

**4<sup>TH</sup> SEM./CIVIL/2022(S)**  
**Th2      Hydraulics and Irrigation Engineering**

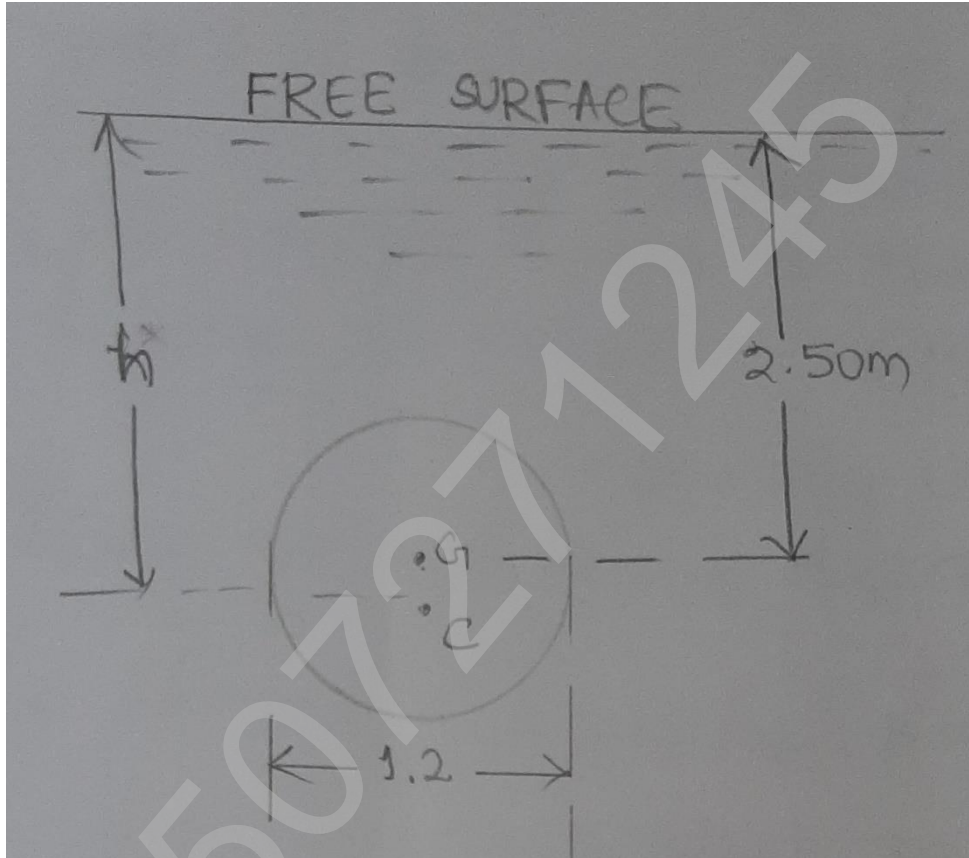
Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2  
Figures in the right hand margin indicates marks

1.      Answer **All** questions 2 x 10
  - a. List out different types of rain gauges.
  - b. What do you mean by gross command area.
  - c. Write two benefits of irrigation.
  - d. What is an aqueduct.
  - e. Define spillway.
  - f. Define viscosity and its unit in C.G.S system.
  - g. What is the difference between laminar flow and turbulent flow.
  - h. Write down Darcy – Weisbach and Chezy's formula.
  - i. Differentiate between notch and weir.
  - j. Define duty of irrigation water.
  
2.      Answer **Any Six** Questions 6 x 5
  - a. Define base, delta and duty and derive the relationship between them.
  - b. Write different types of canal lining. What are the advantages and disadvantages of canal lining.
  - c. Write down the effects of water logging.
  - d. Derive continuity equation.
  - e. Find the loss of head due to friction in a pipe of 1 metre diameter and 15 km long. The velocity of water in the pipe is 1 meter/sec. Take coefficient of friction as 0.005.
  - f. What are the causes of failure of gravity dam.
  - g. The diameter of a pipe at sections 1-1 and 2-2 are 200 mm and 300 mm respectively. If the velocity of water flowing through the pipe at section 1-1 is 4 m/sec. Find discharge through the pipe and velocity of water at section 2-2.
  
- 3      Explain the types of cross drainage work with neat sketch. 10
- 4      Name the component parts of the diversion head works and state their functions. 10
- 5      What is a reciprocating pump? Describe the principle and working of a reciprocating pump with neat sketch. 10

- 6 Figure shows a circular plate of diameter 1.2 m placed vertically in water in such a way that the centre of the plate is 2.5 m below the free surface of water. Determine
- (i) Total pressure on the plate
  - (ii) Position of centre of pressure.



- 7 The water is flowing through a taper pipe of length 100 m having diameters 600 mm at the upper end and 300 mm at the lower end, at the rate of 50 litres/sec. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62N/cm<sup>2</sup>.