

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Agriculture Engg.) (Sem.-6)
FLUID MECHANICS AND OPEN CHANNEL HYDRAULICS

Subject Code : BTAG603-19

M.Code : 91601

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define ideal fluid.
- b) State Pascal's law.
- c) State different types of fluid flow.
- d) Write continuity equation in polar coordinates.
- e) Classify weirs according to the shape of crest.
- f) What do you mean by dimensional homogeneity and what are its applications?
- g) Classify notches according to shape of opening.
- h) Define stream line, path line and streak line.
- i) Define Euler number.
- j) What are the various flow measurement devices?

SECTION-B

2. Derive an expression to find meta-centric height of ship analytically.
3. Determine the centre of pressure and total pressure on an isosceles triangle plate of base 4 metre and altitude 4 metre when it is immersed vertically in an oil of specific gravity 0.9. The base of the plate coincides with the free surface of oil.
4. The pressure difference in a pipe of diameter D and length l due to turbulent flow depends upon the velocity V , viscosity, density, and roughness k . Using Buckingham's pi theorem obtain an expression for pressure difference.
5. Derive Euler's Equation of motion.
6. Calculate (a) pressure gradient along the flow (b) average velocity (c) the discharge for the oil of viscosity 0.02 Ns/m^2 flowing between two stationary plates 1 metre wide maintained 10 mm apart. The velocity midway between the plates is 2 m/s .

SECTION-C

7. Explain the classification orifices and mouthpieces based on their shape, size and sharpness.
8. Derive Darcy equation for major hydraulic losses in pipes.
9. A sharp crested rectangular weir of 1 metre height extends across a rectangular channel of 3 metre width. If the head of water over the weir is 0.45 metre, calculate the discharge. Consider velocity of approach and assume $C_d = 0.623$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.