

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-4)
FLUID MECHANICS
Subject Code : BTME-403
M.Code : 59131
Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION 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. Answer briefly :

- a) Define specific weight and state its units.
- b) Define surface tension and write the formula for hollow bubble.
- c) State the different types of fluid flow.
- d) Define Newtonian fluid and Mach number.
- 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 Weber number.
- j) Define impulse-momentum equation.

SECTION-B

2. Derive an expression for the force exerted on a submerged inclined plane surface by the static liquid and locate the position of centre of pressure.
3. A stream function is given by $5x - 6y$. Calculate the velocity components and also, magnitude and direction of the resultant velocity at any point.
4. The efficiency of a fan depends upon density, dynamic viscosity of fluid, angular velocity, diameter of the rotor and discharge. Using Buckingham's pi theorem obtain an expression for efficiency.
5. Derive Euler's Equation of motion.
6. Calculate the density, specific weight and weight of one litre of petrol of specific gravity 0.7.

SECTION-C

7. A body has the cylindrical upper portion of 3 metre diameter and 1.8 metre deep. The lower portion is a curved one, which displaces a volume of 0.6 m^3 of water. The centre of buoyancy of the curved portion is at a distance of 1.95 metre below the top of the cylinder. The centre of gravity of the whole body is 1.20 metre below the top of the cylinder. The total displacement of water is 3.9 tonnes. Find the meta-centric height of the body.
8. Derive Darcy equation for major hydraulic losses in pipes.
9. Derive equation and explain with a neat sketch
 - a) V-Notch.
 - b) Venturimeter.

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.