

Bharati vidyapeeth Institute of Technology

Question Bank (I-Scheme)

Name of the subject - Hydraulics (22401)

Unit test -2

Course - CE 4I

Chapter 4 (Flow through pipes)

(2 Marks)

- a) State the principle of venturimeter.
- b) What are major and minor loss of head in flow through pipes
- c) Find the discharge flowing through a pipe of 10 cm dia and velocity is 1 m/sec
- d) State the Darcys Weisbach equation for frictional loss in pipe
- e) State any two causes of water hammer.
- f) State two uses of Syphon
- g) Enlist any two factors on which friction coefficient 'F' depends.

(4 Marks)

- a) State the causes and remedial measures of water hammer in pipes.
- b) Water is flowing through a rectangular channel of width 5 m and bed slope 1 in 1200. Depth of flow is 1.75 m. Find the discharge through the channel. Take $c=50$.
- c) What is most economical channel section? Write conditions for rectangular channel section to be economical.
- d) Water discharge at the rate of $0.09 \text{ m}^3/\text{sec}$ through 10 cm diameter vertical sharp edged orifice placed under a constant head of 8 m. A point on the jet measured from vena contracta of the jet has co-ordinates 4.5 m horizontal and 0.54 m vertical. Find the coefficients C_c , C_d and C_v of the orifice.
- e) What are major and minor loss of head in flow through pipes? Write any two equations of minor loss.
- f) Find the discharge through the pipeline 20 cm in diameter and 1500 m long . The drop in water level is 10 m. Assume $F = 0.02$. Also draw TEL.

- g) A 15 cm diameter pipe suddenly enlarge to 20 cm diameter. Calculate discharge through pipe if loss of head due to sudden enlargement is 30 cm of water
- h) Explain with sketch working of syphon pipe
- i) (i) Explain Dupuit's equation for equivalent pipes.
(ii) Define Moody's diagram with its use
- j) State the classification of losses in pipe with suitable sketches and equations for each.

UNIT -5 (Flow through Open Channel)

(2 marks)

- a) State any two uses of pitot tube.
- b) Define Hydraulic mean depth and its Units.
- c) Enlist any four velocity measuring devices for channels
- d) Define i) Wetted perimeter ii) Hydraulic Radius
- e) Define hydraulic jump and state its two applications

(4 Marks)

- a) State with sketch different shapes of Artificial channels. Give the formula for wetted area, wetted perimeter for any two
- b) Determine the most economical section of a trapezoidal channel for carrying discharge 15 m³/sec with bed slope of 1:4500. The side slopes are 4H:3V. Take Manning's constant 0.015.
- c) A trapezoidal channel of most economical section has side slopes 1.5 (horizontal): 1 (vertical). It is required to discharge 15 m³ of water per second with a bed slope of 0.5 metre in 3 km. Design the section using Manning's formula. Take coefficient of roughness as 0.015
- d) A triangular notch of angle 120° is used to measure the discharge. Determine the head over the notch, if discharge is 1500 lts/minute. Assume $C_d = 0.6$.
- e) Draw a neat sketch of cup type current meter and explain its working
- f) Differentiate any four points between notch and weir

Unit -6 (Hydraulic pump)

- a) Define suction head and delivery head with diagram.
- b) Define – Static head and Manometric head

(4 Marks)

- a) Differentiate Reciprocating pump with centrifugal pump.
- b) Calculate the power of the pump from following data. (i) Total Static lift = 25 m (ii) Diameter of suction pipe = 12 cm (iii) Diameter of delivery pipe = 10 cm (iv) Length of suction pipe = 5 m (v) Length of delivery pipe = 50 m (vi) $f = 0.03$ for both pipes (vii) $Q = 30$ lit/sec. (viii) Efficiency = 85%
- c) Differentiate between turbines and pumps on any two factors.
- d) A centrifugal pump is required to pump 15 lit/sec against head of 32 m. Find the power required by the pump taking overall efficiency 75%.
- e) Explain with sketch working of centrifugal pump.