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Total No. of Questions : 09]   [Total No. of Pages : 02

B.Tech. (Sem. - 4th)
FLUID MECHANICS - I
SUBJECT CODE : ME - 206
Paper ID : [A0810]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours   Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section - A

Q1)   (10 × 2 = 20)

   a) What is kinematic viscosity?

   b) Differentiate between ideal and real fluid.

   c) What do you understand by centre of pressure?

   d) Define convectional and local accleration.

   e) How is circulation defined?

   f) Define free vortex flow.

   g) What are the uses of dimensional analysis?

   h) Write the characteristics of laminar flow.

   i) What is the use of orifice meter?

   j) What do you understand by hydraulic gradient line?

Section - B

                                                 (4 × 5 = 20)

Q2) A stone weighs 392.4 N in air and 196.2 N in water. Compute the volume of stone and its specific gravity.

Q3) How will you determine the velocity at any point with the help of pitot tube? Explain.

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Q4) Explain fundamental quantities. derived quantities and repeating variables.

Q5) Explain the significance of K.E. correction factor.

Q6) Given that $u = -4ax(x^2 - 3y^2)$

$v = 4ay(3x^2 - y^2)$

Examine whether these velocity components represent a physically possible two dimensional flow; if so whether the flow is rotational or irrotational?

Section - C

$(2 \times 10 = 20)$

Q7) Derive the continuity equation in cartesian co-ordinates.

Q8) A pipe of diameter 20cm and length 10^4 m is laid at a slope of 1 in 200. An oil of specific gravity 0.9 and viscosity 1.5 poise is pumped up at the rate of 20 liters per second. Find the head lost due to friction. Also calculate the power required to pump the oil.

Q9) Write notes on :

(a) Buckingham's Pi method.

(b) Rotational flows.

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