

**MA/MSCMT-07**  
**December – Examination 2020**  
**M.A./M.Sc. (Final) Examination**  
**MATHEMATICS**  
**(Viscous Fluid Dynamics)**  
**Paper : MA/MSCMT-07**

*Time : 2 Hours ]*

*[ Maximum Marks : 80*

---

*Note* :- The question paper is divided into two Sections A and B. Write answers as per the given instructions.

**Section–A**

**8×2=16**

**(Very Short Answer Type Questions)**

*Note* :- Answer all questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 2 marks.

1. (i) Define Ideal Fluid.

- (ii) Define Thermal Diffusivity.
- (iii) State Kelvin's circulation theorem.
- (iv) Define Reynold's number.
- (v) Define Boundary layer.
- (vi) Define Rayleigh problem.
- (vii) Write the Stokes' equation for slow motion.
- (viii) Define displacement thickness ' $\delta_1$ '.

**Section-B**

**4×16=64**

**(Short Answer Type Questions)**

*Note* :- Answer any *four* questions. Answer should not exceed **200** words. Each question carries 16 marks.

- 2. Write a short note on 'Stress in a fluid in motion'.
- 3. Write short notes on the following :
  - (i) Specific heat
  - (ii) Generalised law of heat conduction
- 4. Discuss plane Couette flow.
- 5. Formulate the Stokes' first problem along with the equation of motion and boundary conditions.

- 6. Discuss the flow of viscous incompressible fluid between two porous plates.
- 7. Write a short note on Stokes' stream function and its physical significance.
- 8. Discuss physical significance as well as applications of boundary layer theory.
- 9. Write a short note on thermal boundary layer.