grounding in the subject of hydrogeology. The book *Hydrogeology Problems with Solutions* fills this void in the finest way and, as desired, chiefly focuses on the sequential steps involved in solving the problems based on hydrogeology. It concisely covers the fundamental concepts, advanced principles, and applications of hydrogeological tasks rather than overemphasising the theoretical aspects. The text comprises sixty solved hydrogeological problems which are logically organised into ten chapters including hydrological cycle, morphometric analysis, hydrological properties, groundwater flow, well hydraulics, well design and construction, groundwater management, seawater intrusion, groundwater exploration, and groundwater quality. The practice of pedagogy of hydrogeology in yesteryears was a two-tier approach of theoretical principles with toy problems and in situ case studies for research start-up. This book bridges the gap between routine problem solving and state-of-the-practice for the future. The book is primarily intended for the undergraduate and postgraduate students of Earth Sciences, Civil Engineering, Water Resources Engineering, Hydrogeology, and Hydrology. It also serves as an excellent handy reference for all professionals.

KEY FEATURES Key Concept succinctly explores the models, methods, and theoretical concepts related to each problem. Necessary equations and formulae are specified. Appendices and Glossary are included, leaving no scope to refer any other book. Bibliography broadens the scope of the book.

On Groundwater Hydrology Problems with Emphasis on Approximate Computer Solutions, 1977

Recent Trends in Hydrogeology Thirupudaimarudhur N. Narasimhan, 1982-01-01 **Notes on Hydrology and the Application of Its Laws to the Problems of Hydraulic Engineering** Daniel Webster Mead, 1904 *Engineering Hydrology* Eric Montgomery Wilson, 1990 *Problem Solving in Engineering Hydrology* Faris Faris, Prof Isam Mohammed Abdel-Magid Ahmed, Mohammed Isam Mohammed Abdel-Magid, 2015-08-13

Objectives of the book are meant to fulfill the main learning outcomes for students registered in named courses which covered the following: Solving problems in hydrology and making decisions about hydrologic issues that involve uncertainty in data, scant incomplete data, and the variability of natural materials; Designing a field experiment to address a hydrologic question; Evaluating data collection practices in terms of ethics; Interpret basic hydrological processes such as groundwater flow, water quality issues, water balance, and budget at a specific site at local and regional scales based on available geological maps and data sets; Conceptualizing hydrogeology of a

particular area in three dimensions and be able to predict the effects on a system when changes are imposed on it Learning outcomes are expected to include the following Overview of essential concepts encountered in hydrological systems Developing a sound understanding of concepts as well as a strong foundation for their application to real world in the field problem solving Acquisition of knowledge by learning new concepts and properties and characteristics of water Cognitive skills through thinking problem solving and use of experimental work and inferences Numerical skills through application of knowledge in basic mathematics and supply issues Student becomes responsible for their own learning through solution of assignments laboratory exercises and report writing Problem solving in engineering hydrology is primarily proposed as an addition and a supplementary guide to fundamentals of engineering hydrology Nevertheless it can be sourced as a standalone problem solving text in engineering hydrology The book targets university students and candidates taking first degree courses in any relevant engineering field or related area The document is valued to have esteemed benefits to postgraduate students and professional engineers and hydrologists Likewise it is expected that the book will stimulate problem solving learning and quicken self teaching By writing such a script it is hoped that the included worked examples and problems will guarantee that the booklet is a precious asset to student centered learning To achieve such objectives immense care was paid to offer solutions to selected problems in a well defined clear and discrete layout exercising step by step procedure and clarification of the related solution employing vital procedures methods approaches equations data figures and calculations The new edition of the book hosted the incorporation of computer model programs for the different hydrological scenarios and encountered problems presented throughout the book Developed programs were coded with Microsoft Visual Basic NET 10 programming language using Microsoft Visual Studio 2010 Professional Edition Most of the examples herein have an equivalent code listed alongside through the text To avoid repetition though some example programs were omitted whenever there was resemblance to another example elsewhere to which the reader is kindly requested to refer to Hydrology Daniel Webster Mead,1919 Hydrologic Issues of the 21st Century, Ecology, Environment and Human Health J. A. Apps,Chin-Fu Tsang,1999 **Curricula and Syllabi in Hydrology** ,1972

Fundamentals of Hydraulic Engineering Systems Robert J. Houghtalen,A. Osman Akan,Ned H. C. Hwang,2010 Fundamentals of Hydraulic Engineering Systems Fourth Edition is a very useful reference for practicing engineers who want to review basic principles and their applications in hydraulic engineering systems This fundamental treatment of engineering hydraulics balances theory with practical design solutions to common engineering problems The author examines the most common topics in hydraulics including hydrostatics pipe flow pipelines pipe networks pumps open channel flow hydraulic structures water measurement devices and hydraulic similitude and model studies Chapters dedicated to groundwater deterministic hydrology and statistical hydrology make this text ideal for courses designed to cover hydraulics and hydrology in one semester **Selected Water Resources Abstracts** ,1972 Physical Problems and Their Solutions Anatole

Alexandre Bourgoignon, 1897 Selected Water Resources Abstracts, 1991 **Quantitative Hydrogeology** Ghislain de Marsily, 1986 This book attempts to combine two separate themes a description of one of the links in the chain of the water cycle inside the earth's crust i.e. the subsurface flow and the quantification of the various types of this flow obtained by applying the principles of fluid mechanics in porous media The first part is the more descriptive and geological of the two It deals with the concept of water resources which then leads us on to other links in the cycle rainfall infiltration evaporation runoff and surface water resources The second part is necessary to quantify groundwater resources It points the way to other applications such as solutions to civil engineering problems including drainage and compaction and transport problems in porous media including aquifer pollution by miscible fluids multiphase flow of immiscible fluids and heat transfer in porous media i.e. geothermal problems However the qualitative and the quantitative aspects are not treated separately but combined and blended together just as geology and hydrology are woven together in hydrogeology **Archives of Medical Hydrology**, 1928 **Ecohydrology of High Mountain Areas** Suresh R. Chalise, 1998 *Transactions of the ASAE*. American Society of Agricultural Engineers, 1987 Soil and water edition of Transactions of the ASAE contains all articles approved by the ASAE Soil and Water Division editor for publication in the general edition and constitutes the Division's Transactions **Hydrogeology in the Service of Man**, 1985

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