

**(Three Hours)****80 Marks**

N.B. (i) Attempt any **Four** Questions out of **Six** Questions

(ii) Assume suitable data if necessary and state it clearly

(iii) Illustrate with figures whenever necessary

**1** Write a short note on following **[20]**

- a) Natural and artificial open channels
- b) Scope of Fluid Mechanics
- c) Significance of Specific energy Curve
- d) Reynold's transport theorem
- e) Examples of fluid mechanics in day to day life

**2** (a) A trapezoidal channel having bottom width 10m and side slope 1:1, carries a discharge of  $100 \text{ m}^3/\text{s}$ . Find conjugate depth to initial depth of 0.75m before the jump. Also determine loss of energy in the jump. **[10]**

**2** (b) A 18m wide rectangular channel with  $S_0 = 0.00016$  and  $n = 0.014$ , carries flow at uniform depth of 2.0m, if depth of flow is changed to 12m, by constructing a dam, find how far u/s will the depth be 2.5m? Use step method, state type of profile. **[10]**

**3** (a) Derive an expression for gradually varied flow in channel. **[10]**

**3** (b) Write any ten examples related to boundary layer theory. **[10]**

**4** (a) Write any one case study related to any topic in fluid mechanics **[10]**

**4** (b) Explain Prandtl's mixing length theory **[10]**

**5** (a) Give any five examples (each) for viscous flow and compressible flow **[10]**

**5** (b) Explain phenomenon of boundary layer separation and what are different methods of preventing it **[10]**

**6** (a) What are basic principal and assumptions in gradually varied flow **[10]**

**6** (b) Write a note on pollutant transfer in open channel **[10]**