MODEL QUESTION

MANMOHAN TECHNICAL UNIVERSITY
OFFICE OF THE CONTROLLER OF EXAMINATIONS
2080, Jestha

Level: Bachelor **Year/Part: II/II**
Faculty: School of Engineering **F.M.: 50**
Program: Civil Engineering **P.M.: 20**
Subject: Hydraulics (E552CE) **Time: 3 Hours**

Group A (Attempt ALL Questions:) [10*1=10 marks]

Instructions:

- Choose one answer out of four options.
- Use black ball pen for shading only one circle for correct option of a question in Answer Sheet which you have provided.
- No mark will be awarded for cutting, erasing, over writing and multiple circles shading

1. Blood Circulation in the human body is an example of
   a. Turbulent Flow b. Laminar Flow c. Steady Flow d. None of them

2. The value of Korman Constant is
   a. 0.2 b. 0.3 c. 0.4 d. None of them

3. Laminar Flow change into Turbulent Flow when
   a. Velocity is increased b. Viscosity of fluid is decreased
   c. Diameter of pipe is increased d. All of them

4. In turbulent flow, shear stress is developed due to transfer of
   a. Momentum b. Density
   c. Viscosity d. None of them

5. Absolute pressure at summit of siphon should not be less than
   a. 2m of water b. 2.5m of water
   c. 3m of water d. None of them

6. Which of the flow type in open channel is practically not possible
   a. Steady uniform flow b. Steady Non-Uniform flow
   c. Unsteady uniform flow d. None of them

7. If Froude number (F_r) < 1 means
   a. High velocity, small depth b. High velocity, large depth
   c. Low velocity, large depth d. None of them

8. Head loss in pipe due to friction is calculated by
   a. Hagen-Poiseuille Equation b. Prandtl's Equation
   c. Darcy Weisbach Equation d. All of them

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9. The relation between Shear velocity (U_*) and Shear stress (τ_o) is
   a. $U_* = \sqrt{\frac{\tau_o}{\rho}}$ b. $U_* = \sqrt{\frac{\rho}{\tau_o}}$
   c. $U_* = \sqrt{\tau_o} * \rho$ d. None of them

10. Most efficient hydraulics channel section means
    a. Least wetted perimeter b. Maximum conveyance capacity
    c. Least construction d. All of them

Group B (Attempt any eight questions) [8*2=16]

1. Write down the characteristics of Laminar flow?
2. Define Hydraulics?
3. What do you mean by hydrodynamically "rough pipe" and "smooth pipe"?
4. What is Prandtl's Mixing Length?
5. What are minor losses in pipe flow?
6. What is Water Hammer?
7. What do you understand by an open channel?
8. Define Unsteady flow in pipes?
9. Write down the major functions of Surge tank?

Group C (Attempt any six question) [6*4=24]

1. A fluid of viscosity 0.9 N/m^2 and specific gravity 1.25 is flowing through a circular pipe of diameter 15cm. The maximum Shear Stress id given as 195.0 N/m^2. Calculate;
   a. Pressure Gradient
   b. Mean Velocity
   c. Reynold's Number

2. What power is needed per Km length of pipe to maintain a flow of 600 Litre/sec water in a 60 cm diameter rough pipe. Take K to be 0.30 cm

3. Following figure shows two pipes connected in parallel conveying a total discharge of $3m^3$/sec. Calculate the discharge in each pipe.

Pipe	Length (m)	Diameter (m)	Friction Factor
Pipe A	1500m	1.25	Take Friction Factor (f) = 0.02 for all pipe
Pipe B	1700m	10	

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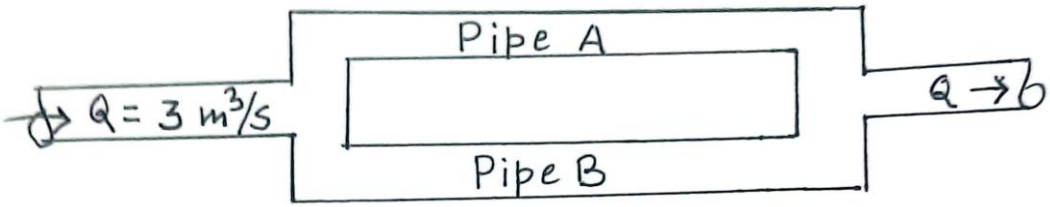
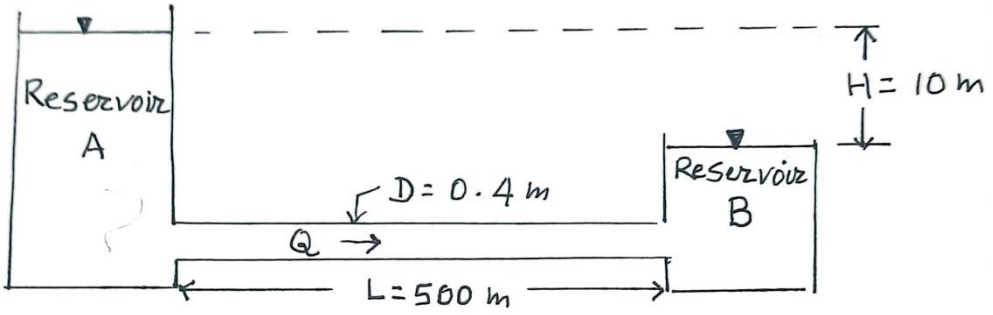


4. Two reservoirs are connected by a pipe of length of 500 m having a difference in elevation of 10m. If the diameter of pipe is 0.4m and friction factor is 0.03. Calculate the rate of flow.



5. A trapezoidal channel with a bottom width of 25 m and the side slope 1:1 (H : V) has a bed slope of 1 in 4000. If it is lined with cement concrete, what is carrying capacity at a normal depth of 3.0 m (Take manning's , n= 0.015)

6. A trapezoidal channel with a bottom width of 6.0 m and side slopes of 1:1. If the depth of flow is 1.5 m at a discharge of 15 m^3/sec. Determine the specific energy and the critical depth

7. Draw surface flow profiles and name them (Any two)