

**B. SC. (APPLIED SCIENCE  
ENERGY) (BSCAEY)  
Term-End Examination  
June, 2026**

**BEY-003 : FLUID MECHANICS**

*Time : 3 Hours*

*Maximum Marks : 70*

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**Note :** *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is allowed. Assume missing data suitably.*

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1. (a) Define and explain the concept of viscosity. Differentiate between dynamic and kinematic viscosity. 5
- (b) Explain the concept of compressibility in fluids. Derive the equation for the Bulk Modulus of Elasticity. 5

2. (a) Differentiate between streamline, streak line and path line with the help of diagrams. 5
- (b) State and derive the continuity equation for an incompressible fluid. 5
3. (a) Define an ideal fluid and explain its properties. With the help of examples differentiate it from real fluid. 5
- (b) Explain the concept of circulation and irrotational flow in ideal fluids. 5
4. (a) A rectangular gate of width 2 m and height 3 m is submerged vertically in water. The top of the gate is 1 m below the water surface. Determine the total hydrostatic force acting on the gate. 5
- (b) Define Buoyancy. Derive the expression for a Buoyant force. 5
5. (a) Prove that Bernoulli's equation is dimensionally homogenous. 5
- (b) With an example of a nozzle flow analysis, explain the concept of control volume. 5

6. (a) How does a pitot tube use Bernoulli's equation to measure fluid velocity ? Explain. 5
- (b) Explain the application of Euler's equation in hydrostatics. 5
7. (a) Derive the momentum equation for fluid flow and explain its applications. 5
- (b) Explain the concept of Drag force on an Immersed Body and its types. 5
8. (a) What is a Single Tank ? Why is it used in Hydraulic Systems ? Explain. 5
- (b) What is Reynolds Number ? How does it determine flow transition ? Explain. 5
9. (a) Explain the concept of Boundary Layer. Discuss its relation to Boundary resistance. 5
- (b) What are the Energy Line (Energy Grade Line) and Hydraulic Grade Line ? Explain their significance. 5

10. Write short notes on any *two* of the following : 5+5

- (a) Model Similitude
- (b) Pitot Tube
- (c) Water Hammer
- (d) Head loss in pipe fittings

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