HYDRAULICS & HYDRAULIC MACHINES   (COMMON TO CV/TR/EV)

Written by Administrator

Saturday, 24 October 2009 06:36 -

Sub Code

:

06 CV 45

IA Marks

:

25

Hrs/ Week

:

04

Exam Hours

:

03

Total Hrs.

:

52

Exam Marks

:

100

PART – A

UNIT 1:

FLOW IN OPEN CHANNELS

1.1   Definition of open channels, 1.2 classification, 1.3 difference between pipe flow & open channel flow, 1.4 types of flow, 1.5 Geometric properties of open channels. 1.6 Uniform flow in open channels, 1.7 Chezy's and Manning's formulae. 1.8 Problems on uniform flow, Most economical open channels. 1.9 Derivation of conditions for rectangle, triangle and trapezoidal sections, Problems on most economical sections, Most economical circular channels derivations and problems

7 Hours

UNIT 2:

FLOW IN OPEN CHANNELS

2.1 Specific energy, definitions, specific energy curve, conditions for minimum specific energy and maximum discharge, 2.2 Critical flow in rectangular channels, problems, 2.3 Hydraulic jump in rectangular channels, derivations with Froude number concept, 2.4 Problems on

Hydraulic Jump, venturi flume.

WATER HAMMER IN PIPES

2.5 Definition, Equation for pressure rise due to gradual closure of valves. 2.6 Equation for pressure due to sudden closure of valves in rigid & Elastic pipes, problems, 2.7 Surge tanks, their functions & types.

7 Hours

UNIT 3:

DIMENSIONAL ANALYSIS & MODEL SIMILITUDE

1.1   Introduction to Dimensional Analysis, units & dimensions, table of Dimensions, 3.2 Dimen sional Homogeneity, 3.3 Methods of Analysis (Raleigh's & Buckingham's method, 3.4 Problems on Raleigh's & Buckingham's methods, 3.5 Model Studies, Introduction, comparison with Dimensional Analysis, 3.6 Similitude, Dimensionless parameters. 3.7 Types of models, 3.8 Froude's models theory & problems, 3.9 Reynold's models, Theory

problems, Scale effects

6 Hours

UNIT 4:

IMPACT OF JET ON FLAT VANES

4.1 Introduction to Impulse – momentum equation and its applications, 4.2 Force exerted by a jet on a fixed target, Derivations, 4.3 Force exerted by a Jet on a moving target, Derivations.

6 Hours

PART – B

UNIT 5:

IMPACT OF JET ON CURVED VANES Continued....

5.1 Force exerted by a jet on a series of curved vanes, 5.2 Concept of velocity triangles, 5.3 Equation for work done & efficiency, 5.4 Problems o force exerted by a Jet on a series of curved valves

HYDRAULIC TURBINES (Impulse turbines)

5.5 Introduction, Types and classifications, 5.6 Pelton Wheel, theory, equation for work done and efficiency, design parameters, 5.7 Problems on Pelton Wheel.□□□□□□

6 Hours

UNIT 6:

HYDRAULIC TURBINES (Reaction turbines)

6.1 Francis Turbine – Theory, equation for work done and efficiency, design parameters, 6.2 Problems on Francis turbine, 6.3 Kaplan turbine – Theory, equation for work done & efficiency, Design parameters, 6.4 Problems on Kaplan turbine □□□ □□□□ □□□

6 Hours

UNIT 7:

HYDRAULIC TURBINES (Performance)

6.5 Draft tubes: types, Equation for efficiency problems, 6.6 Cavitations in turbines, Governing of turbines, Governing of turbines, 6.7 Specific speed of a turbine, Equation for the specific speed, problems, 6.8 Unit quantities of a turbine, definitions, equations and problems, 6.9 Characteristics curves of a turbine, general layout of an hydroelectric plant.

7 Hours

UNIT 8:

CENTRIFUGAL PUMPS

8.1 Definition of pump, classification, 8.2 Description & general principle of working, priming & methods, 8.3 Work done & efficiencies of a centrifugal pump, 8.4 Minimum starting speed, 8.5 cavitation in centrifugal pumps, 8.6 Multistage   pumps, 8.7 Problems on Centrifugal pumps

7 Hours

TEXT BOOKS :

1.   **Hydraulics & Fluid Mechanics**, Modi & Seth., Standard Book House, New Delhi

2.   **Fluid Mechanics & Machinery**, Raghunath. H M., CBS Publishers

3.   **Text Book on Fluid mechanics & Hydraulic Machines**, Bansal R.K., Laxmi pulications

REFERENCE BOOKS:

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1. **Fluid Mechanics and Hydraulic Machines**, S.C. Gupta, Pearson Education, India

2. **Elementary Hydraulics' (1st Edition)** James F Cruise, Vijay P. Singh, Mohsan M. Sherif, Thomson Learning.

3. **Hydraulics & Fluid Mechanics**, K.R. Arora, Standard Book house, New Delhi.

1. **Fluid Mechanics and Hydraulic Machines**, S.C. Gupta, Pearson Education, India