Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

CM-4003-CBGS

B.E. IV Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Fluid Mechanics

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.

1. In a certain application a siphon must gooner a high wall. Can water or oil which a specific gravity of 0.8 go over a higher wall? Why?

2. Consider the following steady, two-dimensional velocity field:

   $$\bar{v} = (u, v) = \left(a^2 - (b - cx)^2\right)\bar{i} + \left(-2cby - 2c^2xy\right)\bar{j}$$

   Is there a stagnation point in this flow field? If so, where is it?

3. Derive the Bernoulli's equation. State the assumptions made for a such derivation and write its application.

4. The head of water over an orifice of diameter 40mm is 10m. Find the actual discharge and actual velocity of the jet at vena-contracta.
   Take $C_d = 0.6$ and $C_v = 0.98$

5. Define the following and give one practical example for each
   i) Laminar flow
   ii) Steady flow, and
   iii) Uniform flow

6. Given the steady two-dimensional velocity distribution $u = kx$, $v = ky$, $w = 0$ where k is a positive constant, compute and plot the streamline of the flow including directions and give some possible interpretations of the pattern.

7. Show that for laminar flow in pipes, the average velocity is precisely one-half of the maximum velocity.

   OR

   Explain mathematically
   i) Friction factor
   ii) Loss of head due to pipe fittings

8. Write short notes on: (any two)
   i) Pitot tube and Prandtl tube
   ii) Fluidized bed and packed bed
   iii) Power and head requirement for pumps
   iv) Equation of continuity

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