

# **CENTRIFUGAL PUMP TEST RIG**

## **(Multistage, Variable Speed, Series & Parallel)**

### **1. OBJECTIVE:**

Study of centrifugal pumps in series & parallel mode.

### **2. AIM:**

2.1 To determine:

2.1.1 Power input

2.1.2 Shaft output

2.1.3 Discharge

2.1.4 Total head

2.1.5 Pump output

2.1.6 Overall efficiency

2.1.7 Pump efficiency

2.12 To plot the following performance characteristics:

2.2.1 Speed vs. Discharge

2.2.2 Head vs Discharge

2.2.3 Pump efficiency vs Discharge

### **3. INTRODUCTION:**

The hydraulic machines, which convert the mechanical energy into hydraulic energy, are called pumps. The hydraulic energy is in the form of pressure energy. If the mechanical energy is converted into pressure energy by means of centrifugal force acting on the fluid, the hydraulic machine is called a centrifugal pump.

### **4. THEORY:**

The centrifugal pump acts as a reverse of an inward radial flow reaction turbine. This means that the flow in centrifugal pumps is in the radial outward directions. The centrifugal pump works on the principle of forced vortex flow, which means that when an external torque rotates a certain mass of liquid, the rise in pressure head of the rotating liquid takes place. The rise in

# Centrifugal Pump Testing Rig Lab Manual

**Michael Hoelscher**



## **Centrifugal Pump Testing Rig Lab Manual:**

**LABORATORY MANUAL HYDRAULICS AND HYDRAULIC MACHINES** R. V. RAIKAR, 2012-09-27 This manual presents 31 laboratory tested experiments in hydraulics and hydraulic machines This manual is organized into two parts The first part equips the student with the basics of fluid properties flow properties various flow measuring devices and fundamentals of hydraulic machines The second part presents experiments to help students understand the basic concepts the phenomenon of flow through pipes and flow through open channels and the working principles of hydraulic machines For each experiment the apparatus required for conducting the experiment the probable experimental set up the theory behind the experiment the experimental procedure and the method of presenting the experimental data are all explained Viva questions with answers are also given In addition the errors arising during recording of observations and various precautions to be taken during experimentation are explained with each experiment The manual is primarily designed for the undergraduate degree students and diploma students of civil engineering mechanical engineering and chemical engineering

**Fluid Mechanics and Machinery : Laboratory Manual** A. B. Shinde, **Laboratory Manual for Groundwater, Wells, and Pumps** Rohitashw Kumar, Vijay P. Singh, Munjid Maryam, 2023-05-23 The over exploitation of groundwater and marked changes in climate over recent decades has led to unacceptable declines in groundwater resources Under the likely scarcity of available water resources in the near future it is critical to quantify and manage the available water resources With increasing demand for potable water for human consumption agriculture and industrial uses the need to evaluate the groundwater development management and productivity of aquifers also increases Laboratory Manual for Groundwater Wells and Pumps serves as a valuable resource and provides a multi disciplinary overview for academics administrators scientists policymakers and professionals involved in managing sustainable groundwater development programs It includes practical guidance on the measurement of groundwater flow soil properties aquifer properties wells and their design as well as the latest state of the art information on pumps and their testing and groundwater modeling Features Covers basics of groundwater engineering advanced methodologies and their applications and groundwater modeling Examines groundwater exploration planning and designing and methods for formulating strategies for sustainable management and development Serves as a reference for practitioners on practical applications and frequently occurring issues of groundwater investigations development and management **Hydraulic Laboratory Manual** Joseph N. Bradley, 1946 **Exercises for the Applied Mechanics Laboratory** John Paul Kottcamp, 1912 **Hydraulic Laboratory Manual** R. G. Folsom, Edson Homer Taylor, 1947 Renewable Energy and Sustainable Buildings Ali Sayigh, 2019-08-30 This book contains selected papers presented during the World Renewable Energy Network's 28th anniversary congress at the University of Kingston in London The forum highlighted the integration of renewables and sustainable buildings as the best means to combat climate change In depth chapters written by the world's leading experts highlight the most current research and technological

breakthroughs and discuss policy renewable energy technologies and applications in all sectors for heating and cooling agricultural applications water desalination industrial applications and for the transport sectors Presents cutting edge research in green building and renewable energy from all over the world Covers the most up to date research developments government policies business models best practices and innovations Contains case studies and examples to enhance practical application of the technologies     **Free Night School of Engineering** Cooper Union for the Advancement of Science and Art. School of Engineering,1928     **Simulators; International Guide** Ralph Albert Collacott,1973     **Catalogue** Kansas State Agricultural College,Kansas State College of Agriculture and Applied Science,Kansas State University,1920

Industrial Engineering and the Engineering Digest ,1911     Bulletin Virginia polytechnic institute, Blacksburg, Va,1912

**Industrial Engineering and the Engineering Digest** Robert Thurston Kent,Charles MacCaughey Sames,1911

**Trends in Educational Activity in the Field of Mechanism and Machine Theory (2018-2022)** Juan Carlos García Prada,Cristina Castejon,Jose Ignacio Pedrero Moya,2023-06-10 This book presents content from the Third International Symposium on the Education in Mechanism and Machine Science ISEMMS 2022 Among others the chapters report on mechanical engineering education mechanism and machine science in the mechanical engineer curricula methodology virtual laboratories and new laws Special attention is given to MMS experiences in Pandemic times The chapters discuss the current problems in MMS education with the aim of providing solutions and identifying appropriate trends for a modern world common vision in the Engineering education field     **Sessional Papers** Great Britain. Parliament. House of Commons,1902

**Fundamentals of Turbomachines** Erik Dick,2022-02-24 This textbook explores the working principles of all kinds of turbomachines The same theoretical framework is used to analyze the different machine types The order in which the different kinds are treated is chosen by the possibility of gradually building up theoretical concepts For each of the turbomachine kinds a balance is sought between fundamental understanding and knowledge of practical aspects Readers are invited through challenging exercises to consider how the theory applies to particular cases This textbook appeals to senior undergraduate and graduate students in mechanical engineering and to professional engineers seeking to understand the operation of turbomachines Readers will gain a fundamental understanding of turbomachines and will be able to make a reasoned choice of a turbomachine for a particular application     **Parliamentary Papers** Great Britain. Parliament. House of Commons,1902     *Nuclear Science Abstracts* ,1975     **Petroleum Register** ,1922     World Petroleum Register ,1922

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