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**CM-226-CBCS**

**B.E. IV Semester**

Examination, June 2020

**Choice Based Credit System (CBCS)**

**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 go over a high wall. Can water or oil which has a specific gravity of 0.8 go over a higher wall? Why?
2. Consider the following steady, two-dimensional velocity field:  
$$\vec{v} = (u, v) = (a^2 - (b - cx)^2)\vec{i} + (-2cby - 2c^2xy)\vec{j}$$

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

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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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