Gujarat Technological University 2010 Diploma Hydraulics Question paper

Q.1 (a) Define
(1) Ideal Fluid (2) Specific weight (3) Hydraulics (4) Notch (5) Viscosity
05

(b) Convert following:
1 300 cm of oil (sp. Gr. 0.8) head in head of water 05
2 0.15 kg/cm2 vacuum pressure into absolute pressure

(c) Explain the working of Bourden's Pressure gauge using a neat sketch 04

Q.2 (a) A circular plate 2.5m diameter is immersed in water its greatest and lowest depth below the free surface being 3.0m and 1.0m respectively find:
(1) Total pressure on one face of the plate
(2) The position of centre of pressure
07

(b) Differentiate between reciprocating and centrifugal pumps. 07
OR
(b) Write main components of centrifugal pumps and mention their purpose. 07

Q.3 (a) State and explain the Bernoulli's equation with its assumption. 05
(b) A venturimeter 15cm x 7.5cm used to measure the flow of an oil of sp. Gr. 0.9 A differential oil mercury manometer connected to inlet and throat gives reading of 17.5cm of mercury. Determine discharge through pipe in liters/sec. Assume Cd = 0.97
05

(c) A jet of water issue from 25mm diameter a sharp edged vertical orifice under a constant head of 1.0m at certain point, has the horizontal and vertical co-ordinates measured from vena contracts as 35cm and 3.5cm
respectively. If the rate of discharge is 0.00135m3/sec then find values of Cc, Cv and Cd.
04

OR

Q.3 (a) List out various apparatus working on Bernoulli's equation and explain anyone with sketch.
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(b) Prove Bernoulli's equation. 05

(c) Define: (1) Co-efficient of contraction (2) Co-efficient of velocity 04

Q.4 (a) Determine discharge for trapezoidal channel having 3.0m bed width and slide slope 1.5:1 when it carries water up to depth of 80cm, it has bed slope of 1 in 900, value of manning's 0.03.
05

(b) The discharge through a rectangular channel 6.0m wide is 12m3/sec, when depth of flow is 1.0m calculate:
(1) Specific energy of flow
(2) Critical depth and critical velocity for this discharge
(3) Value of minimum specific energy for this discharge
(4) Type of flow