TED (15) 4011 Reg.No. …………………

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FOURTH SEMESTER DIPLOMA EXAMINATION IN CIVIL ENGINEERING

MODEL QUESTION PAPER- HYDRAULICS

 (Maximum marks: 100) [Time : 3 hours]

Marks

PART-A

(Maximum marks :10)

I. Answer all questions in one or two sentences. Each question carries 2 marks.

1. Determine the height of an oil column of sp.gravity 0.8 which will cause

 a pressure of 25 kpa.

1. Define the term vena contracta as applied to the flow of water through an orifice.
2. Write down the equation for discharge through a small rectangular orifice.
3. Write down the Basin’s formula for Chezy’s constant C.
4. List any two functions of surge tank in waterway system of hydro-electric power plant.

 (5x2 =10)

PART-B

1. A square plate of 1m side is immersed vertically with its center is 4m below the

 water surface. Find the total pressure and the position of center of pressure.

1. Explain any six classification of fluid flow.
2. Define hydraulic coefficients. Derive an expression connecting cd, cv, cc.
3. Differentiate hydraulic gradient line and total energy line with sketch.
4. Derive the condition for maximum discharge through a channel of Trapezoidal section.
5. Write any six differences between Impulse turbine and Reaction turbine.
6. What is the purpose of air vessel fitted to a reciprocating pump. Explain with neat sketch

 5 x 6=30

Marks

PART-C

(Maximum marks :60)

(Answer one full question from each unit. Each question carries 15 marks)

Unit-1

III (a) Explain with the neat diagrams of simple manometer and differential manometer. 7

 (b) A Differential U-tube manometer connects two pressure pipes A and B. The pipe A contains Carbon tetrachloride having a specific gravity of 1.6 under a pressure of 120kPa.The pipe B Contains oil of specific gravity 0.8 under a pressure of 200kPa.The pipe A lies 2.5m above pipe B . Find the difference in mercury level in the manometers when the left limb mercury level is coinciding with the center of the pipe B. 8

 OR

IV (a) State and prove Bernoulli’s Equation. 7

 (b) A Venturimeter with a 15 cm diameter at inlet and 10cm diameter at throat is laid with its axis horizontal and is used for measuring the flow of oil of specific gravity 0.9.The oil-mercury differential manometer shows a gauge difference of 20cm.Assume coefficient of venturimeter 0.98. Calculate the discharge in litters /min. 8

UNIT-2

V. a) Sketch and classify various types of mouth pieces according to the position, shape and the nature of discharge. 7

 b) A swimming pool of 11 x 7m holds water to a depth of 4.7m. The water is discharge through an orifice provided at the bottom of the pool. If the area of the orifice is 0.3m2,find the time taken to empty the pool. Cd= 0.62 8

OR

VI. a) Derive an expression for loss of head due to sudden enlargement in pipe flow, and therefore deduce the loss due to sudden contraction. 7

 b) With the help of neat sketch explain the working of jet pump. 8

Unit-3

VII. a) What are the advantages of V-notch over a rectangular notch. Also explain why the triangular notch is preferred to measure small quantities of flow of water in laboratory. 7

 b) A trapezoidal notch 60 cm wide at the bottom has side slop 1:1. If the discharge overt the notch be 300litters/sec, determine the head of water over the sill of the notch. Take cd=0.62 8

OR

VIII. a) Derive an expression for finding discharge over submerged weir. 7

 b. Sketch the layout of a typical waterway system of hydro-electric power plant and explain the functions any four components 8

UNIT-4

IX. a) What are the energy losses that occurred in the pipe flow and how they are calculated. 7

 b) A town having a population of 100 000 is to be supplied with water from a reservoir 5km distant and it is stipulated that one half of the daily supply of 150 litters /head should delivered in 8 hours. What must be size of the pipe to furnish the supply, if the head available is 12m? Take C=65 in Chezy’s formula. 8

OR

X. a) Define terms critical depth and critical velocity, Hydraulic mean depth and wetted perimeter, uniform flow and non-uniform flow. 7

 b) A trapezoidal channel having a bed slop of 1:1000 has to discharge water at the rate of 2.5m3/s. If the channel has a side slop of @ 45o and Chezy’s constant C=50. Find the bottom width and depth of the channel. 8

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